A CATALOGUE OF STANDARDIZED CHROMATOGRAPHIC DATA AND BIOSYNTHETIC RELATIONSHIPS FOR LICHEN SUBSTANCES

Third Edition

By
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Canberra

12 September 2014
Synopsis

The third edition of the Catalogue incorporates thin layer chromatographic and high performance liquid chromatographic data for 854 lichen substances (compared with the 605 substances included in the second edition published in 1993). The additional lichen substances have been reported and characterized in the intervening 20 year. Relative thin layer chromatographic $R_F$ values in seven standard solvent systems, the colour of the developed TLC spots under visible and ultraviolet light, as well as the results of thalline spot tests are reported. Qualifying information includes a list of biosynthetically related compound for each substance, the molecular ion and three major peaks in the mass spectrum (where available), high performance liquid chromatographic RI values and the substance class. In addition, entries in this edition include a leading reference (or references) for each substance as well as a natural lichen source.


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Introduction

The application of chemical discriminators to lichen taxonomy began inadvertently when thallus colour was accepted as a valid generic or specific character. Hence, the grey genus *Physcia* (containing the colourless substance atranorin in the cortex) was segregated from the superficially similar yellow-orange genus *Xanthoria* (containing cortical parietin, an orange anthraquinone pigment). Similarly, *Parmeliopsis ambigua* (Wulfen.) Nyl. (with a yellow thallus due to the presence of usnic acid) was separated from *P. hyperopta* (Ach.) Arnold (grey with atranorin). Nevertheless, most lichen substances are colourless and can be detected only by indirect means.

The first chemical tests conducted on lichen thalli for taxonomic purposes were carried out by Nylander in the 1860s (Nylander 1866). He detected the presence of various lichen substances by spotting chemical reagents directly on the lichen thallus (spot tests) to produce characteristic colour changes: iodine solution (I; blue with certain polysaccharides), potassium hydroxide solution (K; distinctive colours with quinones, some depsides and depsidones) and calcium hypochlorite solution (C; pink or red with some depsides). Further test reagents followed: KC (K solution followed by C) and CK (with reverse addition). Nylander utilised the characteristic medullary and cortical reactions as a specific character, but the origin of these characteristic colour reactions remained unknown.

The first serious chemical investigations were conducted by Zopf, culminating in his publication of ‘Die Flechtenstoffe’ in 1907 (Zopf 1907) with the description of over 150 lichen compounds. However, the ultimate structural elucidation of many common lichen metabolites came from to the meticulous pioneering work of Asahina and co-workers in Japan in the 1930s (see Asahina & Shibata 1954). This laid the foundation for further research on these compounds.

More recent workers in this field have included Huneck in Germany, C. F. & W. L. Culberson in the USA, Tabacchi in Switzerland, Elix and co-workers in Australia, Wilkins in New Zealand and Garbarino and colleagues in Chile (see Huneck & Yoshimura, 1996). Normal methods of organic structure determination are utilized, but the development of $^{13}$C and $^1$H n.m.r. spectroscopy, mass spectrometry and X-ray crystallography have greatly aided structural studies. However, from the viewpoint of most lichenologists, the development of microchemical detection methods has been far more important. Asahina developed an additional spot test reagent (P or PD, an alcoholic solution of $p$-phenylenediamine) and, more importantly, a microcrystallization technique for more definitive recognition of individual lichen acids on a routine basis. This involved extraction of a lichen fragment with acetone; evaporation of the solvent and recrystallization of the remaining residue from a suitable
solvent – all conducted on a microscope slide. A particular lichen substance crystallized in a distinctive shape and colour and was identified by comparison with photographs of authentic materials. This method has been superseded by more accurate and sensitive chromatographic methods.

Subsequently, the techniques of paper chromatography and, particularly, thin layer chromatography (TLC) have greatly improved the speed and certainty of recognition of lichen substances by means that are simple to use and relatively inexpensive. Standardised methodology and further refinements of analytical TLC procedures for detecting and comparing lichen metabolites have been reported by C. F. Culberson and colleagues (Culberson 1972; Culberson & Ammann, 1979; Culberson, Culberson & Johnson 1981; Culberson & Johnson 1982). Furthermore, two dimensional TLC has considerably improved R_F discrimination of structurally similar compounds and has enabled the identification of minor constituents present in complex mixtures (Culberson & Johnson 1976). More recently still, high performance liquid chromatography (HPLC) also has been employed as an effective analytical tool for the separation and identification of lichen substances. An added advantage of this technique is that it yields quantitative information about the components present in the total lichen extracts. At present, a disadvantage of the HPLC system is the expense of the equipment and purified solvents, placing it beyond the reach of more modest institutions and routine chemotaxonomic investigations. Consequently, TLC remains the most readily accessible and widely used method for identifying lichen metabolites routinely. As chemical investigations now form an integral part of all serious taxonomic studies on lichen-forming fungi, inevitably even the more experienced lichenologist encounters TLC spots that are unfamiliar and difficult to identify.

In an effort to make most of literature information on standardized TLC R_F values and spot colour characteristics more readily accessible, and to keep such a library of information current as many more lichen metabolites are identified and characterized, databases suitable for storing such information have been prepared. The data has been manipulated on the computer by search programs (Mactabolites: Elix, Johnston & Parker 1987; Wintabolites: Mietzsch, Lumbsch & Elix 1993) which operate on experimentally observed R_F values and TLC spot characteristics to search the database and generate a list of possible identities for the observed spot. The data presented in this Catalogue includes the information contained in those databases as well as information on more recently characterized lichen metabolites.
The Data Set

Listed along with the name of each lichen substance is the following information (where available and/or appropriate)

1) The RF values of the compound in six or seven standard solvent systems
   A, toluene/ dioxane/ acetic acid (180: 45: 5)
   B, hexane/ diethyl ether/ formic acid (130: 80: 20)
   B', hexane/ methyl tert-butyl ether/ formic acid (140: 72: 18)
   C, toluene/ acetic acid (170: 30)
   E, cyclohexane/ ethyl acetate (75: 25)
   F, cyclohexane/ ethyl acetate (50: 50)
   G, toluene/ ethyl acetate/ formic acid (139: 83: 8).
2) Whether the TLC spot is coloured in visible (natural) light and/or detectable in short wavelength ultraviolet light
3) The colour of the TLC spot in visible (natural) and long wavelength ultraviolet light after spraying with \( \text{H}_2\text{SO}_4 \) and charring
4) The colour of the TLC spot after spraying with Archer’s solution
5) The results of medullary spot tests with K, C, KC, PD (when a compound gives a K+ or C+ reaction, then KC has been omitted, unless a different colour is produced by KC)
6) Three major peaks in the mass spectrum plus the molecular ion (if observed)
7) Up to ten biosynthetically related compounds
8) Notes: a one hundred long character message containing additional information regarding the characteristics of the particular substance.

The TLC Method

The basic methodology has been described in detail by Culberson and Kristinsson (1970), Culberson (1972), Culberson and Ammann (1978), and White and James (1985) and was used with minor modifications (detailed below). In particular, we have introduced new solvent systems (25% ethyl acetate/cyclohexane and 50% ethyl acetate/cyclohexane) and the measurement of relative RF values (rather than absolute RF values or RF classes).

The Plates

Merck silica gel 60 F_{254} pre-coated glass-backed TLC plates were used (layer thickness 0.25 mm) and were stored in a dry cupboard over self-indicating silica gel, but were not activated. Culberson (1972) recommended the trimming of 20 × 20 cm plates to 20 × 12.5 cm and only eluting to a height of 10 cm (the level of the solvent front). We consistently find that better
resolution of spots is obtained if the full $20 \times 20$ cm (or alternatively $10 \times 20$ cm) plate is used, and elution continued to the top of the plate (i.e. approximately 18 cm). For solvent E, elution to a height of 10 cm is quite adequate. In all solvent systems the spots were placed 1 cm apart, 2 cm above the base and beginning 2 cm from the edge of the plate (to avoid edge effects). After elution the plate is air-dried for approximately 30 minutes in a well-drafted fume cupboard before viewing under ultraviolet light, spraying, etc.

**Extraction of the Lichen Material**

Our normal procedure is to soak the lichen fragments in c. 1 ml of acetone for 5 minutes in a small test tube and then boil the solution to concentrate the original 1 ml of acetone to approximately 0.1 ml. This concentrated solution is then used for spotting on the TLC plate using a capillary tube – several times if necessary. It is advisable to view the plate under short wavelength ultraviolet light before proceeding in order to ascertain whether the spots are sufficiently intense; if not, further spotting may be necessary.

**Solvents**

Culberson’s improved standardized method (Culberson 1972) used the three solvents A, B and C, constituted as detailed above, and these are still widely used in routine analyses.

We find that solvent C provides the best discrimination of lichen substances, and it is particularly stable and reliable.

Solvent A also is very useful, but as dioxane is hygroscopic, it gradually absorbs water, and $R_F$ values obtained with ‘aged’ mixtures are unreliable and a secondary solvent front can develop.

The standard solvent B is reliable *provided* the solvent is replaced at frequent intervals, but the actual frequency depends on the atmospheric conditions and the number of chromatograms run.

In our experience the substitution of methyl $t$-butyl ether (solvent B’) significantly improves the reliability and stability (lasting up to 4–5 days) of this comparable mixture. We now routinely use this in preference to standard solvent B (which rarely lasts beyond 6 hours).

**Note:** methyl $t$-butyl ether is a potent allergen.

Solvent C (Culberson, Culberson & Johnson 1981) is a very stable and reliable eluant and is particularly useful in separating compounds with relatively low $R_F$ values in solvents A, B, B’, and C ($\beta$-orcinol depsidones, secalonic acids and hopane triterpenoids).

Solvent E (25% ethyl acetate / 75% cyclohexane) and Solvent F (50% ethyl acetate / 50% cyclohexane) have been developed to discriminate non-polar derivatives and those compounds with very high $R_F$ values in solvents A, B, B’, and C (esters such as atranorin, chloroatranorin, pannarin, physciosporin, usnic acid, terpenes, xanthones and other pigments).
These solvents are prepared fresh daily.

**Equilibration and Elution**

When using solvent A, B or B’ a filter paper should be placed at the back of the tank and saturated with the solvent; the TLC plate is then placed in the tank with the silica-side facing the filter paper. This helps achieve uniform vapour saturation of the solvent throughout the tank and assures an even running of the solvent front. If a lower secondary solvent front is observed to develop, this indicates that the solvent mixture is wet and should be discarded and replaced.

When using solvents B, B’ and C, it is important to ‘pre-equilibrate’ the plate with 60% formic acid vapour (for solvents B, B’) or glacial acetic acid vapour (for solvent C) before proceeding with elution. Thus, after the plate has been spotted with the samples, it is placed in a tank saturated with acid vapour for the required time (5 minutes for B, B’; 10 minutes for C). The plate must not be wetted by the liquid acid. This is achieved by having a small quantity of liquid acid covering the base of a closed tank and supporting the dry plate to be pre-equilibrated on several glass islands (above the level of the liquid). Such pretreatment of the plates again ensures uniform travel of the solvent front and prevents the development of secondary solvent fronts.

**Examination of the Developed Plates**

The dried plates are examined initially in visible light (daylight) for pigments that appear as coloured spots. Their colour and position are recorded. Some pigments, such as the secalonic acids and related compounds (which are relatively pale and streak along the plate), are most easily seen if the plate is examined whilst being held in front of a strong (visible) light.

Next, the plates are examined under short wavelength (~ 254 nm) ultraviolet light, where all aromatic lichen substances are indicated by dark spots on a fluorescent background (fatty acids and terpenes are not observed under these conditions unless they are extremely concentrated). These spots should be marked for future reference. Several substances, such as alectoronic acid and α-collatolic acid, fluoresce bright blue under short wavelength ultraviolet light before spraying.

Subsequently, the plates are sprayed with water. When the wet plate is illuminated from above and viewed against a dark background, fatty acid spots show up as opaque white spots against a relatively dull background.

After brief drying the plates are sprayed with 10% sulfuric acid until wet (but with no run-off) or alternatively painted with 10% sulfuric acid using a soft pastry brush, and then heated at 110º in an oven or on a hotplate for 10 minutes to develop the spots. The various diagnostic colours of each lichen substance are well developed by this time and the R_F values and colour
Acid Spray) should be recorded.

Note that colours should be recorded as soon as the plate has cooled, rather than later on, as they often alter with time. Extra purple or blue spots can also appear (which did not show up under ultraviolet light); these indicate lichen triterpenes and steroids.

Additional useful information can also be obtained by noting the colour of fluorescence of the developed spots under long wavelength (350 nm) ultraviolet light immediately after acid and heat treatment. Such colours become less prominent if the plates are stored.

The colours that develop after spraying and charring are concentration-dependent. Thus, a strong or intense spot (especially for depsides and depsidones) will appear as a spot of one colour with a ring or halo of a different colour. If the spot is weak, the compound being present in small quantities, it will appear as a uniform spot of the same colour as the halo of the corresponding intense spot. This phenomenon is observed in both visible light and under long wavelength ultraviolet light.

Other spray reagents can also be used. The use of 3-methyl-2-benzothiazolone hydrazone hydrochloride (MTBH or Archers Solution) has been developed by Archer (Archer 1978) as a complementary spray reagent to sulfuric acid/heat. This reagent develops characteristic colours with a number of depsides, depsidones and dibenzofurans.

Relative rather than Absolute $R_F$ Values

The standardized method (Culberson 1972; Orange et al. 2010) utilized $R_F$ classes determined on each plate by a control mixture (atranorin and norstictic acid), so that accurate reproducibility of the $R_F$ values was not required. This method is very useful in limiting the number of possibilities for an ‘unknown’ spot, but often some ambiguity remains. Certainly, better resolution is usually observed, but the measured or absolute $R_F$ value can fluctuate depending on the atmospheric conditions, the age of the solvent, etc. In practice we find that the most satisfactory method is to use relative $R_F$ values, where one achieves maximum resolution as well as reproducibility. The key to this method is to use more than two compounds in the control mixture (a choice of those listed in Table 1). Although the absolute $R_F$ values of the ‘unknowns’ can fluctuate, the $R_F$ values of the controls will fluctuate in a parallel manner. Hence, the controls are assigned invariant $R_F$ values, and all other spots are measured relative to them.

Confirmation of Identity

The identity of an ‘unknown’ substance can only be confirmed by comparative TLC in at least three of the solvent systems, that is, running the lichen extract adjacent to an extract containing this particular substance or, preferably, using a pure sample of the particular lichen compound. Then the $R_F$ values as well as the fluorescent properties can be compared under
identical conditions. Even so, it is preferable to have independent confirmation of identity, e.g. via mass spectrometry or comparative HPLC.

**Table 1. Standard RF values of control compounds.**

<table>
<thead>
<tr>
<th>Compound</th>
<th>RF in solvent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
</tr>
<tr>
<td>Atranorin</td>
<td>75</td>
</tr>
<tr>
<td>Chloroatranorin</td>
<td>74</td>
</tr>
<tr>
<td>Usnic acid</td>
<td>70</td>
</tr>
<tr>
<td>4-O-Methylhypo-protocetraric acid</td>
<td>39</td>
</tr>
<tr>
<td>Notatic acid</td>
<td>34</td>
</tr>
<tr>
<td>Norstictic acid</td>
<td>40</td>
</tr>
<tr>
<td>Physodalic acid</td>
<td>10</td>
</tr>
<tr>
<td>Stictic acid</td>
<td>32</td>
</tr>
<tr>
<td>Salazinic acid</td>
<td>10</td>
</tr>
</tbody>
</table>

**High performance thin layer chromatography (HPTLC)**

High performance thin layer chromatography (HPTLC) is a method that can be used for screening lichen substances. It is as simple to use as standard TLC, but it is said to have many advantages. Although it is claimed to be more sensitive, I do not believe this to be the case and, in fact, is not as good at distinguishing the faster moving spots. However, it is possible to run more samples in a shorter period of time, and HPTLC requires less solvent. The detailed methodology is described in Arup et al. (1993).
HPLC Materials and Methods

Original HPLC Method (Feige et al. 1993)

A Kontron HPLC connected to a Data System 450 instrument with an UV-detector 430 and an autosampler 360 was used. Spherisorb 5 ODS 2 column (Kontron), 5 µm, 250 × 4 mm was used. Two solvent systems were employed. Solvent system A is Aqua bidest, containing 1% orthophosphoric acid and solvent system B, methanol (Baker). The solvents were degassed for 30 minutes in an ultrasonic vibrator prior to use.

The substances were dissolved in acetone to which the two standards have been added (20 mg of benzoic acid and 20 mg of solorinic acid/1000 ml acetone) While benzoic acid elutes very rapidly, solorinic acid is very hypophobic. Only orsellinic acid, consalazinic acid and the phthalides elute more rapidly than benzoic acid and the RI values (detailed later) of these compounds are given as negative numbers.

The Programmed Run

Small volumes (20 µl) were chromatographed at 0.7ml/min. The run started with 30% B and continued isocratically for 1 minute. After 1 minute small volumes were injected and solvent system B increased to 70% within 14 minutes, then up to 100% in 30 minutes and then isocratically in 100% B for a further 18 minutes. The acquisition was then switched off, the solvent system B decreased to 30% within 1 minute and the column washed with 30% B/70% A for 16 minutes before a new chromatogram was started.

The compounds were detected at 245 nm wavelength, and UV spectra (200–400 nm) of each peak eluted were recorded automatically.

The RI Value

Benzoic and solorinic acids were used as internal standards by their addition to the extraction liquid (acetone). Solorinic acid was employed as a second internal standard. This compound is present in large quantities in the arctic-alpine lichen Solorina crocea and can be readily isolated because of its hydrophobicity. The RI value of an unknown peak is calculated as follows:

\[
RI = \frac{Rt \text{ of Peak} - Rt \text{ of Benzoic acid} \times 100}{Rt \text{ of Solorinic acid}}
\]

The RI values as defined here are very stable during the lifetime of a column and are listed in the Catalogue.
Substances that are eluted at the same time often belong to different substance classes and can readily be distinguished by their UV spectra. Hence substance classes are specified for each compound in the *Catalogue*.

**Modified HPLC Method** (Elix et al. 2003)

Lichen fragments were extracted with warm methanol for high-performance liquid chromatography. Compounds were identified by HPLC with retention index values (RI) calculated from benzoic acid and solorinic acid controls.

For HPLC a Hewlett Packard HP 1050 Series System, a Phenomenex Hypersil 5μ C18 column (250 × 4.6 mm) and a spectrometric detector operating at 254 nm with a flow rate of 1 ml/min were used. Two solvent systems were employed: 1% aqueous orthophosphoric acid and methanol in the ratio 7:3 (A) and methanol (B). The run started with 100% A and was raised to 58% B within 15 min, then to 100% B within a further 15 min, followed by isocratic elution in 100% B for 10 min.

The HPLC was coupled to a photodiode array detector for ultraviolet spectroscopic comparisons. Thus, the ultraviolet spectra observed for the various components eluting in the HPLC chromatogram were recorded and computer-matched against a library of ultraviolet spectra recorded for 1060 authentic lichen metabolites under identical conditions. For each substance the correlation of ultraviolet spectra of the synthetic and natural material was greater than 99.9%.
### Sample Layout of Data

<table>
<thead>
<tr>
<th>Substance</th>
<th>Name of substance</th>
<th>A: 35</th>
<th>B: x</th>
<th>B': 44</th>
<th>C: 39</th>
<th>E: x</th>
<th>G: x</th>
<th>[R_F in standard solvent systems]</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Methoxypsoromic acid</td>
<td>[Name of substance]</td>
<td>HPLC: 22</td>
<td>[RI value]</td>
<td>TLC: [R_F in other solvent systems]</td>
<td></td>
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<td></td>
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<tr>
<td>V: -</td>
<td>UV: +</td>
<td>[Visibility in daylight and short wavelength ultraviolet light]</td>
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<tr>
<td>Archers: No Result</td>
<td>[colour after application of Archers solution]</td>
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<td></td>
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</tr>
<tr>
<td>K: No Result</td>
<td>C: No Result</td>
<td>KC: No Result</td>
<td>PD: P.Yellow</td>
<td>[Spot test results]</td>
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<tr>
<td>Mass spectrum: 388, 360, 359, 342</td>
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<tr>
<td>Substance Class: β-Orcinol Depsidones</td>
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<tr>
<td>Biosynthetically Related Compounds: 2-Hydroxyypsoromic acid</td>
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<tr>
<td>Notes: Occurs in Sulcaria sulcata (major) and Pertusaria sp. [Natural occurrence]</td>
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<tr>
<td>Additional notes - the terms strong/weak refer to the concentration of the substance. The terms pale/bright/deep/dark refer to the intensity of colour after development.</td>
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</tbody>
</table>
Acknowledgements

I thank the many colleagues who have assisted in supplying authentic lichen compounds, particularly Dr K. D. Barrow (Sydney), Dr R. A. Barrow (Canberra), Dr C. F. Culberson (Durham), Dr J. A. Garbarino (Valparaiso), Professor A. C. Gonzales (Tenerife), Dr S. Huneck (Halle), Mr P. W. James (London), Dr W. S. C. Maas (Halifax), Professor M. V. Sargent (Perth), Professor U. Sankawa (Tokyo), Professor S. Shibata (Tokyo), Professor R. Tabacchi (Neuchatel) and Professor A. L. Wilkins (Hamilton).

References


Catalogue of Lichen Substances

Acaranoic acid
A: 43  B: x  B’: 24  C: 41  E: x  F: x  G: x
HPLC: x  V: −  UV: −
Acid Spray: No Result  LW UV: Lilac
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 298, 280, 252, 157
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Acaranoic acid
Notes: Occurs in Pleopsidium chlorophanum

Acarenoic acid
A: 40  B: x  B’: 20  C: 36  E: x  F: x  G: x
HPLC: 30  V: −  UV: −
Acid Spray: No Result  LW UV: Lilac
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 296, 278, 260, 252
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Acaranoic acid
Notes: Occurs in Pleopsidium chlorophanum

3β-Acetoxy-20,24-epoxydammarane-12β,25-diol [3-O-Acetylpyxinol]
A: x  B: x  B’: x  C: 47  E: 27  F: x  G: 52
HPLC: x  V: −  UV: −
Acid Spray: Purple  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 503, 500, 485
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, 20,24-Epoxydammarane-3β,12β,25-triol, Methyl 3-O-acetoxypyxinate, Methyl pyxinate


Notes: Occurs in *Pyxine endochrysea*

**25-Acetox-20,24-epoxydammarane-3β-ol**

A: x  B: x  B': x  C: 52  E: 45  F: x  G: 73

HPLC: x

V: –  UV: –

Acid Spray: Brown  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 502, 487, 442, 398

Substance Class: Terpenoids

Biosynthetically Related Compounds: 25-Acetoxy-20,24-epoxydammarene-3-one, Methyl pyxinate


Notes: Occurs in *Pyxine coccifera*

**25-Acetoxy-20,24-epoxydammarane-3-one**

A: x  B: x  B': x  C: 52  E: 45  F: x  G: 88

HPLC: x

V: –  UV: –

Acid Spray: Purple  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 500, 485, 467, 425

Substance Class: Terpenoids

Biosynthetically Related Compounds: 25-Acetoxy-20,24-epoxydammarane-3β-ol, Methyl pyxinate


Notes: Occurs in *Pyxine coccifera*

**3β-Acetoxyfern-9(11)-ene-12β-ol**

A: 69  B: x  B': 65  C: 41  E: 53  F: x  G: 89

HPLC: x

V: –  UV: –

Acid Spray: P. Brown  LW UV: P. Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 484, 466, 451, 273

Substance Class: Terpenoids


Notes: Acid Spray: pale yellow-brown. LW UV: pale yellow, white halo. Occurs in *Pseudocyphellaria aurata*

### 3β-Acetoxyfern-9(11)-ene-19β-ol

A: 60  B: x  B': 60  C: 56  E: 48  F: x  G: 80
HPLC: x
V: −  UV: −

Acid Spray: Brown  LW UV: Orange

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 484, 469, 451, 409

Substance Class: Terpenoids


Notes: Acid Spray: fades to purple. LW UV: brown, orange halo. Occurs in *Pseudocyphellaria aurata, Pyxine berteriana*

### 12α-Acetoxyfern-9(11)-ene-3β-ol

A: 55  B: x  B': 49  C: 45  E: 27  F: x  G: 60
HPLC: x
V: −  UV: −

Acid Spray: Brown  LW UV: Orange

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 484, 442, 424, 391

Substance Class: Terpenoids

Biosynthetically Related Compounds: Fern-9(11)-ene-3,12-dione, Fern-9(11)-ene-3β,12α-diol


Notes: Acid Spray: fades to purple. LW UV: brown, orange halo. Occurs in *Xanthoria resendei*
3β-Acetoxyfern-9(11)-ene-12-one
A: 72  B: x  B': 64  C: 56  E: 66  F: x  G: 39
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: P. Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 482, 467, 397, 271
Substance Class: Terpenoids
Notes: Acid Spray: pale yellow-brown. LW UV: pale yellow, white halo. Occurs in Pseudocyphellaria aurata

3β-Acetoxyfern-9(11)-ene-19-one
A: 70  B: x  B': x  C: 60  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: Brown  LW UV: P. Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 482, 467, 407
Substance Class: Terpenoids
Notes: Occurs in Pyxine berteriana

3β-Acetoxyhopane-1β,22-diol
A: 51  B: x  B': 34  C: 39  E: 23  F: x  G: 53
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: Pink
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 502, 484, 466, 441
Substance Class: Terpenoids
Biosynthetically Related Compounds: x

Notes: Occurs in *Dirinaria* sp.

6α-Acetoxyhopane-7β,22-diol

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B′</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>40</td>
<td>24</td>
<td>x</td>
<td>34</td>
<td>6</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: x

V: –

UV: –

Acid Spray: P. Brown

LW UV: P. Yellow

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass spectrum: x

Substance Class: Terpenoids

Biosynthetically Related Compounds: 7β-Acetoxyhopane-6α,22-diol, 7β-Acetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-7β,22-diol, Hopane-6α,7β,22-triol


Notes: Occurs in *Pseudocyphellaria crocata*

6α-Acetoxyhopane-16β,22-diol

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B′</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>37</td>
<td>x</td>
<td>34</td>
<td>34</td>
<td>6</td>
<td>x</td>
<td>38</td>
</tr>
</tbody>
</table>

HPLC: x

V: –

UV: –

Acid Spray: P. Brown

LW UV: P. Yellow

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass spectrum: 502, 484, 442, 426

Substance Class: Terpenoids

Biosynthetically Related Compounds: 16β-Acetoxyhopane-6α,22-diol, 6α-Acetoxyhopane-22-ol, 6α,16β-Diaceotoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-16β,22-diol, Hopane-6α,16β,22-triol [Leucotylin]


Notes: Occurs in *Parmelia [Myelochroa] entotheiochroa, Heterodermia tremulans*

7β-Acetoxyhopane-6α,22-diol

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B′</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>47</td>
<td>28</td>
<td>x</td>
<td>40</td>
<td>10</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: x

V: –

UV: –

Acid Spray: Brown

LW UV: Orange

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-7β,22-diol, 7β-Acetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-7β,22-diol, Hopane-6α,7β,22-triol
Notes: Acid Spray: fades to purple. LW UV: fades to pale yellow. Occurs in *Pseudocyphellaria crocata*

**16β-Acetoxyhopane-6α,22-diol**
A: 41  B: x  B': 29  C: 32  E: 8  F: x  G: 36
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: P.Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 502, 484, 442, 424
Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-16β,22-diol, 6α-Acetoxyhopane-22-ol, 6α,16β-Diacetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-16β,22-diol, Hopane-6α,16β,22-triol [Leucotylin]
Notes: Occurs in *Parmelia [Myelochroa] entotheiochroa, Heterodermia tremulans*

**20α-Acetoxyhopane-6α,22-diol**
A: x  B: x  B': 30  C: 36  E: 18  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: Brown  LW UV: Pink
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 502, 484, 442, 424
Substance Class: Terpenoids
Biosynthetically Related Compounds: Hopane-6α,22-diol [Zeorin], Hopane-6α,20α,22-triol
Notes: Occurs in *Physcia austrostellaris*

**6α-Acetoxyhopane-22-ol** [Acetylzeorin, Lesdainin]
A: 62  B: x  B': 56  C: 53  E: 40  F: x  G: 66
**HPLC:** x  
**V:** −  
**UV:** −  
**Acid Spray:** Purple  
**LW UV:** P.Yellow  
**Archers:** x  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass spectrum: 484, 442, 0, 0  
**Substance Class:** Terpenoids  
**Biosynthetically Related Compounds:** 6α-Acetoxyhopane-16β,22-diol, 16β-Acetoxyhopane-6α,22-diol, 6α,16β-Diacetoxyhopane-22-ol, Hopane-6α,22-diol, Hopane-6α,16β,22-triol  
**Notes:** Occurs in *Botryolepraria lesdainii*

### 7β-Acetoxyhopan-22-ol [Peltidactylin]

**A:** 63  
**B:** x  
**B':** 52  
**C:** 49  
**E:** 41  
**F:** x  
**G:** 61  
**HPLC:** x  
**V:** −  
**UV:** −  
**Acid Spray:** P.Brown  
**LW UV:** P.Yellow  
**Archers:** x  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass spectrum: 486, 468, 426, 189  
**Substance Class:** Terpenoids  
**Biosynthetically Related Compounds:** 6α-Acetoxyhopane-7β,22-diol, 7β-Acetoxyhopane-6α,22-diol, Hopane-15α,22-diol, Hopane-7β,22-diol, Hopane-6α,7β,22-triol  
**Reference:** Wilkins, AL/James, PW 1979: The chemistry of *Pseudocyphellaria impressa* s. lat. in New Zealand. Lichenologist 11: 271-281.  
**Notes:** Occurs in *Pseudocyphellaria billardieri*

### 15α-Acetoxyhopan-22-ol [Dolichorrizin]

**A:** 61  
**B:** x  
**B':** 52  
**C:** 44  
**E:** 30  
**F:** x  
**G:** 58  
**HPLC:** x  
**V:** −  
**UV:** −  
**Acid Spray:** Brown  
**LW UV:** Orange  
**Archers:** x  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass spectrum: 486, 468, 426, 408  
**Substance Class:** Terpenoids  
**Biosynthetically Related Compounds:** Hopane-15α,22-diol  
Notes: LW UV: fades to pale yellow. Acid Spray: fades to purple. Occurs in *Peltigera aphthosa*

**16β-Acetoxyhopane-22-ol**

A: x  B: x  B': x  C: 55  E: 22  F: x  G: x  

HPLC: x  

V: –  UV: –  

Acid Spray: Brown  LW UV: P.Yellow  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: 486, 468, 0, 0  

Substance Class: Terpenoids  

Biosynthetically Related Compounds: 6α-Acetoxyhopane-16β,22-diol, 16β-Acetoxyhopane-6α,22-diol, 6α,16β-Diacetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-16β,22-diol, Hopane-6α,16β,22-triol [Leucotylin]  


Notes: Occurs in *Heterodermia spathulifera*

**6α-Acetoxy-22-hydroxyhopane-25-oic acid** [Aipolic acid]

A: x  B: x  B': x  C: 50  E: 10  F: x  G: 50  

HPLC: x  

V: –  UV: –  

Acid Spray: Brown  LW UV: Purple  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: 498, 456, 454, 411  

Substance Class: Terpenoids  

Biosynthetically Related Compounds: 6α-Acetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin]  


Notes: Occurs in *Physcia aipolia* from Kenya

**16β-Acetoxy-22-hydroxyhopane-4α-oic acid** [16-O-Acetylleucotylic acid]

A: x  B: x  B': x  C: 39  E: 2  F: x  G: 36  

HPLC: x  

V: –  UV: –  

Acid Spray: Brown  LW UV: Orange  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 16β,22-Dihydroxypone-4α–oic acid [Leucotylic acid], Hopane-6α,22-diol [Zearin], Hopane-16β,22-diol, Hopane-6α,16β,22-triol [Leucotylin]
Notes: Occurs in Parmelia [Myelochroa] entothiechoera

19-Acetoxylichesterinic acid
A: x B: x B': x C: 46 E: x F: x G: x
HPLC: 26
V: – UV: –
Acid Spray: No Result LW UV: Lilac
Archers: No Result
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 382, 364, 340, 322
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: 19-Acetoxyprotopolicherinic acid, protolicherinic acid, lichesterinic acid
Notes: LW UV: weak spot difficult to detect, often UV-quenching. Best seen as wet plate dries. Occurs in Neoropogon trachycarpus [Usnea trachycarpa]

19-Acetoxyprotopolicherinic acid
A: x B: x B': x C: 40 E: x F: x G: x
HPLC: 19
V: – UV: –
Acid Spray: No Result LW UV: Purple
Archers: No Result
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 382, 364, 340, 322
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: 19-Acetoxylichesterinic acid, protolicherinic acid, lichesterinic acid
Notes: LW UV: weak spot difficult to detect, often UV-quenching. Best seen as wet plate dries. Occurs in Neoropogon trachycarpus [Usnea trachycarpa]
2α-Acetoxystictane-3β,22α-diol

A: 45  B: x  B': 33  C: 37  E: 19  F: x  G: 44
HPLC: x
V: −  UV: −
Acid Spray: P.Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β-Acetoxystictane-2α,22α-diol, 3β-Acetoxystictane-22α-ol, 22α-Hydroxy-3,4-secostict-4(23)-enaldehyde, 22α-Hydroxy-3,4-secostict-4(23)-enoic acid, Stictane-3β,22-diol
Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in Pseudocphellaria degelii and Ps. flavicans

3β-Acetoxystictane-2α,22-diol

A: 45  B: x  B': 33  C: 40  E: 57  F: x  G: 49
HPLC: x
V: −  UV: −
Acid Spray: Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 2α-Acetoxystictane-3β,22α-diol, 3β-Acetoxystictane-22α-ol, 22α-Hydroxy-3,4-secostict-4(23)-enaldehyde, 22α-Hydroxy-3,4-secostict-4(23)-enoic acid, Stictane-3β,22-diol
Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in Pseudocphellaria degelii and Ps. flavicans

α-Acetylconstictic acid

A: 16  B: x  B': 4  C: 11  E: x  F: x  G: 23
HPLC: x
V: −  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Yellow  C: No Result  KC: PD: Orange
Mass spectrum: 384, 370, 342, 314
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Stictic acid
Notes: Occurs in Menegazzia platytrema

α-Acetylhypoconstictic acid
A: 34  B: x  B': 14  C: 20  E: x  F: x  G: 46
HPLC: x
V: –  UV: +
Acid Spray: P.Red  LW UV: Pink
Archers: x
K: Yellow  C: No Result  KC: x  PD: No Result
Mass spectrum: 430, 370, 354, 342
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypoconstictic acid, Hyposalazinic acid, Hypostictic acid, 4-O-Methylhypoprotocetraric acid
Notes: Occurs in Menegazzia dispora, Xanthoparmelia metastrigosa

5-O-Acetyl-4-O-methylhiascic acid
A: 30  B: x  B': 34  C: 45  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: Red
K: No Result  C: P.Red  KC: Red  PD: No Result
Mass spectrum: 1, 330, 304, 286
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 4-O-Methylhiascic acid, Hiascic acid
Notes: Occurs in Koerberiella wimmeriana

2-O-Acetyltenuiorin
A: 63  B: 53  B': x  C: 39  E: x  F: x  G: x
HPLC: x
Acid Spray: Yellow  LW UV: Green
Archers: Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 1, 235, 224, 221
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Tenuiorin
Notes: Reported to occur in Pseudocyphellaria neglecta

**Acetyl-α-tocopherol** [Tocopheryl acetate; vitamin E acetate]
A: 78  B: 90  B': x  C: 77  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 472, 430, 247, 207
Substance Class: Chromanes
Biosynthetically Related Compounds: α-Tocopherol [vitamin E]
Notes: Occurs in Erioderma tomentosum

**Acetylpotentol**
A: 65  B: 29  B': x  C: 45  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 352, 292, 277, 239
Substance Class: Aliphatic compound
Biosynthetically Related Compounds: Portentol
Notes: Looks like fatty acid on plate. Occurs in Roccella fuciformis
Alectorialic acid
A: 36  B: 48  B': 50  C: 32  E: x  F: x  G: 60
HPLC: 18
V: +  UV: +
Acid Spray: P.Brown  LW UV: Brown
Archers: x
K: Yellow  C: D.Red  KC: PD: Yellow
Mass spectrum: -1, 332, 196, 150
Substance Class: Benzyl ester
Biosynthetically Related Compounds: Alectorialin, Barbatolic acid, Barbatolin, 5,7-Dihydroxy-6-methylphthalide
Notes: Occurs in Alectoria nigricans

Alectorialin
A: 37  B: x  B': 34  C: 13  E: 10  F: x  G: 49
HPLC: 13
V: −  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: Yellow  C: Red  KC: PD: Yellow
Mass spectrum: 332, 314, 301, 137
Substance Class: Benzyl ester
Biosynthetically Related Compounds: Alectorialic acid, Barbatolic acid, Barbatolin, 5,7-Dihydroxy-6-methylphthalide
Notes: LW UV: strong dark blue, light blue halo. Occurs in Alectoria nigricans

Alectoronic acid [α-Alectoronic acid]
A: 33  B: 34  B': 31  C: 17  E: x  F: x  G: x
HPLC: 26
V: −  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: P.Red  PD: No Result
Mass spectrum: 494, 468, 450, 370
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: α-Collatolic acid, Lividic acid, Physodic acid, Oxyphysodic acid

Notes: UV: flouresces bright blue before spraying. Acid Spray: pale yellow, grey halo. Occurs in Parmotrema rigidum

**β-Alectoronic acid**

A: 7 B: 6 B': x C: 7 E: x F: x G: x
HPLC: 24
V: – UV: +
Acid Spray: P.Yellow LW UV: P.Blue
Archers: x
K: No Result C: Red KC: Red PD: No Result
Mass spectrum: -1, 495, 494, 468, 450
Substance Class: Diphenyl ether
Biosynthetically Related Compounds: Alectoronic acid, α-Collatolic acid, β-Collatolic acid
Notes: Occurs in Asahinea chrysantha, Parmelia birulae

**Alectosarmentin**

A: 19 B: x B': x C: 12 E: x F: x G: x
HPLC: 5
V: – UV: +
Acid Spray: Grey LW UV: Purple
Archers: x
K: No Result C: Green KC: PD: No Result
Mass spectrum: 286, 240, 212, 184
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Di-O-methylstrepsilin, 7-O-Methylstrepsilin, Strepsilin
Notes: Acid Spray: pale grey-blue. LW UV: strong purple, blue halo. Occurs in Alectoria sarmentosa, Cladonia strepsilis

**Allorhizin**

A: 57 B: 56 B': 52 C: 65 E: 32 F: x G: x
HPLC: x
V: – UV: –
Acid Spray: Yellow LW UV: Purple
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 398, 396, 361, 347
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Allorhizin methyl ether, Norvicanicin, Vicanicin
Notes: Occurs in Pannaria allorhiza

**Alternariol**
A: 32  B: x  B’: 30  C: 10  E: x  F: x  G: x
HPLC: 11
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 258
Substance Class: 3,4-Benzocoumarins
Biosynthetically Related Compounds: 9-O-Methylalternariol
Notes: Minor constituent of Pertusaria praecipua

**Angardianic acid**
A: 42  B: x  B’: 60  C: 48  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 328, 310, 292, 282
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Roccellic acid
Notes: Occurs in Lepraria alpina

**Anhydrofusarubin lactol**
A: 40  B: x  B’: 11  C: 32  E: x  F: x  G: x
HPLC: 13
V: + UV: +

Acid Spray: Grey
LW UV: Pink

Archers: x

K: Red C: No Result KC: PD: No Result

Mass spectrum: -1, 288

Substance Class: Naphthaquinone

Biosynthetically Related Compounds: Fusarubin


Notes: Violet pigment. Occurs in Xanthoparmelia violacea, X. quinonella

**Anhydrofusarubin lactol methyl ketal**

A: 54  B: x  B': 23  C: 45  E: x  F: x  G: x

HPLC: 26

V: + UV: +

Acid Spray: Grey
LW UV: Pink

Archers: x

K: Red C: No Result KC: PD: No Result

Mass spectrum: -1, 288

Substance Class: Naphthaquinone

Biosynthetically Related Compounds: Anhydrofusarubin lactol, Fusarubin


Notes: Violet pigment. Occurs in Xanthoparmelia violacea, X. quinonella

**Anziaic acid**

A: 40  B: 59  B': 55  C: 33  E: x  F: x  G: x

HPLC: 35

V: − UV: +

Acid Spray: P. Yellow
LW UV: Green

Archers: Orange

K: No Result C: Red KC: Red PD: No Result

Mass spectrum: -1, 224, 206, 191

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 4'-O-Demethylmicrophyllinic acid, 2'-O-Methylanziaic acid, Olivetoric acid, Perlatolic acid


Notes: Acid Spray: strong-pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in Anzia japonica.
Aphthosin
A: 0  B: 0  B': 1  C: 0  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 346, 332, 182
Substance Class: Orcinol Tetradepsides
Biosynthetically Related Compounds: 2',2''-Di-O-methyltenuiorin, Gyrophoric acid, Methyl gyrophorate, 2'-O-Methyltenuiorin, 2''-O-Methyltenuiorin, Tenuiorin
Notes: Acid Spray: pale yellow, grey halo. Occurs in Peltigera aphthosa

Argopsin
A: 77  B: x  B': 73  C: 82  E: 43  F: 95  G: x
HPLC: 43
V: –  UV: +
Acid Spray: Blue  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Orange
Mass spectrum: 400, 398, 396
Substance Class: β-Orcinol Dipsidones
Biosynthetically Related Compounds: Norargopsin, Norpannarin, Pannarin
Notes: Occurs in Argopsis spp., Micarea lignaria, M. leprosula

Arthoniaic acid
A: 31  B: 15  B': x  C: 13  E: 43  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: Pink  LW UV: Blue
Archers: x
K: No Result  C: Orange-red  KC: Red  PD: Orange
Mass spectrum: -1, 262, 248, 206
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 4-O-Demethylmicrophyllinic acid, 2’-O-Methylmicrophyllinic acid, Microphyllinic acid
Notes: Occurs in Arthonia pruinata

Arthothelin [2,4,5-Trichloronorlichexanthone]
A: 43  B: x  B’: 40  C: 37  E: 15  F: 32  G: x
HPLC: 35
V: +  UV: +
Acid Spray: Orange  LW UV: Green
Archers: x
K: No Result  C: Orange  KC: PD: No Result
Mass spectrum: 366, 364, 362, 360
Substance Class: Xanthones
Biosynthetically Related Compounds: 4,5-Dichloronorlichexanthone, 6-O-Methylarthothelin, Thiophanic acid, Thuringione
Notes: Pale yellow pigment. Occurs in Buellia halonia, Lecanora straminea

Asahinin [1,4,5,6,8-Pentahydroxy-3-methylanthaquinone]
A: x  B: x  B’: x  C: x  E: x  F: x  G: x
HPLC: x
V: +  UV: +
Acid Spray: Orange  LW UV: Red
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 302, 286, 274
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Cynodontin
Notes: Red-orange pigment. Minor component in Asahinea chrysantha

Ascomatic acid
A: 37  B: x  B’: 32  C: 45  E: x  F: x  G: x
HPLC: 30
V: –  UV: +
Acid Spray: B.Blue  LW UV: Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 300, 285, 268, 267
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Methyl ascomat, 7-O-Methylnorascomatic acid, Norascomatic acid
Reference: Elix, JA/ Venables, D/ Wedin, M 1994: 70. New dibenzofurans and depsides from the lichen
Notes: Occurs in Bunodophoron patagonicum

**Asemone** [4,5,7-Trichloronorlichexanthone]

A: 47  B: x  B’: 55  C: 37  E: 7  F: 20  G: x
HPLC: 37
V: +  UV: +
Acid Spray: P:Yellow  LW UV: B:Blue
Archers: x
K: No Result  C: Orange  KC: PD: No Result
Mass spectrum: 366, 364, 362, 360
Substance Class: Xanthones
Biosynthetically Related Compounds: 4,5-Dichloronorlichexanthone, 5,7-Dichloronorlichexanthone, 3-O-Methylasemone, 6-O-Methylasemone, Thiophanic acid,
Acta Chemica Scandinavica 33B: 475-482.
Notes: Pale yellow pigment. Occurs in Micarea isabellina

**Aspicilin**

A: 53  B: x  B’: 14  C: 11  E: 7  F: x  G: x
HPLC: 22
V: –  UV: –
Acid Spray: No Result  LW UV: Lilac
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 328, 310, 284, 227
Substance Class: Aliphatic compounds
Biosynthetically Related Compounds: x
Tetrahedron 29: 3687-3693.
Notes: Occurs in Aspicilia caesiocinerea

**Atranorin**

A: 76  B: 78  B’: 73  C: 79  E: 57  F: 85  G: x
HPLC: 38
V: – UV: +
Acid Spray: Orange LW UV: Orange
Archers: Orange
K: P.Yellow C: No Result KC: No Result PD: P.Yellow
Mass spectrum: 374, 196, 179, 178
Substance Class: β-Orcinol Dipsides
Biosynthetically Related Compounds: Chloroatranorin, 2'-O-Methylatranorin, Methyl 4-O-demethylbarbatate, Methyl 3α-hydroxy-4-O-demethylbarbatate, Norbaeomycesic acid
Notes: Very common lichen metabolite. Occurs in Physcia caesia

Averantin
A: x B: x B': x C: x E: x F: x G: x
HPLC: x TLC: Rf 25 [benzene/ethyl formate/formic acid, 80/20/1]
V: + UV: +
Acid Spray: P.Red LW UV: Pink
Archers: x
K: Purple C: No Result KC: PD: No Result
Mass spectrum: -1, 354, 325, 311, 300
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 6-O-Methylaverythrin, norsolorinic acid, solorinic acid
Notes: Yellow-orange pigment. Occurs in Solorina crocea

Averythrin
A: 42 B: x B': 53 C: 25 E: 9 F: x G: x
HPLC: x
V: + UV: +
Acid Spray: P.Red LW UV: Pink
Archers: x
K: Purple C: No Result KC: PD: No Result
Mass spectrum: 354, 325, 311, 300
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Averantin, 6-O-Methylaverythrin, Norsolorinic acid, Solorinic acid
Notes: Red-orange pigment. LW UV: bright pink initially. Occurs in *Solorina crocea*

**Baeomycesic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B':</th>
<th>C</th>
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<tr>
<td>39</td>
<td>40</td>
<td>41</td>
<td>42</td>
<td>9</td>
<td>x</td>
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</table>

HPLC: 28
V: – UV: +

Acid Spray: B.Yellow LW UV: Orange
Archers: Orange
K: Yellow C: No Result KC: PD: Yellow

Mass spectrum: 374, 194, 193, 182

Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, Haemathammolic acid, 3α-Hydroxybarbatic acid, Norbaeomycesic acid, Squamic acid


Notes: Acid Spray: strong to pale yellow, grey halo. LW UV: str long-purpl e, pale yellow halo. Widespread.

**Barbatic acid**

<table>
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<tr>
<th>A</th>
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<th>C</th>
<th>E</th>
<th>F</th>
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<tr>
<td>44</td>
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<td>67</td>
<td>52</td>
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HPLC: 37
V: – UV: +

Acid Spray: Yellow LW UV: P.Yellow
Archers: D.Red
K: No Result C: No Result KC: Orange PD: No Result

Mass spectrum: 360, 196, 182, 179

Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Baeomycesic acid, 4-O-Demethylbarbatic acid, Diffractaic acid, 3α-Hydroxybarbatic acid, Methyl barbatate, Norobtusatic acid, Obtusatic acid, Squamic acid


Notes: Acid Spray: strong to pale yellow, grey halo. LW UV: strong-purple, pale yellow halo. Widespread.

**Barbatolic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B':</th>
<th>C</th>
<th>E</th>
<th>F</th>
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<tbody>
<tr>
<td>9</td>
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<td>52</td>
<td>26</td>
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</tbody>
</table>

HPLC: 16
V: + UV: +

Acid Spray: P.Brown LW UV: P.Yellow
Archers: x
K: Yellow  C: No Result  KC: PD: Orange
Mass spectrum: -1, 346, 179, 177
Substance Class: Benzyl esters
Biosynthetically Related Compounds: Alectorionic acid, Alectorionicin, Barbatolin, 6-Formyl-5,7-dihydroxyphthalide
Notes: Visible: strong-very pale yellow. Acid Spray: pale yellow-brown. Occurs in *Bryoria capillaris*

**Barbatolin**

A: 46  B: 48  B': 43  C: 30  E: 13  F: x  G: 60
HPLC: 10
V: –  UV: +
Acid Spray: Yellow  LW UV: Brown
Archers: x
K: Yellow  C: No Result  KC: PD: Orange
Mass spectrum: 346, 179, 177, 150
Substance Class: Benzyl esters
Biosynthetically Related Compounds: Alectorionic acid, Alectorionicin, Barbatolic acid, 6-Formyl-5,7-dihydroxyphthalide
Notes: Minor constituent of *Bryoria nadvornikiana*

**Biruloquinone**

A: 80  B: 13  B': x  C: 30  E: x  F: x  G: 45
HPLC: x
V: +  UV: +
Acid Spray: Purple  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: PD: No Result
Mass spectrum: 326, 298, 297, 280
Substance Class: Phenanthraquinones
Biosynthetically Related Compounds: x
Notes: Violet pigment. Occurs in *Parmelia birulae*
7,7'-Bis(3-ethyl-2,5,6,8-tetrahydroxynaphtho-1,4-quinone) [Bisnorcristazarin]

B: x C: x E: x F: x
HPLC: x
V: + UV: +
Acid Spray: Red LW UV: Magenta
K: Red C: No Result KC: PD: No Result
Mass spectrum: 499, 498, 497, 483
Substance Class: Naphthaquinones
Biosynthetically Related Compounds: 7-Demethylcristazarin, 6-Methylcristazarin, Cristazarin
Notes: Occurs in Flavocetraria cucullata

Boninic acid

A: 44 B: 48 B': 41 C: 46 E: x F: x
HPLC: 31
V: – UV: +
Acid Spray: P.Brown LW UV: Purple
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 416, 236, 224, 207
Substance Class: Orcinol Depside
Biosynthetically Related Compounds: 4,4'-Di-O-methylcryptochlorophaeic acid, 2,4'-Di-O-methylnorsekikaic acid, Homosekikaic acid, 4'-O-Methylpaludosic acid, 2-O-Methylsekikaic acid, Paludosic acid, Sekikaic acid
Notes: Acid Spray: strong-pale yellow-brown, brown halo. Occurs in Ramalina boninensis

Boryquinone [3-Ethyl-2,5,7,8-tetrahydroxy-6-methylnaphtho-1,4-quinone, 6-Methylnorcristazarin]

A: 34 B: x B': 54 C: 16 E: x F: x
HPLC: 26
V: + UV: +
Acid Spray: Purple LW UV: P.Brown
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass spectrum: 264, 249, 236, 221
Substance Class: Naphthaquinones
Biosynthetically Related Compounds: Hybocarpene
Notes: Red pigment in *Cladonia boryi*

### Bourgeanic acid

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<th>B: 61</th>
<th>B’: 62</th>
<th>C: 48</th>
<th>E: x</th>
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<td>Notes:</td>
<td>Occurs in <em>Ramalina bourgeana</em></td>
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### Brialmontin 1

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<th>B’: 75</th>
<th>C: 70</th>
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<tr>
<td>Notes:</td>
<td>Occurs in <em>Lecania brialmontii</em></td>
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### Brialmontin 2

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<th>B’: 85</th>
<th>C: 82</th>
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<tr>
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</tbody>
</table>
Biosynthetically Related Compounds: Brialmontin 1, Nephroarctin, Phenarctin
Notes: Occurs in Lecania brialmontii

**Buellolide**

A: 72   B: x   B': 45   C: 63   E: 51   F: x   G: x
HPLC: 23
V: –   UV: +
Acid Spray: No Result   LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: 436, 434, 432, 219
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Canesolide, 3-Dechlorodiploicin, Dechloro-O-methyldiploicin, Diploicin
Notes: Best seen under SW UV before spraying. Occurs in Diploicia cansescens

**Butlerin A**

A: 76   B: x   B': 45   C: 65   E: x   F: x   G: x
HPLC: 24
V: –   UV: +
Acid Spray: P.Grey   LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: 408, 367, 366
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin B, Butlerin C, Butlerin D, Butlerin E, Butlerin F
Notes: Minor component in Relicina connivens

**Butlerin B**

A: 76   B: x   B': 45   C: 65   E: x   F: x   G: x
HPLC: 24
V: –   UV: +
Acid Spray: P.Grey   LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 408, 367, 366
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin A, Butlerin C, Butlerin D, Butlerin E, Butlerin F
Notes: Minor component in Relicina connivens

Butlerin C
A: 72  B: x  B': 36  C: 60  E: x  F: x  G: x
HPLC: 22
V: –  UV: +
Acid Spray: P.Grey  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 436, 394, 352
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin A, Butlerin B, Butlerin D, Butlerin E, Butlerin F
Notes: Minor component in Relicina connivens

Butlerin D
A: 72  B: x  B': 42  C: 63  E: x  F: x  G: x
HPLC: -
V: –  UV: +
Acid Spray: P.Grey  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 438, 396, 381
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin A, Butlerin B, Butlerin C, Butlerin E, Butlerin F
Notes: Minor component in Relicina connivens

Butlerin E
A: 70  B: x  B': 33  C: 58  E: x  F: x  G: x
HPLC: -
V: –  UV: +
Acid Spray: P.Grey
LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 466, 424, 382
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin A, Butlerin B, Butlerin C, Butlerin D, Butlerin F
Reference: Elix, JA/ Ernst-Russell, MA 1996: Butlerins D, E and F-three new hexasubstituted lichen p-
Notes: Minor component in Relicina connivens

Butlerin F
A: 70  B: x  B': 33  C: 58  E: x  F: x  G: x
HPLC: -
V: −  UV: +
Acid Spray: P.Grey
LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 466, 424, 382
Substance Class: p-Terphenyls
Biosynthetically Related Compounds: Butlerin A, Butlerin B, Butlerin C, Butlerin D, Butlerin E
Reference: Elix, JA/ Ernst-Russell, MA 1996: Butlerins D, E and F-three new hexasubstituted lichen p-
Notes: Minor component in Relicina connivens

Caloploicin
A: 65  B: x  B': 69  C: 58  E: 29  F: x  G: x
HPLC: 39
V: −  UV: +
Acid Spray: P.Grey
LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 406, 404, 402, 367
Substance Class: Orcinol β-Orcinol Depsidone
Biosynthetically Related Compounds: Diploicin, Fulgidin Fulgoicin, Isofulgidin, Vicanicin
Reference: Yosioka, I/ Hino, K/ Fujio, M/ Kitagawa, I 1971: A new trichlorodepsidone from a lichen of the
Notes: Acid Spray: pale grey; if weak, no result. LW UV: strong-purple. Occurs in Caloplaca leptozona
**Calycin**

A: 78  B: 81  B’: 79  C: 88  E: 40  F: x  G: x  
HPLC: 47  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 306, 250, 161, 153  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Calycinic acid, Pulvinic acid, Pulvinic dilactone, Pulvinamidine  
Notes: Yellow-orange pigment. Occurs in Candelariella spp. and Pseudocyphellaria aurata:

**Calycinic acid**

A: 8  B: 32  B’: x  C: x  E: x  F: x  G: x  
HPLC: x  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 324, 306, 161,  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Calycin, Pulvinic acid, Pulvinic dilactone  
Notes: Yellow pigment. Minor component in Pseudocyphellaria crocata

**Canarione**

A: 4  B: x  B’: 2  C: 3  E: x  F: x  G: x  
HPLC: 4  TLC: Rf = 38 [formic acid/ethyl formate/benzene, 3/25/25].  
V: +  UV: +  
Acid Spray: Purple-brown  LW UV: Reddish purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 272, 244, 216, 203  
Substance Class: Naphthaquinone  
Biosynthetically Related Compounds: Calycinic acid, Pulvinic acid, Pulvinic dilactone, Pulvinamidine
Notes: Red pigment. Occurs in Lethariella canariensis

Canesolide
A: 73  B: x  B': 63  C: 71  E: 45  F: x  G: x
HPLC: 21
V: –  UV: +
Acid Spray: No Result  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 472, 470, 468, 466
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Buellolide, Diploicin, 3-Dechlorodiploicin, Dechloro-O-methylidiploicin
Notes: Best seen under SW UV before spraying. Occurs in Diploicia canescens

Caperatic acid
A: 4  B: 27  B': 32  C: 6  E: x  F: x  G: 22
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 402, 384, 371, 366
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Methyl 3,4-dicarboxy-3-hydroxy-19oxoeicosanoate, Norcaperatic acid
Notes: LW UV: strong-white. Occurs in Flavoparmelia caperata, F. hayasomii

Catenarin
A: 55  B: x  B': 62  C: 40  E: 37  F: 67  G: x
HPLC: x
V: +  UV: +
Acid Spray: Orange  LW UV: Red
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 286, 258, 230
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chlorocatenarin, Emodin
Notes: Red-orange pigment. Minor component in *Catenarina desolata*

**Chiodectonic acid**
A: 0  B: x  B': 2  C: 1  E: x  F: x  G: 1
HPLC: 11
V: +  UV: +
Acid Spray: Grey  LW UV: Pink
Archers: x
K: P.Red  C: No Result  KC: x  PD: No Result
Mass spectrum: 334, 319, 316, 291
Substance Class: Naphthaquinones
Biosynthetically Related Compounds: Rhodocladonic acid
Notes: Purple-red pigment; turns bright crimson as soon as wet with H$_2$SO$_4$. Occurs in *Herpothallon rubrocincta, Pyxine coccifera*

**Chalybaeizanic acid**
A: 11  B: x  B': 5  C: 10  E: x  F: x  G: x
HPLC: 10
V: −  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Red  C: No Result  KC:  PD: Orange
Mass spectrum: 386, 341, 340
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Consalazinic acid, Salazinic acid
Notes: Occurs in *Xanthoparmelia chalybaeizans*

**Chloroatranorin**
A: 74  B: 79  B’: 73  C: 81  E: 30  F: 60  G: x
HPLC: 42
V: ±  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: Orange
K: P.Yellow  C: No Result  KC: PD: Yellow
Mass spectrum: 408, 215, 213, 196
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Atranolin, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 4-O-demethylbarbatate, Methyl 3α-hydroxy-4-O-demethylbarbatate
Notes: Visible (pale orange) in E; if very strong visible in all solvents. Widespread

7-Chlorocatenerin
A: 55  B: 60  C: 48  E: 15  F: x  G: x
HPLC: x  TLC: Rf 20 [chloroform/acetone, 4/3]
V: +  UV: +
Acid Spray: Orange  LW UV: Red
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 322, 320
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Catenarin, 7-Chloroemodic acid, 7-Chloroemodin, 7-Chloroemodinal, 7-Citreorosein, Emodin
Notes: Red-orange pigment. Minor component in Catenarina desolata

7-Chlorocitreorosein
A: 18  B: x  B': 22  C: 12  E: 1  F: x  G: x
HPLC: 17
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 322, 320, 291, 264
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloroemodinal, 7-Chloroemodic acid, Emodin
Notes: Intense yellow-orange pigment. Occurs in *Caloplaca spitsbergensis*

### 3-Chloro-4-O-demethylmicrophyllinic acid

<table>
<thead>
<tr>
<th>A</th>
<th>35</th>
<th>B</th>
<th>x</th>
<th>B'</th>
<th>34</th>
<th>C</th>
<th>22</th>
<th>E</th>
<th>x</th>
<th>F</th>
<th>x</th>
<th>G</th>
<th>x</th>
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<tbody>
<tr>
<td>HPLC: 25</td>
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<tr>
<td>V</td>
<td>−</td>
<td>UV: +</td>
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<tr>
<td>Acid Spray: Orange</td>
<td>LW UV: B.Blue</td>
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<td>Archers: x</td>
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<tr>
<td>K: No Result</td>
<td>C: Pink</td>
<td>KC: Red</td>
<td>PD: No Result</td>
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<tr>
<td>Mass spectrum: 284, 283, 282, 248</td>
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<tr>
<td>Substance Class: Orcinol Depsides</td>
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<tr>
<td>Biosynthetically Related Compounds: 4-O-Demethylmicrophyllinic acid</td>
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<tr>
<td>Notes: Occurs in <em>Hypotrachyna leiophylla</em></td>
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### 8-Chlorodioxocondidymic acid

<table>
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<tr>
<th>A</th>
<th>56</th>
<th>B</th>
<th>x</th>
<th>B'</th>
<th>37</th>
<th>C</th>
<th>44</th>
<th>E</th>
<th>x</th>
<th>F</th>
<th>x</th>
<th>G</th>
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<td>HPLC: 17</td>
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<td>V</td>
<td>−</td>
<td>UV: +</td>
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<tr>
<td>Acid Spray: Blue</td>
<td>LW UV: Purple</td>
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<td>Archers: Green</td>
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<tr>
<td>K: No Result</td>
<td>C: Green</td>
<td>KC: PD: No Result</td>
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<tr>
<td>Mass spectrum: 462, 460, 444,</td>
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<tr>
<td>Substance Class: Dibenzofurans</td>
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<tr>
<td>Biosynthetically Related Compounds: 8-Chlorodioxocondidymic acid, 8-Chlorooxodidymic acid, Dioxocondidymic acid, Dioxodidymic acid, Letrouitic acid, Oxodidymic acid</td>
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<tr>
<td>Notes: Minor component in <em>Letrouitia vulpina</em></td>
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</table>

### 8-Chlorodioxodidymic acid

<table>
<thead>
<tr>
<th>A</th>
<th>44</th>
<th>B</th>
<th>x</th>
<th>B'</th>
<th>27</th>
<th>C</th>
<th>35</th>
<th>E</th>
<th>x</th>
<th>F</th>
<th>x</th>
<th>G</th>
<th>x</th>
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<tbody>
<tr>
<td>HPLC: 17</td>
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<td>V</td>
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<td>UV: +</td>
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<tr>
<td>Acid Spray: Blue</td>
<td>LW UV: Purple</td>
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<tr>
<td>Archers: Green</td>
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<tr>
<td>K: No Result</td>
<td>C: Green</td>
<td>KC: PD: No Result</td>
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<tr>
<td>Mass spectrum: 434, 432, 416</td>
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<tr>
<td>Substance Class: Dibenzofurans</td>
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</tbody>
</table>
Biosynthetically Related Compounds: 8-Chlorodioxocondidymic acid, 8-Chlorooxodidymic acid, Dioxocondidymic acid, Dioxididymic acid, Letrouitic acid, Oxididymic acid


Notes: Minor component in Letrouitia vulpina

7-Chloro-1,6-di-O-methylemodin [1-O-Methylfragilin]

A: 57  B: x  B': 36  C: 47  E: 16  F: x  G: x
HPLC: 35  TLC: Rf 20 [toluene]
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 334, 332, 316, 314
Substance Class: Anthraquinones

Biosynthetically Related Compounds: 7-Chloro-1,6-di-O-methylemodin, 7-Chloroemodin, Fragilin


Notes: Orange pigment. Occurs in Nephroma laevigatum and N. tangeriense

7-Chloro-1,8-di-O-methylemodin [8-O-Methylfragilin]

A: x  B: x  B': x  C: x  E: 42  F: x  G: x
HPLC: 37  TLC: Rf 54 [toluene]
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 334, 332, 316, 314
Substance Class: Anthraquinones

Biosynthetically Related Compounds: 7-Chloroemodin, Fragilin


Notes: Yellow-orange pigment. Occurs in Nephroma laevigatum and Caloplaca xanthaspis

3-Chlorodivaricatic acid

A: 56  B: x  B': 57  C: 46  E: x  F: x  G: x
HPLC: 32
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 442, 244, 228, 226
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3-Chloroperlatolic acid, 3-Chlorostenosporic acid, Divaricatic acid
Notes: Acid Spray: strong-pale yellow, grey halo. Occurs in *Thelomma mammosum*

### 5-Chlorodivaricatic acid

A: 42  B: x  B': 62  C: 46  E: x  G: x
HPLC: 33
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 334, 228, 226
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3-Chlorodivaricatic acid, Divaricatic acid
Notes: Minor component in *Dimelaena cf. radiata*

### 7-Chloroemodic acid

A: 46  B: x  B': 37  C: 36  E: x  F: x  G: x
HPLC: 23
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: Violet  C: No Result  KC:  PD: No Result
Mass spectrum: 336, 334
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloroemodal, 7-Chlorocitreeorsein, Emodin
Notes: Intense yellow-orange pigment. Occurs in *Caloplaca spitsbergensis*

### 4-Chloroemodin

A: 68  B: x  B': 48  C: 54  E: 49  F: x  G: x
HPLC: 36
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 306, 304
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin
Notes: Intense yellow pigment. Acid Spray: Yellow when cold, brown when hot. Occurs in Caloplaca michelagoensis

5-Chloroemodin
A: x  B: x  B': x  C: 56  E: x  F: x  G: x
HPLC: 35
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 306, 304,
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 5,7-Dichloroemodin, Emodin
Notes: Intense yellow pigment. Occurs in Heterodermia obscurata

7-Chloroemodin
A: 55  B: x  B': 56  C: 47  E: 11  F: x  G: x
HPLC: 38  TLC: Rf 50 [chloroform/methanol, 4/1], Rf 47 [chloroform/acetone, 4/1]
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 306, 304,
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 5,7-Dichloroemodin, Emodin, Fragilin
Notes: Intense yellow pigment. Occurs in Heterodermia obscurata
7-Chloroemodinal

A: 32  B: x  B': x  C: 27  E: 10  F: x  G: x

HPLC: 19

V: +  UV: +

Acid Spray: Yellow  LW UV: Yellow

Archers: x

K: Violet  C: No Result  KC:  PD: No Result

Mass spectrum: 320, 318, 289

Substance Class: Anthraquinones

Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloroemodic acid, 7-Chlorocitreorosein, Emodin


Notes: Intense yellow-orange pigment. Occurs in Caloplaca spitsbergensis

7-Chlorofallacinal

A: 63  B: x  B': 40  C: 55  E: 20  F: x  G: x

HPLC: 21  TLC: Rf 33 [oxalic acid-SiO_2/benzene]

V: +  UV: +

Acid Spray: Yellow  LW UV: Orange

Archers: x

K: Violet  C: No Result  KC:  PD: No Result

Mass spectrum: 334, 332, 303, 289

Substance Class: Anthraquinones

Biosynthetically Related Compounds: 7-Choroparietinic acid, Fallacinal, Fragilin


Notes: Yellow pigment. SW UV: bright orange before spraying. Minor constituent of Caloplaca sp., Letrouititia leprolyta

3-Chloroisosubdivaricatic acid

A: 36  B: x  B': 45  C: 34  E: x  F: x  G: x

HPLC: 29

V: -  UV: +

Acid Spray: P. Yellow  LW UV: Green

Archers: Orange

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 394, 229, 228, 227

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 3-Chlorodivaricatic acid, Subdivaricatic acid, 3-Chlorosubdivaricatic acid

Notes: Minor component in Dimelaena radiata

3-Chlorolecanoric acid
A: 34  B: x  B': 41  C: 30  E: x  F: x  G: x
HPLC: 18
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: 352, 187, 186, 185
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid, 5-Chlorolecanoric acid, 3-Chloronordivaricatic acid

Notes: Minor component in Dimelaena radiata

5-Chlorolecanoric acid
A: 33  B: x  B': 44  C: 29  E: x  F: x  G: x
HPLC: 18
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: 352, 187, 186, 185
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid, 3,5-Dichlorolecanoric acid

Notes: Minor constituent of Punctelia pseudocoralloidea, P. subalbicans, P. subflava

Chlorolecideoidin
A: 58  B: x  B': 45  C: 48  E: x  F: x  G: x
HPLC: 28
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 436, 434, 432, 402
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3'-Dechlorolecideiodin, Lecideoidin, Leoidin
Notes: Minor component in Lecanora sulphurescens, Lecanora leprosa

2-Chlorolichexanthone
A: 69  B: x  B': 54  C: 70  E: 29  F: 80  G: x
HPLC: 47
V: +  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 321, 320, 319
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chloro-6-O-methylnorlichexanthone, 2,4-Dichlorolichexanthone, 2,5- Dichlorolichexanthone, Lichexanthone
Notes: Pale yellow pigment. Acid Spray: sulphur yellow. LW UV: dull green. Occurs in Pertusaria cicatricosa

4-Chlorolichexanthone
A: 75  B: x  B': 68  C: 78  E: 59  F: 88  G: x
HPLC: 50
V: +  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 321, 320, 291
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 2,4-Dichlorolichexanthone, Lichexanthone
Notes: Pale yellow pigment. Occurs in Sporopodium citrinum

5-Chlorolichexanthone
A: 73  B: x  B': 63  C: 77  E: 53  F: 83  G: x
HPLC: 48
V: +  UV: +
Acid Spray: Yellow  
LW UV: Green

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 321, 320, 291
Substance Class: Xanthones
Biosynthetically Related Compounds: 5-Chloro-6-\textit{O}-methylnorlichexanthone, 5-Chloronorlichexanthone, 2,5-Dichlorolichexanthone
Notes: Pale yellow pigment. Occurs in \textit{Lecanora contractula}

\textbf{7-Chlorolichexanthone}
A: 73  B: x  B': 61  C: 77  E: 39  F: x  G: x
HPLC: 52
V: +  UV: +

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 321, 320, 291
Substance Class: Xanthones
Biosynthetically Related Compounds: 7-Chloro-6-\textit{O}-methylnorlichexanthone, 2,7-Dichlorolichexanthone, 2,7-Dichloro-6-\textit{O}-methylnorlichexanthone,
Notes: Pale yellow pigment. Minor component in \textit{Lecanora contractuloides}

\textbf{5-Chloro-2'\textit{O}-methylanziaic acid}
A: 39  B: x  B': 38  C: 39  E: x  F: x  G: x
HPLC: 29
V: −  UV: +

Archers: x
K: No Result  C: P.Red  KC: Red  PD: No Result
Mass spectrum: -1, 242, 241, 240
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichloro-2'\textit{O}-methylanziaic acid, 3,5-Dichloro-2'\textit{O}-methylnorvaricatic acid, 3,5-Dichloro-2'\textit{O}-methylnorstenosporic acid
Notes: Minor component in \textit{Lecanora lividocinerea}. 
**5-Chloro-1-O-methylcitreorosein** [5-Chloro-1-O-methyl-α-hydroxyemodin]

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x  TLC: Rf 15 [chloroform/methanol, 9/1]
V: +  UV: +
Acid Spray: Yellow-orange  
LW UV: Yellow
Archers: x
K: Purple  C: No Result  
KC: PD: No Result
Mass spectrum: 336, 334

Substance Class: Anthraquinones
Biosynthetically Related Compounds: 5-Chloroemodin, 5-Chloro-1-O-methylemodin, Emodin, 1-O-Methylemodin


Notes: Intense yellow-orange pigment. Occurs in *Lasallia papulosa*

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**7-Chloro-1-O-methylcitreorosein** [1-O-Methyl-7-chlorocitreorosein]

A: x  B: x  B': x  C: 9  E: x  F: x  G: x
HPLC: 14  TLC: Rf 30 [chloroform/methanol, 9/1]
V: +  UV: +
Acid Spray: Yellow  
LW UV: Orange
Archers: x
K: Violet  C: No Result  
KC: PD: No Result
Mass spectrum: 337, 335

Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chlorocitreorosein


Notes: Intense yellow pigment. Occurs in *Nephroma laevigatum*

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**5-Chloro-1-O-methylemodin**

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x  TLC: Rf 65 [chloroform/methanol, 9/1]
V: +  UV: +
Acid Spray: Yellow  
LW UV: Yellow
Archers: x
K: Purple  C: No Result  
KC: PD: No Result
Mass spectrum: 320, 318

Substance Class: Anthraquinones
Biosynthetically Related Compounds: 5-Chloroemodin, 5-Chloro-1-O-methylcitreorosein, Emodin, 1-O-Methylemodin
Notes: Intense yellow-orange pigment. Occurs in Lasallia papulosa

7-Chloro-1-O-methylemodin [1-O-methyl-7-chloroemodin]
A: x  B: x  B': x  C: x  E: 4  F: x  G: x
HPLC: 35  TLC: Rf 70 [chloroform/methanol, 9/1], Rf 67 [chloroform/acetone, 4/1]
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 318, 300, 290, 289
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chloroemodin, Emodin, 1-O-Methylemodin
Notes: Intense yellow pigment. Occurs in Nephroma laevisatum

2-Chloro-6-O-methylnorlichexanthone
A: 56  B: x  B': 53  C: 46  E: 20  F: 67  G: x
HPLC: 31
V: +  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: Orange  KC: PD: No Result
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorlichexanthone, 4-Chloro-6-O-methylnorlichexanthone, 2-Chloronorlichexanthone, Lichexanthone, Thiophaninic acid
Notes: Pale yellow pigment. Occurs in Pertusaria xanthoplaca

4-Chloro-3-O-methylnorlichexanthone [Griseoxanthone B]
A: 54  B: x  B': 62  C: 43  E: 36  F: 75  G: x
HPLC: 36
V: +  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result   C: Orange   KC: PD: No Result
Substance Class: Xanthones
Biosynthetically Related Compounds: 4-Chloro-6-0-methylnorlichexanthone, 4-Chlorolicheanthone, 4,5-Dichlorolicheanthone, 4,5-Dichloro-3-0-methylnorlichexanthone
Notes: Occurs in Sporopodium citrinum

4-Chloro-6-0-methylnorlichexanthone
A: 56   B: x   B': 55   C: 46   E: 30   F: 72   G: x
HPLC: 34
V: +   UV: +
Acid Spray: P.Yellow   LW UV: Green
Archers: x
K: No Result   C: Orange   KC: PD: No Result
Substance Class: Xanthones
Biosynthetically Related Compounds: 4-Chlorolicheanthone, 2-Chloro-6-0-methylnorlichexanthone, 4-Chloronorlichexanthone, Lichexanthone, Thiophaninic acid
Notes: Yellow pigment. Occurs in Pertusaria xanthoplaca

5-Chloro-3-0-methylnorlichexanthone [Vinetorin]
A: 52   B: x   B': 57   C: 48   E: 29   F: 69   G: x
HPLC: 35
V: +   UV: +
Acid Spray: P.Yellow   LW UV: Green
Archers: x
K: No Result   C: Orange   KC: PD: No Result
Mass spectrum: 308, 306, 279, 277
Substance Class: Xanthones
Biosynthetically Related Compounds: 5-Chlorolicheanthone, 5-Chloronorlichexanthone, 2,5-Dichloro-3-0-methylnorlichexanthone
Notes: Yellow pigment. Occurs in Lecanora vinetorum
5-Chloro-6-O-methylnorlichexanthone
A: 50  B: x  B': 45  C: 46  E: 31  F: 75  G: x
HPLC: 32
V: +  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Orange  KC:  PD: No Result
Mass spectrum: 308, 306
Substance Class: Xanthones
Biosynthetically Related Compounds: 5-Chlorolichexanthone, 5-Chloronorlichexanthone, 2,5-Dichloro-6-O-methylnorlichexanthone
Notes: Yellow pigment. Occurs in Lecanora contractula

7-Chloro-6-O-methylnorlichexanthone
A: 54  B: x  B': 56  C: 36  E: 20  F: 61  G: x
HPLC: 40
V: +  UV: +
Acid Spray: Orange  LW UV: Yellow
Archers: x
K: No Result  C: Orange  KC:  PD: No Result
Substance Class: Xanthones
Biosynthetically Related Compounds: 7-Chlorolichexanthone, 7-Chloronorlichexanthone, 2,7-Dichloro-6-O-methylnorlichexanthone
Notes: Yellow pigment. Occurs in Lecanora populincola, L. salina

1'-Chloronephroarctin
A: 69  B: 54  B': 52  C: 67  E: 17  F: x  G: x
HPLC: 37
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Yellow
Mass spectrum: 406, 207, 202, 200
Substance Class: β-Orcinol Dipsides
Biosynthetically Related Compounds: Nephroarctin, Phenarctin

Notes: Acid Spray: very pale yellow, grey halo. LW UV: orange-brown, fades to orange. Minor component in *Pseudocyphellaria pickeringii*

**3-Chloronordivaricatic acid**

A: 37  B: x  B': 50  C: 36  E: x  F: x  G: x

HPLC: 25

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: Orange

K: No Result  C: P.Red  KC: Red  PD: No Result

Mass spectrum: -1, 213, 212, 195

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 3-Chlorolecanoric acid, Nordivaricatic acid, 3-Chlorodivaricatic acid


Notes: Minor component in *Dimelaena radiata*

**2-Chloronorlichexanthone**

A: 36  B: x  B': 41  C: 19  E: 7  F: 44  G: x

HPLC: 28

V: +  UV: +

Acid Spray: No Result  LW UV: B.Blue

Archers: x

K: No Result  C: Orange  KC: PD: No Result

Mass spectrum: 294, 293, 292, 291

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Chlorolichexanthone, 2-Chloro-6-O-methylnorlichexanthone, 2,7-Dichloronorlichexanthone


Notes: Yellow pigment. Occurs in *Lecanora populicola*

**4-Chloronorlichexanthone**

A: 38  B: x  B': 43  C: 23  E: 19  F: x  G: x

HPLC: 21

V: +  UV: +

Acid Spray: Yellow  LW UV: Green

Archers: x
5-Chlororlichexanthone

A: 40  B: x  B': 46  C: 25  E: 17  F: x  G: x
HPLC: 19
V: +  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Orange  KC:  PD: No Result
Mass spectrum: 294, 292, 263, 257
Substance Class: Xanthones
Biosynthetically Related Compounds: 5-Chlororlichexanthone, 5-Chloro-3-O-methylnorlichexanthone, 5-Chloro-6-O-methylnorlichexanthone, 2,5-Dichloronorlichexanthone
Notes: Yellow pigment. Occurs in Lecanora straminea

7-Chloronorlichexanthone

A: 42  B: x  B': 47  C: 26  E: 42  F: 78  G: x
HPLC: 39
V: +  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: 294, 292, 257, 229
Substance Class: Xanthones
Biosynthetically Related Compounds: 7-Chlororlichexanthone, 7-Chloro-6-O-methylnorlichexanthone, 2,7-Dichloronorlichexanthone, 5,7-Dichloronorlichexanthone
Notes: Yellow pigment. Occurs in Lecanora populicola

8-Chlorooxodidymic acid
A: 60  B: x  B': 55  C: 48  E: x  G: x
HPLC: 37
V: –  UV: +
Acid Spray: Blue  LW UV: Purple
Archers: Green
K: No Result  C: Green  KC: PD: No Result
Mass spectrum: 420, 418, 400
Substance Class: Dibenzo-furans
Biosynthetically Related Compounds: 8-Chlorodioxo-con-didymic acid, 8-Chlorodioxididymic acid, Dioxocon-didymic acid, Dioxodidymic acid, Letrouit acid, Oxoidymic acid
Notes: Minor component in *Letrouitia vulpina*

**7-Chloroparietinic acid**

A: 42  B: x  B': 47  C: 47  E: 0  F: x  G: x
HPLC: 32
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 350, 348
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chorofallacinal, 7-Chorotelochistin, Fragilin
Notes: Minor component in *Letrouitia leprolyta*

**3-Chloroperlatolic acid**

A: 47  B: x  B': 66  C: 51  E: x  F: x  G: x
HPLC: 45
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 272, 256, 254
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3- Chlorodivaratic acid, 3-Chlorostenosporic acid, Perlatolic acid
Chlorophyllopsorin
A: 72  B: x  B': 53  C: 73  E: 15  F: x  G: x
HPLC: 28
V: −  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Yellow
Mass Spectrum: 412, 410, 384, 382
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Allorhizin, Argopsin, Methyl 2,7-dichloropsoromate, Methyl 2,7-dichloronorpsoromate, Phyllopsorin
Notes: Occurs in Phyllopsora africana

3-Chlorostenosporic acid
A: 44  B: x  B': 61  C: 49  E: x  F: x  G: x
HPLC: 39
V: −  UV: +
Acid Spray: P. Yellow  LW UV: Purple
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 244, 228, 226
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3- Chlorodivaricatic acid, 3-Chloroperlatolice acid, Stenosporic acid
Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in Dimelaena californica

3-Chlorosubdivaricatic acid
A: 36  B: x  B': 45  C: 34  E: x  G: x
HPLC: 29
V: −  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers:
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 394, 216, 201, 200
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3-Chlorodivaricatic acid, Subdivaricatic acid, 3-Chloroisosubdivaricatic acid
Notes: Minor component in *Dimelaena radiata*

**7-Choroteloschistin**

A: 43  B: x  B': 30  C: 33  E: 11  F: x  G: x
HPLC: 18
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 336, 334
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Choroparietinic acid, 7-Chorofallacinal, Fragilin
Notes: Orange pigment. SW UV: bright orange before spraying. Minor constituent of *Letrouitia leprolyta*

**2-Chlorovirensic acid** [5-Chlorovirensic acid]

A: 30  B: x  B': 58  C: 38  E: x  F: x  G: x
HPLC: 33
V: −  UV: +
Acid Spray: Green  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Orange
Mass spectrum: 394, 392, 376, 374
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Physciosporin, Virensic acid
Reference: New report
Notes: Minor accessory substance in *Pseudocyphellaria faveolata*

**7-Chloro-1,6,8-trihydroxy-3-methyl-9-anthrone** [AO1-Anthrone]

A: 55  B: x  B': x  C: 45  E: x  F: x  G: x
HPLC: 34
V: +  UV: +
Acid Spray: P.Yellow  LW UV: Yellow
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 292, 290
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chloroemodin, 5,7-Dichloroemodin, Emodin
Notes: Pale yellow pigment. Occurs in Caloplaca spitsbergenensis, Heterodermia obscurata

Chodatin
A: 66  B: x  B': 64  C: 68  E: x  F: x  G: x
HPLC: 52
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
K: No Result  C: Orange  KC: PD: No Result
Archers: x
Mass spectrum: 408, 406, 404, 393
Substance Class: Xanthones
Biosynthetically Related Compounds: Demethylchodatin, Isoarthothelin, 2,5,7-Trichloro-3-O-methylnorlichexanthone
Notes: Occurs in Lecidella granulosula

Chrysophanal
A: 58  B: x  B': 51  C: 47  E: 10  F: x  G: x
HPLC: 17
V: +  UV: +
Acid Spray: Orange  LW UV: Magenta
Archers: x
K: Red-violet  C: No Result  KC: PD: No Result
Mass spectrum: 268
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Chrysophanol, Rhein
Notes: Yellow pigment. Occurs in Caloplaca rheinigera

Chrysophanol [Chrysophanic acid]
A: 75  B: x  B': 80  C: 80  E: 80  F: 90  G: x
HPLC: 35
V: +                   UV: +
Acid Spray: Yellow     LW UV: Yellow
Archers: x
K: Red-violet   C: No Result   KC: PD: No Result
Mass spectrum: 254
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Chrysophanal, Rhein
Notes: Intense yellow pigment. Occurs in Caloplaca rheinigera

**Cinchonaric acid** [3-O-Methylprotocetraric acid]
A: 2  B: x  B': 6  C: 3  E: x  F: x  G: x
HPLC: 10
V: -                   UV: +
Acid Spray: Grey       LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: No Result   PD: Red
Mass spectrum: x
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Protocetraric acid
Notes: Occurs in Ocellularia cavata

**Citreorosein**
A: 26  B: x  B': 22  C: 11  E: 2  F: x  G: x
HPLC: 14
V: +                   UV: +
Acid Spray: Yellow     LW UV: Yellow
Archers: x
K: Violet   C: No Result   KC: PD: No Result
Mass spectrum: 286, 257
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Emodinal, Emodic acid
Notes: Yellow pigment. Occurs in Caloplaca stewartensis, Xanthoria parietina

**α-Collatolic acid**
A: 40  B: 32  B': 35  C: 35  E: x  F: x  G: x  
HPLC: 26
V: –  UV: +
Acid Spray: P.Yellow   LW UV: D.Blue
Archers: x
K: No Result  C: No Result  KC: P.Red  PD: No Result
Mass spectrum: 508, 482, 263, 262
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Alectoronic acid, Dehydrocollatolic acid, 4-O-Methylphysodic acid, Physodic acid
Notes: SW UV: floresces bright blue before spraying. Occurs in *Tephromela atra*

**β-Collatolic acid**
A: 32  B: 10  B': x  C: 26  E: x  F: x  G: x
HPLC: 22
V: –  UV: +
Acid Spray: P.Yellow   LW UV: Blue
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: -1, 508, 483, 482
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Alectoronic acid, β-Alectoronic acid, α-Collatolic acid
Notes: Occurs in *Asahinea chrysantha*

**Concinchonaric acid**
A: 3  B: x  B': 9  C: 5  E: x  F: x  G: x
HPLC: 12
V: -  UV: +
Acid Spray: Yellow   LW UV: Green
Archers: x
K: x  C: x  KC: x  PD: x
Mass spectrum:
Substance Class: unknown
Biosynthetically Related Compounds: Cinchonaric acid
Condidymic acid

A: 47  B: 77  B': 74  C: 52  E: x  F: x  G: x
HPLC: 40
V:  -  UV:  +
Acid Spray: Blue-grey  LW UV: Purple
Archers: x
K: No Result  C: Green  KC: No Result  PD: No Result
Mass spectrum: 398, 380, 354, 298
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Didymic acid, Isodidymic acid, Subdidymic acid
Notes: Occurs in Cladonia floerkeana

Conechinocarpic acid

A: 18  B: 38  B': 37  C: 27  E: x  F: x  G: x
HPLC: 27
V:  -  UV:  +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: P.Yellow
Mass spectrum: -1, 299, 257, 196
Substance Class: Benzyl esters
Biosynthetically Related Compounds: Echinocarpic acid, Hirtifructic acid
Notes: Occurs in Relicina samoensis

Coneuplectin

A: 55  B: x  B': 17  C: 47  E: 11  F: x  G: x
HPLC: 25
V:  +  UV:  +
Acid Spray: P.Yellow  LW UV: P.Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 297, 296
Substance Class: Naphthopyrones
Biosynthetically Related Compound: Euplectin
Notes: Yellow-orange pigment. Occurs in Flavoparmelia euplecta

Confluentic acid
A: 48  B: 32  B': 32  C: 46  E: x  F: x  G: x
HPLC: 29
V: −  UV: +
Acid Spray: P.Yellow  LW, UV: B.Blue
Archers: P.Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 280, 266, 262

Substance Class: Orcinol Depsidines
Biosynthetically Related Compounds: Hyperconfluentic acid, 2'-O-Methylconfluentic acid, 2'-O-Methylmicrophyllinic acid, 2'-O-Methylperlatolic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Paraporpidia leptocarpa

Confriesic acid
A: 12  B: x  B': 23  C: 17  E: x  F: x  G: x
HPLC: 24
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x

Substance Class: Depsido-depsides
Biosynthetically Related Compounds: Friesic acid
Notes: Occurs in Xylographa isidiosa

Confumarprotocetraric acid
A: 2  B: x  B': 2  C: 2  E: x  F: x  G: 17
HPLC: 15
V: −  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: -1, 209, 151, 149, 135  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Fumarprotocetraric acid  
Notes: Occurs in Cladonia phyllophora

Congrayanic acid  
A: 29  B: 47  B’: 45  C: 34  E: x  F: x  G: x  
HPLC: 37  
V: −  UV: +  
Acid Spray: P.Orange  LW UV: Pink  
Archers: x  
K: No Result  C: Red  KC: PD: No Result  
Mass spectrum: 432, 388, 370, 344  
Substance Class: Diphenyl ethers  
Biosynthetically Related Compounds: 4-O-Demethylgrayanic acid, Grayanic acid  
Notes: Acid Spray: pale orange, grey halo. LW UV: purplish pink. Occurs in Neophyllis melacarpa

Conhirtifructic acid  
A: 45  B: x  B’: 35  C: 33  E: x  F: x  G: x  
HPLC: 22  
V: −  UV: +  
Acid Spray: Orange  LW UV: Orange  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: x  
Substance Class: unknown  
Biosynthetically Related Compounds: Hirtifructic acid, Echinocarpic acid  
Notes: Occurs in Ocellularia diacida

Conhypoprotocetraric acid  
A: 4  B: x  B’: 12  C: 3  E: x  F: x  G: x  
HPLC: 12  
V: −  UV: +
Acid Spray: P.Grey  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 165, 149, 139
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypoprotocetraric acid, Conprotocetraric acid
Notes: Occurs in Lecanora myriocarpoides (major) and Relicina cf. incongrua (minor)

**Conhyposalazinic acid**

A: 4  B: x  B': 5  C: 1  E: x  F: x  G: 17
HPLC: 0
V: –  UV: +

Acid Spray: Pink  LW UV: P.Red
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypoconstictic acid, Hyposalazinic acid, Hypostictic acid
Notes: Minor component in Xanthoparmelia quintaria

**Conloxodin**

A: 50  B: 36  B': 31  C: 32  E: 18  F: x  G: x
HPLC: 20
V: –  UV: +

Acid Spray: Green  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: Pink  PD: No Result
Mass spectrum: 428, 396, 384, 370
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Conorlobaridone, Loxodin, Norlobaridone
Notes: Occurs in Xanthoparmelia xanthofarinosa

**Connorstictic acid**

A: 11  B: 11  B': 11  C: 3  E: x  F: x  G: 26
HPLC: 3
V: – 
UV: +
Acid Spray: Orange
LW UV: Orange
Archers: x
K: Red
C: No Result
KC: PD: No Result
Mass spectrum: 374, 356, 181, 179

Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Consalazinic acid, Hyposalazinic acid, Norstictic acid, Subnorstictic acid
Notes: Occurs in Ramboldia petraeoides

Conorobaridone
A: 43
B: 30
B': 33
C: 14
E: 20
F: x
G: x
HPLC: 17
V: – 
UV: +
Acid Spray: Green
LW UV: B.Blue
Archers: x
K: No Result
C: No Result
KC: Pink
PD: No Result
Mass spectrum: 370, 342, 313, 286

Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Conloxadon, Loxadin, Norloobaridone, Subnorloobaridone
Notes: Acid Spray: Green fades to grey. Occurs in Xanthoparmelia xanthofarinosa

Conphysodalic acid
A: 2
B: x
B': 11
C: 2
E: x
F: x
G: 24
HPLC: 16
V: – 
UV: +
Acid Spray: Orange
LW UV: Orange
Archers: x
K: No Result
C: No Result
KC: No Result
PD: No Result
Mass spectrum: 374, 356, 181, 179

Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Physodalic acid, Protocetraric acid, Virensic acid
Notes: Minor component in Flavoparmelia ferax
**Conporphyrilic acid**

A: 4  B: x  B': 6  C: 3  E: x  F: x  G: x

HPLC: 3

V: –  UV: +

Acid Spray: No Result  LW UV: Purple

Archers: x

K: No Result  C: Green  KC: No Result  PD: No Result

Mass spectrum: 330, 312

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: Porphyrilic acid

Reference: New report

Notes: Minor component in *Lepraria atlantica*

**Conprotocetraric acid**

A: 2  B: x  B': 7  C: 2  E: x  F: x  G: 9

HPLC: 12

V: –  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: -1, 149, 111, 97

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Protocetraric acid, Convirensic acid


Notes: Minor component in *Usnea trichodeoides*

**Consalazinic acid**

A: 2  B: 1  B': 1  C: 1  E: x  F: x  G: 6

HPLC: 0

V: –  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: P.Red  C: No Result  KC: No Result  PD: Orange

Mass spectrum: x

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Connorstic acid, Norstic acid, Salazinic acid


Notes: Minor component in *Xanthoparmelia tasmanica*
**Consalazinolide [6α-Deoxyconsalazinic acid]**

A: 3  B: x  B': 4  C: 2  E: x  F: x  G: x

HPLC: 7

V: –  UV: +

Acid Spray: Yellow  LW UV: Brown

Archers: x

K: D: Red  C: No Result  KC: PD: Orange

Mass spectrum: x

Biosynthetically Related Compounds: Consalazinic acid, Norstictic acid, Salazinic acid


Notes: Acid Spray: blue-grey, yellow on standing. Minor component in *Heterodermia queenslandica*

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**Constictic acid**

A: 7  B: 3  B': 1  C: 2  E: x  F: x  G: 9

HPLC: 1

V: –  UV: +

Acid Spray: Orange-brown  LW UV: Brown

Archers: x

K: Yellow  C: No Result  KC: PD: Orange

Mass spectrum: 402, 384, 356, 193

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: α-Acetylconstictic acid, Cryptostictic acid, Hypoconstictic acid, Hypostictic acid, Menegazziaic acid, Norstictic acid, Peristentic acid, Stictic acid


Notes: Minor component in *Xanthoparmelia conspersa*

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**Constipatic acid**

A: 31  B: x  B': 27  C: 29  E: x  F: x  G: x

HPLC: 33

V: –  UV: –

Acid Spray: P.Brown  LW UV: Lilac

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 368, 353, 350, 324

Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Dehydroconstipatic acid, Dehydroprotoconstipatic acid, Protoconstipatic acid
Notes: Occurs in Xanthoparmelia constipata

**Consuccinoprotocetraric acid**

A: 2  B: x  B': 2  C: 2  E: x  F: x  G: 15
HPLC: 15
V: –  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 121, 119, 117
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Conprotocetraric acid, Succinprotocetraric acid
Notes: Minor component in Xanthoparmelia succinprotocetrarica

**Contortin**

A: 67  B: x  B': 41  C: 60  E: 34  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: Green  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 418, 403, 388, 387
Substance Class: Biphenyls
Biosynthetically Related Compounds: Usnic acid
Notes: Occurs in Pannaria contorta

**Convirensic acid [Hypovirensic acid]**

A: 9  B: x  B': 26  C: 7  E: x  F: x  G: 37
HPLC: 16
V: –  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 183, 168, 128
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Conprotocetraric acid, Virensic acid
Notes: Minor component in Sulcaria virens

**Coronatoquinone**

A: 38  B: x  B': 11  C: 28  E: x  F: x  G: x
HPLC: 12
V: +  UV: +
Acid Spray: Lilac  LW UV: Pink
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 320, 318, 303, 302
Substance Class: Naphthaquinone
Biosynthetically Related Compounds: Anhydofusarubin lactol, Fusarubin
Notes: Reddish purple pigment. Occurs in Pseudocyphellaria coronata

**Cristazarin** [2-Ethyl-3,5,8-trihydroxy-6-methoxynaphtho-1,4-quinone]

A: 40  B: x  B': x  C: 33  E: x  F: x  G: x
HPLC: x
V: +  UV: +
Acid Spray: Purple  LW UV: Magenta
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 264, 249
Substance Class: Naphthaquinones
Biosynthetically Related Compounds: Boryquinone, 6-Methylcristazarin, Norcristazarin
Notes: Purple pigment. Occurs in cultures of Cladonia cristatella

**Crustinic acid**

A: 24  B: 18  B': 34  C: 9  E: x  F: x  G: x
HPLC: 19
V: – UV: +
Acid Spray: Black LW UV: Black
Archers: x
K: No Result C: Red KC: PD: No Result
Mass spectrum: -1, 301, 151
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid
Notes: Minor component in Umbilicaria custulosa

Cryptochlorophaeic acid
A: 46 B: 46 B': 45 C: 37 E: x F: x G: x
HPLC: 23
V: – UV: +
Acid Spray: P.Brown LW UV: P.Brown
Archers: Red-brown
K: Red C: Red KC: PD: No Result
Mass spectrum: -1, 240, 238, 222
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4,4'-Di-O-methylcryptochlorophaeic acid, Merochlorophaeic acid, 4-O-Methylcryptochlorophaeic acid, 4'-O-Methylcryptochlorophaeic acid, Paludosic acid
Notes: Occurs in Cladonia cryptochlorophaea

Cryptostictinolide
A: 28 B: x B': x C: 20 E: x F: x G: x
HPLC: 14
V: – UV: +
Acid Spray: Orange LW UV: Orange
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 372, 354
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Constictic acid, Cryptostictic acid, Hypostictic acid, Menegazziaic acid, Norstictic acid, Stictic acid

Notes: Minor component in *Usnea himantodes*

**Cryptostictic acid**

A: 14  B: 14  B': 10  C: 10  E: x  F: x  G: 27  

HPLC: 4

V: –  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 388, 370, 177

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Connorstictic acid, Constictic acid, Hypostictic acid, Menegazziaic acid, Norstictic acid, Stictic acid


Notes: Minor component in *Lobaria oregana*, *Xanthoparmelia conspersa*

**Cryptothamnolic acid**

A: 38  B: x  B': 32  C: 40  E: x  F: x  G: x

HPLC: 25

V: –  UV: +

Acid Spray: Brown  LW UV: Brown

Archers: x

K: Yellow  C: No Result  KC: x  PD: Yellow

Mass spectrum: -1, 346, 219, 194

Substance Class: β-Orcinol m-Depsides

Biosynthetically Related Compounds: Hypothamnolic acid, Thamnolic acid, Lactothamnolic acid


Notes: Occurs in *Pertusaria* sp.

**Cyclographin**

A: 68  B: x  B': 63  C: 70  E: 9  F: x  G: x

HPLC: 25

V: –  UV: +

Acid Spray: Grey  LW UV: Grey

Archers: x
K: No Result  C: No Result  KC: No Result  PD: Yellow
Mass spectrum: 408, 406, 374, 346
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Methyl virensate, Physciospin
Notes: Occurs in Catarrhaphia dictyoplaca

Cynodontin
A: 78  B: x  B': 85  C: 85  E: 57  F: 90  G: x
HPLC: 12
V: +  UV: +
Acid Spray: Magenta  LW UV: Purple
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 286, 270, 257, 229
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Asahinin, Islandicin
Notes: Reddish purple pigment. Occurs in Asahinea chrysantha

Decarboxyalectoronic acid
A: 40  B: x  B': 28  C: 16  E: x  F: x  G: x
HPLC: 25
V: -  UV: +
Acid Spray: P.Yellow  LW UV: Blue
Archers: x
K: No Result  C: No Result  KC: Red  PD: No Result
Mass spectrum: 468, 450, 371, 370
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Alectoronic acid
Notes: Occurs in Hypotrichyna graciliescens

Decarboxyzaniaic acid
A: 48  B: x  B': 46  C: 32  E: x  F: x  G: x
HPLC: 48
V: -  UV: +
Acid Spray: P.Yellow            LW UV: Green
Archers: x
K: No Result    C: Red        KC: No Result    PD: No Result
Mass spectrum: 448, 297
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C
Notes: Occurs in Xanthoparmelia depsidella

Decarboxydivaricatic acid
A: 60   B: x   B': 56   C: 51   E: x   F: x   G: x
HPLC: 45
V: –           UV: +
Acid Spray: P.Yellow            LW UV: Green
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass spectrum: 344, 194, 193, 192
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxynorstenosporic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, Divaricatic acid
Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxyhypothamnolic acid
A: 5    B: x    B': 15    C: 13    E: x    F: x    G: x
HPLC: 15
V: –            UV: +
Acid Spray: Brown            LW UV: Brown
Archers: x
K: Purple        C: P.Red    KC:         PD: No Result
Mass spectrum: 362, 209, 192, 191
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Hypothamnolic acid, Thamnolic acid, Lactothamnolic acid
Notes: Occurs in Pertusaria sp.
Decarboxy-2'-O-methylvaricatic acid
A: 74  B: x  B': 73  C: 88  E: x  F: x  G: x
HPLC: 53
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 358, 194, 193, 192
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxynorstenosporic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, 2'-O-Methlydivaricatic acid
Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxy-2'-O-methylimbricaric acid
A: 60  B: x  B': 56  C: 48  E: x  F: x  G: x
HPLC: 51
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: No Result  PD: No Result
Mass spectrum: 372, 208, 207, 166
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxynorstenosporic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, 2'-O-Methylimbricaric acid
Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxynorimbricaric acid
A: 46  B: x  B': 53  C: 29  E: x  F: x  G: x
HPLC: 42
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: No Result  PD: No Result
Mass spectrum: 358, 208, 207, 163
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, Imbricaric acid


Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxynorstenosporic acid
A: 45    B: x    B': 45    C: 27    E: x    F: x    G: x
HPLC: 43
V: –    UV: +
Acid Spray: P.Yellow    LW UV: Green
Archers: x
K: No Result    C: Red    KC: No Result    PD: No Result
Mass spectrum: 358, 180, 179, 178
Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, Stenosporic acid


Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxyperlatolic acid
A: 63    B: x    B': 60    C: 56    E: x    F: x    G: x
HPLC: 55
V: –    UV: +
Acid Spray: P.Yellow    LW UV: Green
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass spectrum: 400, 222, 221, 180
Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C, Perlatolic acid


Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxystenosporic acid
A: 63    B: x    B': 57    C: 55    E: x    F: x    G: x
HPLC: 51
V: –    UV: +
Acid Spray: P.Yellow                      LW UV: Green
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: 372, 194, 193, 124
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxynorstenosporic acid, Stenosporic acid, Depsidellin A, Depsidellin B, Depsidellin C
Notes: Minor constituent of Xanthoparmelia depsidella

Decarboxythamnolic acid
A: 5     B: 25     B’: 18     C: 18     E: x     F: x     G: 38
HPLC: 7
V: −      UV: +
Acid Spray: Brown                      LW UV: Brown
Archers: P.Red
K: Yellow   C: No Result   KC: PD: Orange
Mass spectrum: 376, 332, 226, 209
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Thamnolic acid
Notes: Occurs in chemotypes of Thamnolia vermicularis

3-Dechlorodiploicin
A: 58     B: x     B’: 53     C: 62     E: 28     F: x     G: x
HPLC: 37
V: −      UV: +
Acid Spray: Grey                      LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: 390, 388, 355, 353
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3-Dechloro-4-O-methylidiploicin, Diploicin, Scensidin
Notes: Occurs in Diploicia canescens
**4-Dechlorogangaleoidin** [3-Dechlorogangaleoidin]

A: 53  B: x  B': 31  C: 40  E: x  F: x  G: x

HPLC: 23

V: –  UV: +

Acid Spray: Orange  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 416, 414, 412

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Norangaleoidin, Gangaleoidin


Notes: Minor component in *Lecanora argentata*

**(+)-Dechlorogriseofulvin**

A: 32  B: x  B': 6  C: 19  E: x  F: x  G: x

HPLC: 5

V: –  UV: +

Acid Spray: Yellow  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 318, 180, 138

Substance Class: Spirobenzofuranones

Biosynthetically Related Compounds: (+)-Griseofulvin


Notes: Occurs in *Lecanora griseofulva*

**3'-Dechlorolecideoidin**

A: 56  B: 47  B': 40  C: 42  E: 17  F: x  G: x

HPLC: 17

V: –  UV: +

Acid Spray: Orange  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 366, 364, 334, 332

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Gangaleoidin, Lecideoidin

Notes: Acid Spray: orange, grey halo. Minor component in *Tylothalia pahiensis*

**2-Dechloro-8-O-methylthiomelin** [1-Hydroxy-4-chloro-5,8-dimethoxy-6-methylxanthone]
A: 65  B: x  B': 45  C: 53  E: 35  F: x  G: x
HPLC: 64
V: +       UV: +
Acid Spray: Orange   LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 320, 307, 305
Substance Class: Xanthones
Biosynthetically Related Compounds: 4-Dechloro-8-O-methylthiomelin, 4-Dechlorothiomelin, 8-O-Methylthiomelin, Thiomelin
Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*

**4-Dechloro-8-O-methylthiomelin** [1-Hydroxy-2-chloro-5,8-dimethoxy-6-methylxanthone]
A: 64  B: x  B': 39  C: 51  E: 29  F: x  G: x
HPLC: 66
V: +       UV: +
Acid Spray: Orange   LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 322, 320, 305, 302
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 4-Dechlorothiomelin, 8-O-Methylthiomelin, Thiomelin
Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*

**3-Dechloro-4-O-methylpiplocin** [Dechloro-O-methylpiplocin]
A: 74  B: x  B': 58  C: 83  E: 55  F: x  G: x
HPLC: 44
V: –       UV: +
Acid Spray: P.Grey   LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 404, 402, 369, 367
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3-Dechlorodiploicin, Diploicin, Scensidin
Buella canescens (Dicks.) De Not: Novel Phthalide Catabolites of Depsidones. Journal of the Chemical 
Notes: Best seen under SW UV before spraying. Minor component in Diploicia canescens

Dechloropannarin
A: 73  B: 73  B': 61  C: 75  E: 55  F: x  G: x
HPLC: 29
V: +  UV: +
Acid Spray: Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Orange
Mass spectrum: 328, 300, 285, 284
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Nordechloropannarin, Norpannarin, Pannarin
Journal of Chemistry. 35: 2325-2333.
Notes: Acid Spray: orange, fades to brown-grey. Occurs in Phyllopsora beutneri

2-Dechlorothiomelin [1,8-Dihydroxy-4-chloro-5-methoxy-6-methylxanthone]
A: 79  B: x  B': 80  C: 85  E: 64  F: x  G: x
HPLC: 44
V: +  UV: +
Acid Spray: No Result  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 308, 306, 293, 292
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 4-Dechlorothiomelin, 8-O- 
Methylthiomelin, Thiomelin
Reference: Elix, JA/ Jiang, H/ Gaul, KL 1993: The structure and synthesis of some minor xanthones from the 
Notes: Pale yellow pigment. Minor component in Rinodina thiomela

4-Dechlorothiomelin [1,8-Dihydroxy-2-chloro-5-methoxy-6-methylxanthone]
A: 78  B: x  B': 86  C: 83  E: 61  F: x  G: x
HPLC: 46
Acid Spray: No Result     
LW UV: Purple

Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result

Mass spectrum: 308, 306, 293, 292

Substance Class: Xanthones

Biosynthetically Related Compounds: 4-Dechloro-8-O-methylthiemin, 2-Dechlorothiemin, 8-O-Methylthiemin, Thiemin


Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*

**2-Dechlorovicanicin**

A: 52  B: x  B': 48  C: 40  E: 22  F: x  G: x

HPLC: 34

Acid Spray: Blue     
LW UV: Purple

Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result

Mass spectrum: 364, 362

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Dechloropannarin, 7-dechlorovicanicin, Hypopannarin, O-Methylvicanicin, Norvicanicin, Pannarin, Vicanicin

Reference: New report

Notes: Acid Spray: pale light blue, fades to blue-grey. Minor constituent in chemical race of *Pannaria sphinctrina*

**7-Dechlorovicanicin**

A: x  B: x  B': 64  C: 68  E: 61  F: x  G: x

HPLC: 36

Acid Spray: Blue     
LW UV: Purple

Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result

Mass spectrum: 364, 362

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Dechloropannarin, 7-dechlorovicanicin, Hypopannarin, O-Methylvicanicin, Norvicanicin, Pannarin, Vicanicin

Reference: New report

Notes: Minor constituent in *Lecanora margarodes*
Dehydrocollatolic acid

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Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Alectoronic acid, α-Collatolic acid, Dehydroalectoronic acid


Notes: Minor component in Parmotrema nilgherrense

Dehydroconstipatic acid [Isomuronic acid, Neuropogonic acid]

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<th>C</th>
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Substance Class: Aliphatic acids

Biosynthetically Related Compounds: Constipatic acid, Muronic acid, Protoconstipatic acid


Notes: Occurs in Neuropogon trachycarpus

4-O-Demethylbarbatic acid

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Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Barbatic acid, Norobtusatic acid, Obtusatic acid

Notes: Acid Spray: pale yellow, grey halo. LW UV: purple, pale yellow halo. Minor component in Cladia aggregata

**Demethylchodatin**

A: 46  B: x  B': 40  C: 34  E: x  F: x  G: x
HPLC: 44

V: +  UV: +

Acid Spray: Yellow  LW UV: Orange

K: No Result  C: Orange  KC: No Result  PD: No Result

Mass spectrum: 394, 392, 390, 377

Substance Class: Xanthones

Biosynthetically Related Compounds: Chodatin, Isoarthothelin, 2,5,7-Trichloro-3-O-methylnorlichexanthone


Notes: Occurs in Lecidella granulosula

**7-Demethylcristazarin** [2-Ethyl-3,5,6,8-tetrahydroxynaphtho-1,4-quinone, Norcristazarin]

A: 32  B: x  B': 48  C: 10  E: x  F: x  G: x
HPLC: x

V: +  UV: +

Acid Spray: Purple  LW UV: Magenta

K: Red  C: No Result  KC: PD: No Result

Mass spectrum: 250, 235, 232, 217

Substance Class: Naphthaquinones

Biosynthetically Related Compounds: 6-Methylcristazarin, Cristazarin


Notes: Occurs in Flavocetraria cucullata

**4-O-Demethylidiffractaic acid**

A: 34  B: x  B': 44  C: 31  E: x  F: x  G: x
HPLC: 17

V: −  UV: +

Acid Spray: P.Yellow  LW UV: P.Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 360, 316, 269, 179

Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Diffractaic acid
Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, pale yellow halo. Minor component in Xanthoparmelia duplicata

4-O-Demethylglomellic acid
A: 22  B: x  B': 20  C: 11  E: x  F: x  G: 48
HPLC: 12
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: -1, 238, 221, 220
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylglomelliferic acid, Glomellic acid, Glomelli feri acid
Notes: Minor component in Xanthoparmelia loxodes

4-O-Demethylglomelliferic acid
A: 29  B: x  B': 36  C: 21  E: x  F: x  G: 52
HPLC: 20
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: -1, 224, 221, 220
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylglomelliferic acid, Glomellic acid, Glomelli feri acid
Notes: Minor component in Xanthoparmelia loxodes

4-O-Demethylgrayanic acid
A: 41  B: x  B': 21  C: 18  E: x  F: x  G: x
HPLC: 41
V: –  UV: +
Acid Spray: P.Brown  
LW UV: P.Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 356, 328
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Congrayanic acid, Grayanic acid, Melacarpic acid
Notes: Acid Spray: pale orange brown, fades to pale orange. LW UV: strong-pale brown, bluish halo. Minor component in Cladonia grayi, Neophyllis melacarpa

4-O-Demethylimbricaric acid
A: 35  B: x  B': 57  C: 32  E: x  F: x  G: x
HPLC: 29
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: -1, 224, 196, 179
Substance Class: Orcinol Dypsides
Biosynthetically Related Compounds: Anziaic acid, Imbricaric acid
Notes: Acid Spray: strong-pale yellow, grey halo. Minor component in Cetrelia sanguinea

Demethylleprapinic acid
A: x  B: x  B': x  C: 7  E: 9  F: x  G: x
HPLC: x  TLC: Rf 48 [hexane/diethyl ether/formic acid, 30/20/6]
V: +  UV: +
Acid Spray: P.Yellow  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 435, 290, 145
Substance Class: Pulvinic acid derivatives
Biosynthetically Related Compounds: Leprapinic acid
Notes: Intense yellow pigment. Occurs in Lepraria sp.

4-O-Demethylloxodellic acid
A: 23  B: x  B': 34  C: 18  E: x  F: x  G: 49
HPLC: 14
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: -1, 310, 221, 220
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylglomelliferic acid, Glomellic acid, Glomelliferic acid, Loxodelllic acid
Notes: Minor component in Xanthoparmelia loxodes

4-O-Demethylmicrophyllinic acid
A: 32  B: x  B': 31  C: 16  E: x  F: x  G: 49
HPLC: 23
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: 478, 426, 338, 248
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, Microphyllinic acid, Olivetoric acid
Notes: Acid Spray: pale orange, grey halo. SW UV: fluorescence bright blue before spraying. Occurs in Parmotrema demethylmicrophyllinicum

4-O-Demethylnotatic acid [Nornotatic acid]
A: 16  B: 38  B': 35  C: 14  E: x  F: x  G: 46
HPLC: 11
V: –  UV: +
Acid Spray: Orange  LW UV: D.Blue
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: 330, 312, 286, 284
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypoprotocetraric acid, Norisonotatic acid, Notatic acid
Reference: Culberson, CF/ Hale, ME 1973: 4-O-Demethylnotatic acid, a new depsidone in some lichens producing hypoprotocetraric acid. Bryologist 76: 77-84.

Notes: Acid Spray: pale orange, grey halo. Occurs in Ocellularia actinota

**4-O-Demethylplanaic acid** [2,2'-Di-O-methylanziaic acid]

A: 42  B: 32  B': 29  C: 33  E: x  F: x  G: x

HPLC: 24

V: –  UV: +

Acid Spray: Orange  LW UV: Green

Archers: D.Red

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: -1, 238, 221, 196

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: 2'-O-Methylperlatoic acid, Planaic acid


Notes: Acid Spray: pale orange, grey halo. LW UV: pale brown, green halo. Occurs in Lecidea plana

**2'-O-Demethylpsoromic acid** [Conpsoromic acid, Neopsoromic acid]

A: 15  B: 36  B': 39  C: 12  E: x  F: x  G: 46

HPLC: 13

V: –  UV: +

Acid Spray: Brown  LW UV: Brown

Archers: Red-violet

K: No Result  C: No Result  KC: No Result  PD: Yellow

Mass spectrum: 344, 300, 272, 179

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Psoromic acid, Subpsoromic acid


Notes: Minor component in Usnea inermis

**3-O-Demethylscensidin**

A: 60  B: x  B': 52  C: 53  E: 28  F: x  G: x

HPLC: 23

V: –  UV: +

Acid Spray: No Result  LW UV: D.Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 358, 356, 354, 328

Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Dechloro-O-methyliploicin, Diploicin, Isofulgidin, Scensidin
Notes: Best seen under SW UV before spraying. Minor component in Diploicia canescens

3-O-Demethylschizopeltic acid
A: 34  B: x  B': 29  C: 41  E: x  F: x  G: x
HPLC: 14
V:  –  UV: +
Acid Spray: Blue-grey  LW UV: D.Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 344, 312, 284, 156
Substance Class: Dibenzo furans
Biosynthetically Related Compounds: Pannaric acid, Schizopeltic acid
Notes: Occurs in Roccella hypomecha

4'-O-Demethylsekikaic acid
A: 40  B: 41  B': 52  C: 36  E: x  F: x  G: x
HPLC: 21
V:  –  UV: +
Acid Spray: Orange-grey  LW UV: Green
Archers: x
K: P.Red  C: Red  KC:  PD: No Result
Mass spectrum: -1, 212, 210, 193
Substance Class: Orcinol m-Depsides
Biosynthetically Related Compounds: Homosekikaic acid, Ramalinolic acid, Sekikaic acid
Notes: Acid Spray: strong-pale yellow-orange, grey halo. Occurs in Ramalina americana

4-O-Demethylsphaerophorin
A: 38  B: x  B': 57  C: 33  E: x  F: x  G: x
HPLC: 33
V:  –  UV: +
Acid Spray: Orange  LW UV: Green
Archers: x
K: No Result  C: Red  KC:  PD: No Result
Mass spectrum: -1, 208, 150, 137
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isosphaeric acid, Sphaerophorin
Notes: Acid Spray: pale orange, grey halo. LW UV: purple, green halo. Occurs in Bunodophoron melacarpum

4-O-Demethylsquamatic acid [Consquamatic acid]
A: 3  B: x  B': 1  C: 3  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Grey  LW UV: Green
Archers: Red
K: No Result  C: Red  KC:  PD: No Result
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Squamatic acid
Notes: Occurs in Cladonia capitellata var. squamatica

4-O-Demethylstenosporic acid
A: 44  B: 54  B': x  C: 32  E: x  F: x  G: x
HPLC: 28
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: -1, 224, 206, 196
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, Divaricatic acid, Nordivaricatic acid, Stenosporic acid
Notes: Occurs in Xanthoparmelia pokornyi

4-O-Demethylsuperconfluentic acid
A: 41  B: x  B': 37  C: 30  E: x  F: x  G: x
HPLC: 38
V: –  UV: +
Acid Spray: Yellow  LW UV: B.Blue
Archers: x
K: No Result        C: Pink        KC: Red        PD: No Result
Mass spectrum: -1, 277, 276, 266
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Glaucophaic acid, 2’-O-Methylnorsuperphyllinic acid, Insignin, Superconfluentic acid
Notes: Occurs in *Stirtonia ramosa, Porpidia glaucophaea*

**Demethylvioxanthin**

A: 25   B: x   B’: 4   C: 18   E: x   F: x   G: x
HPLC: 17
V: +   UV: +
Acid Spray: Green-brown   LW UV: Yellow
Archers: x
K: Red     C: No Result     KC: No Result     PD: No Result
Mass spectrum: x
Substance Class: Naphthpyrone
Biosynthetically Related Compounds: Pigmentosin A, Vioxanthin
Reference: New Report
Notes: Yellow-green pigment. Occurs in *Buellia vioxanthina*

**Deoxylicherestinic acid**

A: 55   B: x   B’: 50   C: 57   E: x   F: x   G: x
HPLC: 38
V: –   UV: –
Acid Spray: P.Brown   LW UV: Lilac
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass spectrum: 308, 290, 264
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Lichesterinic acid
Notes: Occurs in *Rinodina intermedia*

**Deoxystictic acid** [Stictinolide]

A: x   B: x   B’: x   C: 33   E: x   F: x   G: x
HPLC: 14
V: –
UV: +
Acid Spray: Orange
LW UV: Orange
Archers: x
K: Yellow  C: No Result
KC: PD: Orange
Mass spectrum: 370, 342
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Stictic acid
Notes: reported to occur in *Hypotrachyna revoluta* [but possibly a misdetermination of *Parmotrema perlatum*]

**Depsidellin A**

A: 77  B: x  B': 69  C: 91  E: x  F: x  G: x
HPLC: 65
V: –
UV: +
Acid Spray: P.Yellow
LW UV: Green
Archers: x
K: No Result  C: No Result
KC: No Result  PD: No Result
Mass spectrum: 564, 194, 193, 124
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin B, Depsidellin C
Notes: Occurs in *Xanthoparmelia depsidella*

**Depsidellin B**

A: 47  B: x  B': 42  C: 32  E: x  F: x  G: x
HPLC: 60
V: –
UV: +
Acid Spray: P.Yellow
LW UV: Green
Archers: x
K: No Result  C: Red
KC: PD: No Result
Mass spectrum: 592, 386, 208, 207
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin C
Notes: Minor component in *Xanthoparmelia depsidella*

**Depsidellin C**

A: 59  B: x  B': 49  C: 53  E: x  F: x  G: x  
HPLC: 63
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: P.Red  KC: No Result  PD: No Result
Mass spectrum: 578, 227, 208, 207
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Decarboxyanziaic acid, Decarboxydivaricatic acid, Decarboxystenosporic acid, Depsidellin A, Depsidellin B
Notes: Minor component in *Xanthoparmelia depsidella*

**Desmethylhybocarpone** [Norhybocarpone]

A: 6  B: x  B': 35  C: 5  E: x  F: x  G: x  
HPLC: 22
V: +  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 516, 250
Substance Class: Naphthaquinone
Biosynthetically Related Compounds: Hybocarpone, Norcrystazarin
Notes: Orange pigment. Occurs in *Heterodermia hybocarponica*

**3β,25-Diacetoxy-20,24-epoxydammarane** [Diacetyl-12-deoxypiryxinol]

A: x  B: x  B': x  C: 85  E: 70  F: x  G: 90  
HPLC: x
V: –  UV: –
Acid Spray: Purple  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 529, 484, 383
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, 20,24-Epoxydammarane-3β,12β,25-triol, Methyl 3-O-acetoxypyxinate, Methyl pyxinate
Notes: Occurs in Pyxine endochrysina

3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol [Diactylpyxinol]
A: x B: x B': x C: 45 E: 19 F: x G: 48
HPLC: x
V: – UV: –
Acid Spray: Purple    LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 545, 500, 485

Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β-Acetoxy-20,24-epoxydammarane-12β,25-diol, 3β,25-Diacetoxy-20,24-epoxydammarane, 20,24-Epoxydammarane-3β,12β,25-triol, Methyl 3-O-acetoxypyxinate, Methyl pyxinate
Notes: Occurs in Pyxine endochrysina, P. sorediata

6α,16β-Diacetoxyhopan-22-ol
A: 50 B: x B': 37 C: 40 E: 4 F: x G: 45
HPLC: x
V: – UV: –
Acid Spray: P.Brown    LW UV: P.Yellow
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 544, 484, 466, 426

Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-16β,22-diol, 16β-Acetoxyhopan-6α,22-diol Hopane-6α,22-diol [Zeorin], Hopane-6α,16β,22-triol [Leucotylin]
Notes: Occurs in Heteroderma tremulans, Myelochroa entotheochroa

3β,22α-Diacetoxyxictane
A: x B: x B’: x C: 85 E: x F: x G: x
HPLC: x
Acid Spray: P. Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β-Acetoxystictane-22α-ol, Stictane-3β,22α-diol
Reference: Chin, WJ / Corbett, RE / Heng, CK / Wilkins, AL 1973: Lichen and fungi. Part XI. triterpenoids. IV.
Notes: Occurs in Pseudocyphellaria coronata

2α,3β-Diacetoxystictane-22α-ol
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 2α-Acetoxystictane-3β,22α-diol, 3β-Acetoxystictane-22α-ol, 2α,3β-Diacetoxystictane-22-one, Stictane-2α,3β,22α-triol, 2α,3β,22α-Triacetoxystictane
Reference: Chin, WJ / Corbett, RE / Heng, CK / Wilkins, AL 1973: Lichen and fungi. Part XI. triterpenoids. IV.
Notes: Occurs in Pseudocyphellaria coronata

2α,3β-Diacetoxystictane-22-one
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 2α-Acetoxystictane-3β,22α-diol, 3β-Acetoxystictane-22α-ol, 2α,3β-Diacetoxystictane-22α-ol, Stictane-2α,3β,22α-triol, 2α,3β,22α-Triacetoxystictane

Notes: Occurs in Pseudocyphellaria coronata

**Diacetylgraciliformin**

A: 40  B: x  B': 34  C: 25  E: 1  F: x  G: x
HPLC: 37
V: +  UV: +
Acid Spray: Green  LW UV: Grey
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass spectrum: 626, 566, 506, 254
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Graciliformin, Monoacetylgraciliformin, Skyrin

Notes: Yellow pigment. Acid Spray: colour like skyrin. Occurs in Cladonia graciliformis

**5,7-Dichloro-2,8-dihydroxy-1,3-dimethylxanthone**

A: 62  B: x  B': 70  C: 65  E: 46  F: 83  G: x
HPLC: 58
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 328, 326, 324, 295
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Dechloro-8-0-methylthiomelin, 4-Dechloro-8-0-methylthiomelin, 2-Dechlorothiomelin, 4-Dechlorothiomelin, 8-0-Methylthiomelin, Thiomelin

Notes: Pale yellow pigment. Occurs in Rinodina thiomela

**5,7-Dichloroemodin**

A: 50  B: x  B': 63  C: 65  E: x  F: x  G: x
HPLC: 37  TLC: Rf 32 [chloroform/methanol, 4/1]
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result

Mass spectrum: 342, 340, 338

Substance Class: Anthraquinones

Biosynthetically Related Compounds: 5-Chloroemodin, 7-Chloroemodin, Emodin


Notes: Yellow-orange pigment. Minor pigment in *Heterodermia obscurata*

**5,7-Dichloro-8-hydroxy-2-methoxy-1,3-dimethylxanthone**

A: 79  B: x  B': 88  C: 86  E: 72  F: 90  G: x

HPLC: 70

V: +  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 342, 340, 338, 325

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 4-Dechloro-8-O-methylthiomelin, 2-Dechlorothiomelin, 4-Dechlorothiomelin, 5,7-Dichloro-2,8-dihydroxy-1,3-dimethylxanthone, 8-O-Methylthiomelin, Thiomelin


Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*

**7,7'-Dichlorohypericin**

A: x  B: x  B': x  C: x  E: x  F: x  G: x

HPLC: x  TLC: Rf 30 [chloroform/methanol, 4/1]

V: +  UV: +

Acid Spray: Blue-purple  LW UV: Blue-purple

Archers: x

K: Violet  C: No Result  KC: PD: No Result

Mass spectrum: 575, 573, 571

Substance Class: Phenanthroperylenequinones

Biosynthetically Related Compounds: 2,2',7,7'-Tetrachlorohypericin


Notes: Indigo pigment. Minor pigment in *Nephroma laevigatum*

**2,4-Dichlorolichexanthone**

A: 78  B: x  B': 76  C: 75  E: 55  F: 85  G: x
HPLC: 57
V: + UV: +
Acid Spray: Orange LW UV: Orange
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 358, 356, 354, 315
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 4-Chlorolichexanthone, 2,5-Dichlorolichexanthone, Thiophaninic acid, 2,4,5-Trichlorolichexanthone
Notes: Pale yellow pigment. Minor component in *Pertusaria aleianta*

2,5-Dichlorolichexanthone
A: 73 B: x B': 59 C: 76 E: 43 F: 80 G: x
HPLC: 50
V: + UV: +
Acid Spray: Orange LW UV: B.Blue
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 358, 356, 354, 213
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 5-Chlorolichexanthone, 2,4-Dichlorolichexanthone, 4,5-Dichlorolichexanthone, 2,4,5-Trichlorolichexanthone
Notes: Pale yellow pigment. Minor component in *Pertusaria aleianta*

2,7-Dichlorolichexanthone
A: 77 B: x B': 70 C: 80 E: 24 F: 57 G: x
HPLC: 53
V: + UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 358, 356, 354, 213
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 7-Chlorolichexanthone, 2,7-Dichloro-3-O-methylnorlichexanthone, 2,7-Dichloro-6-O-methylnorlichexanthone, 2,5,7-Trichlorolichexanthone

Notes: Pale yellow pigment. Occurs in *Lecanora salina, L. populicola, L. behringii*

**4,5-Dichlorolichexanthone**

A: 72  B: x  B': 60  C: 76  E: 43  F: 77  G: x  
HPLC: 55
V: +  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 358, 356, 354, 313
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 7-Chlorolichexanthone, 2,4-Dichlorolichexanthone, 2,5-Dichlorolichexanthone, 4,5-Dichloro-3-O-methylnorlichexanthone, 4,5-Dichloro-6-O-methylnorlichexanthone, 2,4,5-Trichlorolichexanthone

Notes: Pale yellow pigment. Occurs in *Buellia glaziouana, Pertusaria coronata*

**5,7-Dichlorolichexanthone**

A: 80  B: x  B': 81  C: 90  E: 72  F: 77  G: x  
HPLC: 55
V: +  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 358, 356, 354, 329
Substance Class: Xanthones
Biosynthetically Related Compounds: 5-Chlorolichexanthone, 7-Chlorolichexanthone, 2,4-Dichlorolichexanthone, 5,7-Dichloro-3-O-methylnorlichexanthone, Isoarthothelin, 2,5,7-Trichlorolichexanthone, 2,5,7-Trichloro-3-O-methylnorlichexanthone

Notes: Pale yellow pigment. Occurs in *Sporopodium flavescens*

**3,5-Dichloro-2'-O-methylanziaic acid**

A: 43  B: x  B': 46  C: 45  E: x  F: x  G: x  
HPLC: 32
V: −  UV: +
Acid Spray: P.Yellow          LW UV: Green
Archers: x
K: No Result    C: P.Red    KC: PD: No Result
Mass spectrum: -1, 276, 274, 238
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichloro-2’-O-methylnorhypertolic acid, 3,5-Dichloro-2’-O-methylnorstenosporic acid, 5-Chloro-2’-O-methylanziaic acid
Notes: Acid Spray: yellow, grey halo. Occurs in Lecanora sulphurella

3,5-Dichloro-2’-O-methylnorivaricatic acid
A: 40    B: x    B’: 35    C: 43    E: x    F: x    G: x
HPLC: 22
V: −      UV: +
Acid Spray: P.Yellow          LW UV: Green
Archers: K: No Result    C: P.Red    KC: Red    PD: No Result
Mass spectrum: -1, 249, 248, 247
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichloro-2’-O-methylniaziaic acid, 3,5-Dichloro-2’-O-methylnorstenosporic acid, 5-Chloro-2’-O-methylniaziaic acid
Notes: Minor component in Lecanora sorediomarginata

3,5-Dichloro-2’-O-methylnorivaricatic acid
A: 44    B: x    B’: 51    C: 46    E: x    F: x    G: x
HPLC: 39
V: −      UV: +
Acid Spray: P.Yellow          LW UV: Green
Archers: K: No Result    C: P.Red    KC: Red    PD: No Result
Mass spectrum: -1, 292, 277, 276
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichloro-2’-O-methylniaziaic acid, 3,5-Dichloro-2’-O-methylnordivaricatic acid, 3,5-Dichloro-2’-O-methylnorstenosporic acid, 5-Chloro-2’-O-methylniaziaic acid

Notes: Minor component in *Lecanora lividocinerea*.

### 2,5-Dichloro-6-O-methylnorlichexanthone

A: 64    B: x    B': 51    C: 51    E: 32    F: 67    G: x

HPLC: 36

V: +       UV: +

Acid Spray: Yellow       LW UV: Green

Archers: x

K: No Result    C: No Result     KC: No Result     PD: No Result

Mass spectrum: 344, 342, 340, 311

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Chloro-6-O-methylnorlichexanthone, 5-Chloro-6-O-methylnorlichexanthone, 2,5-Dichlorlichexanthone, 2,5-Dichloronorlichexanthone, 4,5-Dichloro-6-O-methylnorlichexanthone, 6-O-Methylarthothelin, Thiophaninic acid, 2,4,5-Trichlorlichexanthone


Notes: Pale yellow pigment. Minor component in *Dimelaena elevata*.

### 2,7-Dichloro-3-O-methylnorlichexanthone

A: 53    B: x    B': 51    C: 42    E: 11    F: 41    G: x

HPLC: 48

V: +       UV: +

Acid Spray: Orange       LW UV: Yellow

Archers: x

K: No Result    C: No Result     KC: No Result     PD: No Result

Mass spectrum: 344, 342, 340, 306

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Chloronorlichexanthone, 7-Chloronorlichexanthone, 2,7-Dichlorlichexanthone, 2,7-Dichloronorlichexanthone, 2,7-Dichloro-6-O-methylnorlichexanthone


Notes: Pale yellow pigment. Occurs in *Lecanora behringii, L. salina*.

### 2,7-Dichloro-6-O-methylnorlichexanthone

A: 52    B: x    B': 46    C: 46    E: 12    F: 44    G: x

HPLC: 46

V: +       UV: +

Acid Spray: Orange       LW UV: Yellow
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 344, 342, 340, 306  
Substance Class: Xanthones  
Biosynthetically Related Compounds: 2-Chloro-6-O-methylnorlichexanthone, 7-Chloro-6-O-methylnorlichexanthone, 2-Chloronorlichexanthone, 7-Chloronorlichexanthone, 2,7-Dichlorolichexanthone, 2,7-Dichloronorlichexanthone, 2,7-Dichloro-3-O-methylnorlichexanthone  
Notes: Pale yellow pigment. Occurs in Lecanora behringii, L. populicola, L. salina  

4,5-Dichloro-3-O-methylnorlichexanthone  
A: 57  B: x  B': 52  C: 58  E: 24  F: 50  G: x  
HPLC: 37  
V: +  UV: +  
Acid Spray: P.Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 344, 342, 340  
Substance Class: Xanthones  
Biosynthetically Related Compounds: Arthothelin, Asemone, 4,5-Dichlorolichexanthone, 4,5-Dichloronorlichexanthone, 3-O-Methylasemone, Thuringione  
Notes: Pale yellow pigment. Occurs in Lecidella carpathica  

4,5-Dichloro-6-O-methylnorlichexanthone  
A: 60  B: x  B': 51  C: 48  E: 30  F: 65  G: x  
HPLC: 38  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 344, 342, 340, 309  
Substance Class: Xanthones  
Biosynthetically Related Compounds: Arthothelin, Asemone, 4,5-Dichlorolichexanthone, 4,5-Dichloronorlichexanthone, 6-O-Methylarthothelin, 6-O-Methylasemone  
Notes: Pale yellow pigment. Minor component in Dimelaena elevata
5,7-Dichloro-3-\textit{O}-methylnorlichexanthone

A: 67  B: x  B': 67  C: 59  E: 16  F: 40  G: x
HPLC: 46

V: +  UV: +

Acid Spray: Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 344, 342, 340, 314

Substance Class: Xanthones

Biosynthetically Related Compounds: 5,7-Dichlorolichexanthone, 5,7-Dichloronorlichexanthone, Isoarthothelin, 2,5,7-Trichloro-3-\textit{O}-methylnorlichexanthone


Notes: Pale yellow pigment. Occurs in \textit{Lecanora epibryon} ssp. \textit{broccha}

5,7-Dichloro-6-\textit{O}-methylnorlichexanthone

A: 57  B: x  B': 73  C: 46  E: 38  F: 79  G: x
HPLC: 45

V: +  UV: +

Acid Spray: Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 344, 342, 340

Substance Class: Xanthones

Biosynthetically Related Compounds: 5,7-Dichlorolichexanthone, 5,7-Dichloronorlichexanthone, Isoarthothelin, 2,5,7-Trichloro-3-\textit{O}-methylnorlichexanthone


Notes: Pale yellow pigment. Occurs in \textit{Byssoloma subdiscordans}

3,5-Dichloro-2'-\textit{O}-methylorstenosporic acid

A: 42  B: x  B': 40  C: 45  E: x  F: x  G: x
HPLC: 24

V: -  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: x

K: No Result  C: P.Red  KC: Red  PD: No Result

Mass spectrum: -1, 249, 248, 247

Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichloro-2′-O-methylanziaic acid, 3,5-Dichloro-2′-O-methylnordivaricatic acid, 3,5-Dichloro-2′-O-methylnorhypertolic acid, 5-Chloro-2′-O-methylanziaic acid
Notes: Occurs in Lecanora lividocinerea and L. sorediomarginata

**3,5-Dichloro-4-O-demethylplanaic acid [2-0-Methylsulphurellin]**
A: 44 B: x B': 49 C: 46 E: x F: x G: x
HPLC: 34
V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 291, 289, 239
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 5-Chloro-2′-O-methylanziaic acid, 3,5-Dichloro-2′-O-methylanziaic acid, 3,5-Dichloro-2′-O-methylnordivaricatic acid, 3,5-Dichloro-2′-O-methylnorhypertolic acid, 3,5-Dichloro-2′-O-methylnorstenosporic acid
Notes: Occurs in Lecanora jamesii

**2,4-Dichloronorlichexanthone**
A: 49 B: x B': 43 C: 30 E: 8 F: 30 G: x
HPLC: 29
V: + UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: Orange KC: PD: No Result
Mass spectrum: 330, 328, 326, 306
Substance Class: Xanthones
Biosynthetically Related Compounds: Arthothelin, 2-Chloronorlichexanthone, 4-Chloronorlichexanthone, Thiophanic acid, Thiophaninic acid
Notes: Pale yellow pigment. Occurs in Lecanora straminea

**2,5-Dichloronorlichexanthone**
A: 42 B: x B': 40 C: 32 E: 9 F: 42 G: x
HPLC: 27
Acid Spray: Yellow
Archers: x
K: No Result  C: Red-orange  KC:  PD: No Result
Mass spectrum: 328, 326, 294, 292
Substance Class: Xanthones
Biosynthetically Related Compounds: Arthothelin, 2-Chloronorlichexanthone, 5-Chloronorlichexanthone, 2,5-Dichloro-6-O-methylnorlichexanthone, Isoarthothelin
Notes: Pale yellow pigment. Occurs in Lecanora epibryon subsp. broccha

2,7-Dichloronorlichexanthone
A: 40  B: x  B': 38  C: 27  E: 5  F: 26  G: x
HPLC: 28
V: +  UV: +
Archers: x
K: No Result  C: Red-orange  KC:  PD: No Result
Mass spectrum: 328, 326, 294, 292
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chloronorlichexanthone, 7-Chloronorlichexanthone, 2,7-Dichloro-3-O-methylnorlichexanthone, 2,7-Dichloro-6-O-methylnorlichexanthone, 5,7-Dichloronorlichexanthone, Isoarthothelin
Notes: Pale yellow pigment. Occurs in Lecanora dispersa

4,5-Dichloronorlichexanthone
A: 44  B: x  B': 48  C: 33  E: 14  F: 49  G: x
HPLC: 26
V: +  UV: +
Archers: x
K: No Result  C: Red-orange  KC:  PD: No Result
Mass spectrum: 330, 328, 326
Substance Class: Xanthones
Biosynthetically Related Compounds: Arthothelin, Asemone, 4-Chloronorlichexanthone, 5-Chloronorlichexanthone, 4,5-Dichloro-3-O-methylnorlichexanthone, Thiophanic acid

Notes: Pale yellow pigment. Occurs in Lecanora straminea, Micarea isabellina

4,7-Dichloronorlichexanthone
A: 43 B: x B': 47 C: 32 E: 17 F: 52 G: x
HPLC: 30
V: + UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: Red-orange KC: PD: No Result
Mass spectrum: 330, 328, 326, 292
Substance Class: Xanthones
Biosynthetically Related Compounds: 4-Chloronorlichexanthone, 7-Chloronorlichexanthone, 4,5-Dichloronorlichexanthone, Thiophanic acid
Notes: Pale yellow pigment. Occurs in Lecanora epibryon subsp. broccha

5,7-Dichloronorlichexanthone
A: 44 B: x B': 48 C: 33 E: 11 F: 43 G: x
HPLC: 30
V: + UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: Red-orange KC: PD: No Result
Mass spectrum: 330, 328, 326, 292
Substance Class: Xanthones
Biosynthetically Related Compounds: Aemone, 5-Chloronorlichexanthone, 7-Chloronorlichexanthone, 5,7-Dichloro-3-O-methylnorlichexanthone, 4,7-Dichloronorlichexanthone, Isoarathothelin, Thiophanic acid
Notes: Pale yellow pigment. Occurs in Lecanora epibryon subsp. broccha

5,7-Dichloro-1,6,8-trihydroxy-3-methyl-9-anthrone [AO2-Anthrone]
A: x B: x B': x C: 40 E: x F: x G: x
HPLC: 35
V: + UV: +
Acid Spray: P.Yellow LW UV: P.Yellow
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass spectrum: 326, 324
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloro-1,6,8-trihydroxy-3-methyl-9-anthrone, 5,7-Dichloroemodin, Emodin
Notes: Pale yellow pigment. Occurs in Heterodermia obscurata

**Didechlorolecideoidin**

A: 44  B: x  B’: 29  C: 29  E: x  F: x  G: x
HPLC: 22
V: –  UV: +
Acid Spray: P.Orange  LW UV: D.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 330, 298, 270
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Norgangaleoidin, 3’-Dechlorolecideoidin, Lecideoidin
Notes: Minor component in Lecanora californica and Tylothallia verrucosa

**Didymic acid**

A: 44  B: 77  B’: 68  C: 52  E: x  F: x  G: x
HPLC: 35
V: –  UV: +
Acid Spray: Blue  LW UV: Purple
Archers: Green
K: No Result  C: Green  KC: PD: No Result
Mass spectrum: 370, 353, 352, 326
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Condidymic acid, Isodidymic acid, Subdidymic acid
Notes: Acid Spray: strong-purple with bright blue halo. Minor component in Cladonia floerkeana

**Diffractaic acid**

A: 44  B: 64  B’: 55  C: 51  E: x  F: x  G: x
**HPLC:** 30  
**V:** –  
**UV:** +  

Acid Spray: P.Yellow  
LW UV: P.Yellow  

Archers: D.Red  

K: No Result  
C: No Result  
KC: No Result  
PD: No Result  

Mass spectrum: 374, 193, 182, 164  

**Substance Class:** β-Orcinol Depsides  

**Biosynthetically Related Compounds:** Barbatic acid, 4-O-Demethyldiffractaic acid, 2-O-Methylobtusatic acid  


**Notes:** Acid Spray: pale yellow, grey halo. LW UV: deep purple, pale yellow halo. Occurs in *Cladia muelleri*.

**(-)-Dihydropertusaric acid**  

A: 42  
B: 36  
B’: 36  
C: 35  
E: x  
F: x  
G: x  

HPLC: x  

V: –  

**UV:** –  

Acid Spray: No Result  
LW UV: Lilac  

Archers: x  

K: No Result  
C: No Result  
KC: No Result  
PD: No Result  

Mass spectrum: 368, 353, 326, 293  

**Substance Class:** Aliphatic acids  

**Biosynthetically Related Compounds:** allo-Pertusaric acid  


**Notes:** Occurs in *Pertusaria albescens*.

**Dihydropicrolichenic acid** [2-O-Methylanziaic acid]  

A: 44  
B: x  
B’: 38  
C: 33  
E: x  
F: x  
G: x  

HPLC: x  

V: –  

**UV:** +  

Acid Spray: Yellow  
LW UV: Green  

Archers: x  

K: No Result  
C: No Result  
KC: No Result  
PD: No Result  

Mass spectrum: -1, 238, 224, 222  

**Substance Class:** Orcinol Depsides  

**Biosynthetically Related Compounds:** Anziaic acid, 4-O-Demethylplanaic acid, Picrolichenic acid  

Notes: Occurs in *Ramalina americana s. lat.*

**1,7-Dihydroxy-2,4-dichloro-6,8-dimethylxanthone**

A: 62  B: x  B’: 70  C: 65  E: 46  F: 83  G: x  
HPLC: 58  
V: +  UV: +  
Acid Spray: P. Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 328, 326, 324, 295  
Substance Class: Xanthones  
Biosynthetically Related Compounds: 2-Dechlorothiomelin, 4-Dechlorothiomelin, Thiomelin  
Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*.

**1,8-Dihydroxy-3,6-dimethoxyxanthone**

A: 75  B: x  B’: 73  C: 78  E: x  F: x  G: x  
HPLC: 48  
V: +  UV: +  
Acid Spray: P. Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 288, 259, 245, 230  
Substance Class: Xanthones  
Biosynthetically Related Compounds: x  
Notes: Pale yellow pigment. Occurs in *Laurera meritospora*.

**3β,22-Dihydroxyhopane-29-oic acid** [Pyxinic acid]

A: x  B: x  B’: x  C: 38  E: x  F: x  G: x  
HPLC: x  
V: −  UV: +  
Acid Spray: Pink  LW UV: Orange  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: x  
Substance Class: Terpenoids  
Biosynthetically Related Compounds: Methyl 3-O-acetoxyxpyxinate, Methyl pyxinate
Notes: Occurs in Pyxine endochrysea

6α,22-Dihydroxyhopan-23-oic acid
A: 18 B: x B': 31 C: 14 E: 7 F: x G: 32
HPLC: x
V: – UV: –
Acid Spray: Brown LW UV: Pink
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 226, 210, 208
Substance Class: Terpenoids
Biosynthetically Related Compounds: Hopane-6α,22-diol [Zeorin]
Notes: Occurs in Pseudocyphellaria billardieri

16β, 22-Dihydroxyhopan-4α-oic acid [Leucytolic acid]
A: x B: x B': x C: 37 E: 2 F: x G: 32
HPLC: x
V: – UV: –
Acid Spray: P.Brown LW UV: Yellow
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 488, 470, 452, 428
Substance Class: Terpenoids
Biosynthetically Related Compounds: 16β-Acetoxy-22-hydroxyhopane-4α-oic acid, Hopane-6α,22-diol [Zeorin], Hopane-6α,16β,22-triol [Leucytolin]
Notes: Occurs in Myelochroa aurulenta

2,4-Dihydroxy-6-pentylbenzoic acid [Olivetolcarboxylic acid]
A: 45 B: 58 B': x C: 35 E: x F: x G: x
HPLC: 12
V: – UV: +
Acid Spray: Yellow LW UV: Grey
Archers: x
K: No Result C: Red KC: PD: No Result
Mass spectrum: 224, 207, 206, 180

Substance Class: Monocyclic aromatic compounds

Biosynthetically Related Compounds: 2-Hydroxy-4-methoxy-6-pentylbenzoic acid, Perlatolic acid


Notes: Possibly an artefact, reported to occur in *Cladonia macaronesica*

**5,7-Dihydroxy-6-methylphthalide**

A: 43  B: x  B': 25  C: 15  E: 11  F: x  G: 43  HPLC: −3

V: −  UV: +  Acid Spray: No Result  LW UV: P.Yellow  Archers: x  K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 180, 162

Substance Class: Monocyclic aromatic compounds

Biosynthetically Related Compounds: Alectorialic acid, Alectorialin, Hypoalectorialic acid


Notes: Occurs in *Anamylopsora pulcherrima*

**4,4'-Di-O-methylcryptochlorophaeic acid**

A: 50  B: 35  B': 44  C: 51  E: x  F: x  G: x  HPLC: 42

V: −  UV: +  Acid Spray: P.Brown  LW UV: Purple  Archers: x  K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: -1, 252, 236, 235

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Boninic acid, 2,4'-Di-O-methylnorsekikaic acid, 4'-O-Methylcryptochlorophaeic acid, 4'-O-Methylpaludosic acid, 2-O-Methylsekikaic acid


Notes: Acid Spray: fades to pink. Occurs in *Ramalina asahinae*

**2,2'-Di-O-Methyldivaricatic acid**

A: 39  B: 35  B': 24  C: 44  E: x  F: x  G: x  HPLC: 22

V: −  UV: +  Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 223, 208, 207
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 2,2'-Di-O-Methylstenosporic acid, Planaic acid
Notes: Occurs in *Pertusaria subplanaica*

**2,4-Di-O-methylgyrophoric acid**

A: 44  B: 37  B': 35  C: 48  E: x  F: x  G: x
HPLC: 29
V: −  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 346, 196, 180
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid, 5-O-Methylhiascic acid, 2,4,5-Tri-O-methylhiascic acid
Notes: Acid Spray: strong yellow, grey halo. Occurs in *Hypotrachyna neodamaziana*

**4,2''-Di-O-methylgyrophoric acid** [2'',4-Di-O-methylgyrophoric acid]

A: 45  B: x  B': 65  C: 51  E: x  F: x  G: x
HPLC: x
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 182, 165, 164
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Evernic acid, Lecanoric acid, 2'-O-Methylvernic acid
Notes: Acid Spray: strong yellow, grey halo. Occurs in *Evernia prunastri*

**2,4-Di-O-Methylhiascic acid**

A: 28  B: x  B': 22  C: 30  E: x  F: x  G: x
HPLC: 23
V: – UV: +
Acid Spray: P. Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: Pink PD: No Result
Mass spectrum: -1, 363, 212, 195
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Umbilicaric acid, Lecanoric acid, Hiascic acid, 4-O-Methylhiascic acid, 2,4,5-Tri-O-Methylhiascic acid
Notes: Minor component in *Hypotrachyna spumosa*

**2,5-Di-O-Methylhiascic acid**
A: 30 B: x B': 24 C: 28 E: x F: x G: x
HPLC: 23
V: – UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 382, 212, 195
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Umbilicaric acid, Lecanoric acid, Hiascic acid, 5-O-Methylhiascic acid, 2,4,5-Tri-O-Methylhiascic acid
Notes: Minor component in *Hypotrachyna neodamaziana*

**4,5-Di-O-methylhiascic acid**
A: 33 B: 36 B': 41 C: 40 E: x F: x G: x
HPLC: 31
V: – UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: Pink PD: No Result
Mass spectrum: -1, 212, 194, 178
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Hiascic acid, Lecanoric acid, 5-O-Methylhiascic acid, 2,4,5-Tri-O-Methylhiascic acid
2,2'-Di-O-methylimbricaric acid
A: 42   B: 36   B': 29   C: 46   E: x   F: x   G: x
HPLC: x
V: −   UV: +
Acid Spray: Yellow   LW UV: Green
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: -1, 236, 235, 151
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2,2'-Di-O-Methyldivaricatic acid, 2,2'-Di-O-Methylstenosporic acid, Planaic acid
Notes: Minor component in Pertusaria subplanaica

2,4'-Di-O-methylnorsekikaic acid
A: 32   B: 29   B': 27   C: 18   E: x   F: x   G: x
HPLC: 16
V: −   UV: +
Acid Spray: Orange   LW UV: Green
Archers: x
K: No Result   C: x   KC: x   PD: x
Mass Spectrum: -1, 226, 210, 208
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Boninic acid, 4'-O-Methylcryptochlorophaeic acid, 4'-O-Methylpaludosic acid, 2-O-Methylsekikaic acid
Notes: Acid Spray: strong orange, grey halo. LW UV: strong purple, green halo. Minor component in Ramalina asahinae

2,4-Di-O-methylolivetoric acid
A: 49   B: 29   B': 57   C: 46   E: x   F: x   G: x
HPLC: 36
V: −   UV: +
Acid Spray: Yellow          LW UV: Blue
Archers: x
K: No Result       C: No Result       KC: x No Result       PD: No Result
Mass Spectrum: x
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Methylolivetoric acid, 2-O-Methylperlatolic acid, Olivetoric acid
Notes: Occurs in Pertusaria georgeana var. goonooensis

2’,4-Di-O-methylphysodic acid
A: 70          B: 29          B’: 33          C: 45          E: x          F: x          G: x
HPLC: 25
V: –          UV: +
Acid Spray: P.Yellow          LW UV: Purple
Archers: x
K: No Result       C: No Result       KC: x No Result       PD: No Result
Mass Spectrum: 498, 454, 263, 262
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Physodic acid, 2’-O-Methylphysodic acid, 4-O-methylphysodic acid
Notes: Minor component in Pseudevernia furfuracea

6α,9α-Di-O-Methylsalazinic acid
A: 48          B: x          B’: 24          C: 40          E: x          F: x          G: 51
HPLC: 27
V: –          UV: +
Acid Spray: Orange          LW UV: Orange
Archers: x
K: P.Red       C: No Result       KC:       PD: Yellow
Mass Spectrum: 416, 385, 384, 370
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Salazinic acid, Quaesitic acid, 9α-O-Methylsalazinic acid
Notes: Minor component in Cetreliopsis rhytidocarpa, Hypotrachyna quaesita, Xanthoparmelia subnuda

2,2’-Di-O-Methylstenosporic acid
A: 44          B: x          B’: 29          C: 48          E: x          F: x          G: x
HPLC: 30
V: – UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: -1, 244, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2,2'-Di-O-Methyldivaricatic acid, 2,2'-Di-O-Methylimbricaric acid, Planariaic acid
Notes: Minor component in Pertusaria subplanaica

2',2''-Di-O-methyltenuiorin
A: 70 B: 44 B': 29 C: 63 E: 19 F: x G: x
HPLC: 31
V: – UV: +
Acid Spray: P. Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: x No Result PD: No Result
Mass Spectrum: -1, 361, 329, 196
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Methyl gyrophorate, 2'-O-Methyltenuiorin, 2''-O-Methylteniorin, Tenuiorin
Notes: Minor component in Pseudocryphellaria faveolata

Dioxocondidymic acid
A: 56 B: x B': 37 C: 44 E: x F: x G: x
HPLC: 22
V: – UV: +
Acid Spray: Blue LW UV: Purple
Archers: Green
K: No Result C: Green KC: PD: No Result
Mass spectrum: 426, 409, 408
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: 8-Chlorodioxodidymic acid, 8-Chlorooxodidymic acid, 8-Chlorodioxocondidymic acid, Dioxodidymic acid, Letrouitic acid, Oxodidymic acid

Notes: Minor component in *Letrouitia vulpina*

**Dioxodidymic acid**

A: 44  B: x  B': 27  C: 35  E: x  F: x  G: x

HPLC: 17

V: –  UV: +

Acid Spray: Blue  LW UV: Purple

Archers: Green

K: No Result  C: Green  KC: PD: No Result

Mass spectrum: 398, 380, 354

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: 8-Chlorodioxocondidymic acid, 8-Chlorodioxodidymic acid, 8-Chlorooxodidymic acid, Dioxocondidymic acid, Letrouitic acid, Oxodidymic acid


Notes: Minor component in *Letrouitia vulpina*

**Diploicin**


HPLC: 43

V: –  UV: +

Acid Spray Grey  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 424, 422, 420, 390

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Buellolide, 3-Dechlorodiploicin, 3-Dechloro-O-methylidiploicin, Fulgidin, Fulgoicin, Isofulgidin, O-Methylidiploicin, Scensidin


Notes: Occurs in *Buellia tetrapla, Diploicia canescens*

**Diploschistescis acid**

A: 21  B: 39  B': 37  C: 13  E: x  F: x  G: x

HPLC: 10

V: –  UV: +

Acid Spray: P: Yellow  LW UV: Green
Archers: x
K: Yellow  C: Red  KC:  PD: No Result

Mass Spectrum: 334, 184, 168, 166
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid, Orsellinic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Diploschistes scruposus

4,4' Disolorinic acid
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: 59  TLC: Rf 95 [benzene/ethyl formate/formic acid, 80/20/1]
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC:  PD: No Result

Mass spectrum: 766
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Averantin, Averythrin, 6-O-Methylaverythrin, Norsolorinic acid, Solorinic acid
Notes: Orange-red pigment. Minor component in Solorina crocea

Dissectic acid
A: 59  B: x  B': 51  C: 45  E: 29  F: x  G: x
HPLC: 22
V: −  UV: +
Acid Spray: P.Brown  LW UV: Brown
Archers: x
K: Yellow  C: Red  KC:  PD: Yellow

Mass spectrum: -1, 299, 257, 196
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Atranorin
Notes: Occurs in Heterodermia dissecta

Divaricatic acid
A: 39  B: 75  B': 68  C: 51  E: x  F: x  G: x
HPLC: 33
V: –    UV: +
Acid Spray: P, Yellow         LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 370, 193, 179
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Nordivaricatic acid, Perlatolic acid, Stenosporic acid, Subdivaricatic acid
Notes: Acid Spray: strong yellow, grey halo. LW UV: strong purple, green halo. Occurs in Canoparmelia texana, Evernia divaricata

**Divaronic acid**

A: 35  B: x  B': 54  C: 42  E: x  F: x  G: x
HPLC: 30
V: –  UV: +
Acid Spray: Pink         LW UV: Pink
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 386, 368, 340, 193
Substance Class: Orcinol Depsidoses
Biosynthetically Related Compounds: Colensoic acid, Grayanic acid, Stenosporonic acid
Notes: LW UV: purplish pink, like colensoic acid. Occurs in Cladonia grayi

**Echinocarpic acid**

A: 11  B: 33  B': 27  C: 11  E: x  F: x  G: 32
HPLC: 16
V: –  UV: +
Acid Spray: Orange         LW UV: Orange
Archers: x
K: Yellow  C: No Result  KC:  PD: Orange
Mass Spectrum: -1, 299, 257, 215, 196
Substance Class: Benzyl Esters
Biosynthetically Related Compounds: Conechinocarpic acid, Hirtifructic acid
Elatinic acid

A: 32  B: 27  B': 25  C: 43  E: x  F: x  G: 52

HPLC: 25
V: −  UV: +

Acid Spray: P: Yellow  LW UV: Green

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 404, 209, 196, 193

Substance Class: β-Orcinol Depsides

Biosynthetically Related Compounds: Methyl barbatate, 2-O-Methylsquamatic acid, Squamatic acid


Notes: SW UV: bright blue before spraying. Occurs in Loxospora elatina, Pertusaria tropica

Emodic acid

A: 46  B: x  B': 40  C: 33  E: x  F: x  G: x

HPLC: 20
V: +  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x
K: Violet  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 300, 283, 255

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Emodin, Emodinal, Citreorosein


Notes: Orange pigment. Occurs in Xanthoria calcicola

Emodin

A: 52  B: 61  B': 58  C: 38  E: 27  F: x  G: x

HPLC: 32  TLC: Rf 74 [chloroform/acetone, 4/1]
V: +  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x
K: Purple  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 270, 242, 214

Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodic acid, Emodinal, 7-Chloroemodin, Citreorosein, Skyrin


Notes: Acid Spray: bright orange, fades to dark yellow. Orange pigment. Occurs in *Nephroma laevigatum*

### Emodinal [Emodinaldehyde]

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<th>C</th>
<th>E</th>
<th>F</th>
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HPLC: 28

V: +  
UV: +

Acid Spray: Orange  
LW UV: Orange

Archers: x

K: Purple  
C: No Result  
KC: PD: No Result

Mass spectrum: 300, 283, 255

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Emodic acid, Emodin, Citreorosein


Notes: Orange pigment. Occurs in *Xanthoria calcicola*, *Xanthoria karroensis*

### Endocrocin

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HPLC: x

V: +  
UV: +

Acid Spray: Orange  
LW UV: D.Red

Archers: x

K: Purple  
C: No Result  
KC: PD: No Result

Mass spectrum: 314, 296, 270

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Emodin


Notes: Red-orange pigment. Occurs in *Nephromopsis endocrocea*

### Epanorin

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<th>B'</th>
<th>C</th>
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HPLC: 36

V: +  
UV: +

Acid Spray: P.Yellow  
LW UV: Orange

Archers: x
20,24-Epoxydammarane-3β,12β,25-triol [Pyxinol]

A: x  B: x  B': x  C: 33  E: 6  F: x  G: 32

HPLC: x

V: −  UV: −

Acid Spray: Purple  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 463, 417, 400

Substance Class: Terpenoids

Biosynthetically Related Compounds: 3β-Acetoxy-20,24-epoxydammarane-12β,25-diol, 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, Methyl 3-O-acetoxypxinate, Methyl pyxinate


Notes: Occurs in Pyxine endochrysina, P. sorediata

Epiphorellic acid 1

A: 44  B: x  B': 46  C: 35  E: x  F: x  G: x

HPLC: 40

V: −  UV: +

Acid Spray: Orange  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 474, 456, 430, 399

Substance Class: Diphenyl ethers

Biosynthetically Related Compounds: Epiphorellic acid 2, Epiphorellic acid 3


Notes: Occurs in Coelopogon abraxas, Coelopogon epiphorellus

Epiphorellic acid 2
Epiphorelic acid 3

A: 41  B: x  B': 43  C: 32  E: x  F: x  G: x
HPLC: 32
V: −  UV: +
Acid Spray: Orange  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 446, 428, 402, 371
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Epiphorelic acid 1, Epiphorelic acid 2
Notes: Minor component in Coelopogon abraxas

20,24-Epoxydammarane-3β,12β,25-triol [Pyxinol]

A: x  B: x  B': x  C: 30  E: x  F: x  G: x
HPLC: x
V: −  UV: −
Acid Spray: Purple  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 463, 417, 400, 381
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β-Acetoxy-20,24-epoxydammarane-12β,25-diol, 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, Methyl 3-O-acetoxypyxinate, Methyl pyxinate

Notes: Occurs in *Pyxine endochrysina*

**Ergochrome AA** [Entothein, Secalonic acid A]

A: 39  B: 16  B’: 13  C: 28  E: x  F: x  G: 37  
HPLC: 34  
V: +  
UV: +  
Acid Spray: P.Brown  
LW UV: Purple  
Archers: Brown  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass Spectrum: 638, 620, 579, 260  
Substance Class: Ergochromes  
Biosynthetically Related Compounds: Ergochrome AC, Ergochrome BB, Eumitrin A₁, Eumitrin A₂, Eumitrin B  
Notes: Yellow pigment. Visible: pale yellowish orange streak on plate; best seen by holding plate before strong light. Occurs in *Myelochroa entotheiochroa*

**Ergochrome AB** [Secalonic acid C]

A: 42  B: x  B’: 17  C: 32  E: x  F: x  G: 45  
HPLC: 33  
V: +  
UV: +  
Acid Spray: P.Brown  
LW UV: Purple  
Archers: Brown  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass Spectrum: 638, 620, 579, 260  
Substance Class: Ergochromes  
Biosynthetically Related Compounds: Ergochrome AA, Ergochrome BB, Eumitrin A₁, Eumitrin A₂, Eumitrin B  
Notes: Yellow pigment. Visible: pale yellowish orange streak on plate; best seen by holding plate before strong light. Occurs in *Nephromopsis ornata*

**Ergochrome BB** [Secalonic acid B]

A: 44  B: x  B’: 21  C: 37  E: x  F: x  G: 53  
HPLC: 32  
V: +  
UV: +  
Acid Spray: P.Brown  
LW UV: Purple  
Archers: Brown
K: No Result   C: No Result   KC: No Result   PD: No Result

Mass Spectrum: 638, 620, 579, 561

Substance Class: Ergochromes

Biosynthetically Related Compounds: Ergochrome AA, Ergochrome AB, Eumitrin A₁, Eumitrin A₂, Eumitrin B


Notes: Yellow pigment. Visible: pale yellowish orange streak on plate; best seen by holding plate before strong light. Occurs in Diploicia canescens subsp. australasica

**Ergosterol**

A: 56   B: 66   B': 66   C: 43   E: 41   F: x   G: 59

HPLC: x

V: –   UV: –

Acid Spray: Purple   LW UV: Pink

Archers: x

K: No Result   C: No Result   KC: No Result   PD: No Result

Mass Spectrum: 396, 378, 363, 337

Substance Class: Steroids

Biosynthetically Related Compounds: Ergosterol peroxide


Notes: Occurs in Cladonia rangiferina

**Ergosterol peroxide**

A: 56   B: 66   B': 66   C: 43   E: 38   F: x   G: 59

HPLC: x

V: –   UV: –

Acid Spray: Purple   LW UV: Pink

Archers: x

K: No Result   C: No Result   KC: No Result   PD: No Result

Mass Spectrum: 428, 410, 396, 385

Substance Class: Steroids

Biosynthetically Related Compounds: Ergosterol peroxide


Notes: Occurs in Peltigera aphthosa

**Eriodermin**

A: 51   B: 66   B': 64   C: 82   E: 57   F: x   G: x
HPLC: 35
V: − UV: +
Acid Spray: P.Yellow LW UV: P.Yellow
Archers: x
K: No Result C: No Result KC: No Result PD: Orange
Mass Spectrum: 384, 382, 367, 347
Substance Class: Orcinol β–Orcinol Depsidones
Biosynthetically Related Compounds: Argopsin, Pannarin, Vicanicin
Reference: Connolly, JD/ Freer, AA/ Kalb, K/ Huneck, S 1984: Eriodermin, a dichlorodepsidone from the lichen Erioderma physcioides – crystal structure analysis. Phytochemistry 23: 857-858.
Notes: Occurs in Erioderma sorediatum

Erythrin
A: 4 B: 5 B’: 2 C: 1 E: x F: x G: x
HPLC: 7
V: − UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: Red KC: PD: No Result
Mass Spectrum: x
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Roccella physcopsis

Erythroglaucin
A: 82 B: x B’: x C: 87 E: 60 F: x G: x
HPLC: 72
V: + UV: +
Acid Spray: Orange LW UV: Red
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass Spectrum: 300, 282, 270, 260
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Erythroglaucinic acid, Parietin, Xanthorin
Notes: Red pigment. Occurs in Xanthoria elegans
**Erythroglaucinic acid** [Erythroglaucincarboxylic acid]

A: x  B: x  B': x  C: x  E: 32  F: x  G: x  
HPLC: x  TLC: Rf 40 [oxalic acid-SiO$_2$/benzene]  
V: +  UV: +  
Acid Spray: Orange  LW UV: Red  
Archers: x  
K: Violet  C: No Result  KC: PD: No Result  
Mass Spectrum: 344, 300, 282, 270  
Substance Class: Anthraquinones  
Biosynthetically Related Compounds: Erythroglaucin, Parietin  

Notes: Red pigment. Occurs in Xanthoria fallax

**Erythrommone** [3,6-Di-O-acetyl-2,4,5-trichlorolichexanthone]

A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: x  
V: +  UV: +  
Acid Spray: P.Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 448, 446, 444, 404  
Substance Class: Xanthones  
Biosynthetically Related Compounds: Arthothelin  

Notes: Pale yellow pigment. Reported to occur in Haematomma erythromma

**Ethyl everninate**

A: x  B: x  B': x  C: 77  E: 50  F: x  G: x  
HPLC: x  
V: −  UV: +  
Acid Spray: Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 210, 165, 164  
Substance Class: Monocyclic aromatic derivatives  
Biosynthetically Related Compounds: Evernic acid, Everninic acid

Notes: Possibly an artefact. Reported to occur in *Evernia prunastri*

**Ethyl haematommate**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>78</td>
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<td></td>
<td>77</td>
<td>85</td>
<td>x</td>
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HPLC: x  
V: −  
UV: +  
Acid Spray: Yellow  
LW UV: Orange  
Archers: x  
K: No Result  
C: Red  
KC: PD: Yellow  
Mass Spectrum: 224, 195, 179, 178  
Substance Class: Monocyclic aromatic derivatives  
Biosynthetically Related Compounds: Atranorin, Haematommic acid

Notes: Possibly an artefact. Reported to occur in *Pseudevernia furfuracea*

**Ethyl 2-hydroxy-4-methoxy-6-pentylbenzoate** [Ethyl 4-O-methylolivetolcarboxylate]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>x</td>
<td>x</td>
<td></td>
<td>75</td>
<td>x</td>
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</table>

HPLC: x  
V: −  
UV: +  
Acid Spray: P.Yellow  
LW UV: Green  
Archers: x  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result  
Mass Spectrum: 266, 221, 220  
Substance Class: Monocyclic aromatic derivatives  
Biosynthetically Related Compounds: 2-Hydroxy-4-methoxy-6-pentylbenzoic acid, Perlatolic acid

Notes: Possibly an artefact. Reported to occur in *Cladonia macaronesica*

**Ethyl orsellinate**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>62</td>
<td>66</td>
<td>x</td>
<td>44</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: x  
V: −  
UV: +  
Acid Spray: P.Yellow  
LW UV: Green  
Archers: Orange  
K: No Result  
C: Red  
KC: PD: No Result  
Mass Spectrum: 196, 151, 150, 122
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Lecanoric acid, Orsellinic acid
Notes: Acid Spray: pale yellow, grey halo. Possibly an artefact. Reported to occur in Roccella fuciformis

Eugenitin
A: x B: x B': x C: x E: x F: x G: x
HPLC: 19
V: – UV: +
Acid Spray: P.Yellow LW UV: Yellow
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 220, 205, 202, 191

Substance Class: Chromones
Biosynthetically Related Compounds: Eugenitol, 6-Hydroxyeugenitol, Sordidone
Notes: Occurs in Lecanora rupicola sens. lat.

Eugenol
A: x B: x B': x C: x E: x F: x G: x
HPLC: 8
V: – UV: +
Acid Spray: P.Yellow LW UV: Yellow
Archers: x
K: No Result C: Orange KC: PD: No Result
Mass Spectrum: 206, 191

Substance Class: Chromones
Biosynthetically Related Compounds: Eugenitin, 6-Hydroxyeugenitol, Sordidone
Notes: Occurs in Lecanora rupicola sens. lat.

Eumitrin A1
A: 47 B: x B': 22 C: 40 E: x F: x G: 48
HPLC: 24
V: + UV: +
Acid Spray: P.Brown LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 680, 621, 561, 501
Substance Class: Ergochromes
Biosynthetically Related Compounds: Eumitrin A₂, Eumitrin B
Notes: Yellow pigment. Occurs in Usnea baileyi

Eumitrin A₂
A: 47  B: x  B': 22  C: 40  E: x  F: x  G: 48
HPLC: 22
V: +  UV: +
Acid Spray: P.Brown  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 666, 607, 565, 547
Substance Class: Ergochromes
Biosynthetically Related Compounds: Eumitrin A₁, Eumitrin B
Notes: Yellow pigment. Not separated from Eumitrin A₁ in above solvents. Occurs in Usnea baileyi

Eumitrin B
A: 51  B: x  B': 27  C: 44  E: x  F: x  G: 55
HPLC: 23
V: +  UV: +
Acid Spray: P.Brown  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 666, 607, 565, 547
Substance Class: Ergochromes
Biosynthetically Related Compounds: Eumitrin A₁, Eumitrin A₂
Notes: Yellow pigment. Occurs in Usnea baileyi

Euplectin
A: 53  B: x  B': 17  C: 48  E: 15  F: x  G: x
HPLC: 26
V: +  UV: +
Acid Spray: P.Yellow  LW UV: P.Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 295, 294, 266, 254

Substance Class: Naphthopyrones

Biosynthetically Related Compounds: Coneuplectin


Notes: Red-orange pigment. Occurs in *Flavoparmelia euplecta*

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**Evernic acid**

A: 38  B: 61  B’: 60  C: 43  E: x  F: x  G: x

HPLC: 26

V: –  UV: +

Acid Spray: Orange  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 182, 168, 165

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Lecanoric acid, Methyl evernate


Notes: Occurs in *Evernia prunastri*

---

**Evernin** [Evernine]

A: 74  B: x  B’: 71  C: 81  E: 60  F: x  G: x

HPLC: 39

V: –  UV: +

Acid Spray: Orange  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 360, 196, 166, 165

Substance Class: Orcinol β-Orcinol Depsides

Biosynthetically Related Compounds: Atranorin, Evernic acid


Notes: Acid Spray: pale orange, grey halo. LW UV: purple, green halo. Occurs in *Evernia prunastri*

---

**Exuviatic acid A**
A: 53  B: x  B’: 42  C: 44  E: x  F: x  G: x
HPLC: 46
V: –  UV: –
Acid Spray: Green  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Aliphatic acids [unknown structure]
Biosynthetically Related Compounds: Exuviatic acid B
Notes: Occurs in Xanthoparmelia exuvia

Exuviatic acid B
A: 50  B: x  B’: 35  C: 40  E: x  F: x  G: x
HPLC: 44
V: –  UV: –
Acid Spray: Green  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Aliphatic acids [unknown structure]
Biosynthetically Related Compounds: Exuviatic acid A
Notes: Occurs in Xanthoparmelia exuvia

Fallacinal
A: 62  B: x  B’: 38  C: 57  E: 24  F: x  G: 65
HPLC: 23  TLC: Rf 30 [oxalic acid-SiO2/benzene]
V: +  UV: +
Acid Spray: Pink  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 298, 284, 270, 252
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Parietin, Parietinic acid, Teloschistin
Notes: Orange-yellow pigment. Occurs in *Xanthoria fallax*

**Fern-9(11)-ene-3β,12α-diol**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>40</td>
<td>x</td>
<td>36</td>
<td>7</td>
<td>x</td>
<td>91</td>
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</table>

HPLC: x

V: –

Acid Spray: Brown

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 442, 424, 409, 273

Substance Class: Terpenoids


Notes: Acid Spray: fades to purple. LW UV: brown, orange halo. Occurs in *Xanthoria resendei*

**Fern-9(11)-ene-3β,12β-diol**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tr>
<td>45</td>
<td>x</td>
<td>41</td>
<td>15</td>
<td>x</td>
<td>50</td>
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HPLC: x

V: –

Acid Spray: Brown

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 442, 424, 409, 273

Substance Class: Terpenoids


Notes: Acid Spray: fades to purple. LW UV: brown, orange halo. Occurs in *Pseudocyphellaria aurata*

**Fern-9(11)-ene-3,12-dione**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>55</td>
<td>x</td>
<td>48</td>
<td>48</td>
<td>x</td>
<td>78</td>
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</tbody>
</table>

HPLC: x

V: –

Acid Spray: Orange

Archers: x
**Fern-9(11)-ene-3,19-dione**

- **A:** 80  
  **B:** x  
  **B':** x  
  **C:** 65  
  **E:** x  
  **F:** x  
  **G:** x

- **HPLC:** x
- **V:** −  
  **UV:** −

- **Acid Spray:** Brown  
  **LW UV:** B. Yellow

- **Archers:** x
- **K:** No Result  
  **C:** No Result  
  **KC:** No Result  
  **PD:** No Result

- **Mass Spectrum:** 438, 423, 405
- **Substance Class:** Terpenoids


- **Reference:** Maier, MS/ Rosso, ML/ Fazio, AT/ Adler, MT/ Bertoni, MD 2009. Fernene triterpenoids from the lichen *Pyxine berteriana*. Journal of Natural Products 72: 1902-1904.

**Notes:** Occurs in *Pyxine berteriana*

**Flavo-obscurin A**

- **A:** x  
  **B:** x  
  **B':** x  
  **C:** x  
  **E:** x  
  **F:** x  
  **G:** x

- **HPLC:** 51  
  **TLC:** Rf 42 [chloroform/methanol, 4/1]

- **V:** +  
  **UV:** +

- **Acid Spray:** Yellow  
  **LW UV:** Yellow

- **Archers:** x
- **K:** x  
  **C:** No Result  
  **KC:** x  
  **PD:** No Result

- **Mass spectrum:** -1, 326, 324, 292
- **Substance Class:** Anthraquinones

**Biosynthetically Related Compounds:** 7-Chloroemodin, 7-Chloro-3-methyl-1,6,8-trihydroxy-9-anthrone, 5,7-Dichloroemodin, Flavo-obscurin B1, Flavo-obscurin B2


**Notes:** Yellow pigment. Occurs in *Heterodermia obscurata*
**Flavo-obscurin B₁**

A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: 52  TLC: Rf 20 [chloroform/methanol, 4/1]  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K:  x  C: No Result  KC: x  PD: No Result  
Mass spectrum: -1, 328, 326, 324  
Substance Class: Anthraquinones  
Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloro-3-methyl-1,6,8-trihydroxy-9-anthrone, 5,7-Dichloroemodin, Flavo-obscurin A, Flavo-obscurin B₂  
Notes: Yellow pigment. Occurs in Heterodermia obscurata

**Flavo-obscurin B₂**

A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: 54  TLC: Rf 19 [chloroform/methanol, 4/1]  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K:  x  C: No Result  KC: x  PD: No Result  
Mass spectrum: -1, 328, 326, 324  
Substance Class: Anthraquinones  
Biosynthetically Related Compounds: 7-Chloroemodin, 7-Chloro-3-methyl-1,6,8-trihydroxy-9-anthrone, 5,7-Dichloroemodin, Flavo-obscurin A, Flavo-obscurin B₂  
Notes: Yellow pigment. Occurs in Heterodermia obscurata

**6-Formyl-5,7-dihydroxypthalide**

A: 29  B: x  B': 13  C: 26  E: 2  F: x  G: 37  
HPLC: 0  
V: −  UV: +  
Acid Spray: Brown  LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 194, 166  
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Barbatolic acid, Barbatolin
Notes: LW UV: purple, pale yellow halo. Occurs in Bryoria nadvornikiana

Fragilin
A: 75  B: 82  B': 67  C: 82  E: 54  F: x  G: x
HPLC: 50  TLC: Rf 69 [toluene]
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 318, 284, 277, 275
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 7-Chlorocitreorosein, 7-Chloroemodin, 7-Chlorofallacinal, 1-O-Methylfragilin, 8-O-Methylfragilin, Parietin
Notes: Orange pigment. SW UV: bright orange. Occurs in Nephroma laevigatum

Fragilin 9-anthrone
A: 73  B: x  B': x  C: 75  E: x  F: x  G: x
HPLC: 52
V: +  UV: +
Acid Spray: Yellow  LW UV: Brown
Archers: x
K: x  C: No Result  KC: x  PD: No Result
Mass spectrum: x
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Fragilin, Parietin, Physcoin Bisanthrone
Notes: Pale yellow pigment. Occurs in Letrouitia hafellneri

Fragilin Bisanthrone
A: 67  B: x  B': 47  C: 65  E: x  F: x  G: x
HPLC: 55
V: +  UV: +
Acid Spray: Yellow  LW UV: Brown
**Archers:** x  
**K:** x  
**C:** No Result  
**KC:** x  
**PD:** No Result

**Mass spectrum:** x

**Substance Class:** Anthraquinones

**Biosynthetically Related Compounds:** Fragilin, Parietin, Physcoin Bisanthrone


**Notes:** Pale yellow pigment. Occurs in *Letrouitia hafellneri*

---

**Friedelan-3β-ol [Epifriedelinol]**

- **A:** x  
- **B:** x  
- **B':** x  
- **C:** x  
- **E:** x  
- **F:** x  
- **G:** x

**HPLC:** x

**V:** –  
**UV:** –

**Acid Spray:** x  
**LW UV:** x

**Archers:** x

**K:** No Result  
**C:** No Result  
**KC:** No Result  
**PD:** No Result

**Mass spectrum:** x

**Substance Class:** Terpenoids

**Biosynthetically Related Compounds:** Friedelin


**Notes:** Occurs in *Flavocetraria nivalis*

---

**Friedelin**

- **A:** x  
- **B:** x  
- **B':** x  
- **C:** x  
- **E:** x  
- **F:** x  
- **G:** x

**HPLC:** x

**V:** –  
**UV:** –

**Acid Spray:** x  
**LW UV:** x

**Archers:** x

**K:** No Result  
**C:** No Result  
**KC:** No Result  
**PD:** No Result

**Mass spectrum:** 426, 411, 302, 273

**Substance Class:** Terpenoids

**Biosynthetically Related Compounds:** Friedelan-3β-ol


**Notes:** Occurs in *Flavocetraria nivalis*

---

**Friesic acid**

- **A:** 19  
- **B:** x  
- **B':** 28  
- **C:** 11  
- **E:** x  
- **F:** x  
- **G:** x
HPLC: 17
V: – UV: +
Acid Spray: Yellow LW UV: Purple
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 358, 196, 178
Substance Class: Depsido-depsones
Biosynthetically Related Compounds: Confristeric acid
Notes: Occurs in *Hypocenomyce friesii*

**Fulgidin**

A: 61 B: x B': 49 C: 54 E: 11 F: x G: x
HPLC: 30
V: – UV: +
Acid Spray: P.Yellow LW UV: Brown
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 392, 390, 388, 357
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Caloploicin, Diploicin, Fulgoicin, Isofulgidin
Notes: Best seen under SW UV before spraying. Occurs in *Fulgensia fulgida*

**Fulgoicin**

A: 66 B: x B': 60 C: 63 E: 14 F: x G: x
HPLC: 53
V: – UV: +
Acid Spray: P.Yellow LW UV: Purple
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 370, 368, 333, 325
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: Caloploicin, Diploicin, Fulgidin, Isofulgidin
Notes: Best seen under SW UV before spraying. Occurs in *Fulgensia fulgida*
**Fumarprotocetraric acid**

A: 1  B: 25  B': 26  C: 7  E: x  F: x  G: 31  
HPLC: 17  
V: -  UV: +  
Acid Spray: Grey  LW UV: Purple  
Archers: x  
K: P.Brown  C: No Result  KC:  PD: D.Red  
Mass spectrum: -1, 358, 356, 314  
Substance Class: \(\beta\)-Orcinol Depsidones  
Biosynthetically Related Compounds: Confumarprotocetraric acid, Physodalic acid, Protocetraric acid, Subvirensic acid, Succinprotocetraric acid, Virensic acid  
Notes: Occurs in *Cladonia phyllophora*

**Furfuraceic acid** [Haemophaein]

A: 46  B: x  B': 35  C: 24  E: x  F: x  G: x  
HPLC: 30  
V: -  UV: +  
Acid Spray: Brown  LW UV: B.Blue  
Archers: Green  
K: No Result  C: Green  KC:  PD: No Result  
Mass spectrum: 468, 450, 352  
Substance Class: Dibenzofurans  
Biosynthetically Related Compounds: Oxodidymic acid, Letrouitic acid, Dioxodidymic acid  
Notes: Occurs in *Phyllopsora furfuracea*

**Furfuric acid**

A: 12  B: x  B': 42  C: 28  E: x  F: x  G: 51  
HPLC: 17  
V: -  UV: +  
Acid Spray: P.Brown  LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: Yellow  
Mass spectrum: 552, 196, 164, 136  
Substance Class: \(\beta\)-Orcinol Depsidones  
Biosynthetically Related Compounds: Fumarprotocetraric acid

Notes: Acid Spray: initially orange, quickly fades to grey-brown as plate cools. Probably an artefact. Reported to occur in *Pseudevernia furfuracea*

**Fusarubin**

A: 36 B: x B': 9 C: 28 E: x F: x G: x  
HPLC: 11  
V: + UV: +  
Acid Spray: Grey LW UV: Pink  
Archers: x  
K: Red C: No Result KC: PD: No Result  
Mass spectrum: 306, 288, 273, 246  
Substance Class: Naphthaquinones  
Biosynthetically Related Compounds: Anhydrofusarubin lactol, Anhydrofusarubin lactol methyl ketal  
Notes: Red pigment. Occurs in *Xanthoparmelia endomiltoides*

**Galapagin**

A: x B: x B': x C: x E: x F: x G: x  
HPLC: 5  
V: + UV: +  
Acid Spray: x LW UV: x  
Archers: x  
K: Yellow C: No Result KC: PD: No Result  
Mass spectrum: 466, 452, 424, 220  
Substance Class: Chromones  
Biosynthetically Related Compounds: Mollin, Roccellin  
Notes: Pale yellow pigment. Occurs in *Roccella galapagoensis*

**Galbinic acid** [α-Acetylsalazinic acid]

A: 29 B: 12 B': 17 C: 19 E: x F: x G: 40  
HPLC: 9  
V: – UV: +  
Acid Spray: Orange LW UV: Brown  
Archers: x  
K: D.Red C: No Result KC: PD: Orange  
Mass spectrum: -1, 152, 151, 60
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Consalazinic acid, Norstictic acid, Salazinic acid
Notes: Spot test: K+ yellow then red. Occurs in Usnea dasaea

Gangaleoidin
A: 64 B: 43 B': 40 C: 54 E: 11 F: x G: x
HPLC: 21
V: – UV: +
Acid Spray: P.Yellow LW UV: Orange
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 414, 412, 397, 220
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 3-Dechlorogangaleodin, Lecideoidin, Leoidin, Norgangaleoidin
Notes: Occurs in Lecanora gangaleoides

Glaucophaeic acid
A: 15 B: x B': 10 C: 9 E: x F: x G: x
HPLC: 35
V: – UV: +
Acid Spray: Pink LW UV: B.Blue
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 291, 290, 206
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 2’-O-Methylhyperphyllinic acid, 2’-O-Methylmicrophyllinic acid, 2’-O-Methylsuperphyllinic acid
Notes: Occurs in Porpidia glaucophaea

Glomellic acid
A: 34 B: 30 B': 27 C: 33 E: x F: x G: x
HPLC: 18
V: – UV: +
Acid Spray: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 252, 238, 234
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylglomellic acid, Glomelliferic acid, Loxodellic acid, Oxostenosporic acid, Perlatolic acid, Stenosporic acid
Notes: Acid Spray: pale orange, grey halo. Occurs in Xanthoparmelia verruculifera

Glomelliferic acid
A: 43  B: 47  B': 47  C: 50  E: x  F: x  G: x
HPLC: 27
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: Pink  PD: P.Red
Mass spectrum: -1, 252, 235, 234
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O- Demethylglomelliferic acid, Glomellic acid, Loxodellonic acid, Oxostenosporic acid, Perlatolic acid, Stenosporic acid
Notes: Acid Spray: pale orange, grey halo. Occurs in Xanthoparmelia verruculifera

Glomelliferonic acid
A: 43  B: x  B': 40  C: 36  E: x  F: x  G: x
HPLC: 26
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 456, 412, 235, 234
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Glomellonic acid, Loxodellonic acid
Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-dark blue, purple halo. Occurs in Xanthoparmelia subincerta
**Glomellonic acid**

A: 34  B: x  B': 24  C: 28  E: x  F: x  G: x  

HPLC: 18  

V: –  UV: +  

Acid Spray: P.Yellow  LW UV: Purple  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: -1, 453, 452, 234  

Substance Class: Orcinol Depsidones  

Biosynthetically Related Compounds: Glomelliferonic acid, Loxodellonic acid  


Notes: Acid Spray: pale yellow, grey halo. Occurs in *Xanthoparmelia subincerta*.

---

**Graciliformin**

A: 35  B: x  B': 10  C: 15  E: x  F: x  G: x  

HPLC: 22  

V: +  UV: +  

Acid Spray: Green  LW UV: Grey  

Archers: x  

K: x  C: x  KC: x  PD: x  

Mass spectrum: 542, 270, 254  

Substance Class: Anthraquinones  

Biosynthetically Related Compounds: Diacetylgraciliformin, Monoacetylgraciliformin, Skyrin  


Notes: Bright yellow pigment. Acid Spray: colour like skyrin. Occurs in *Cladonia graciliformis*.

---

**Graphislactone A**

A: 47  B: x  B': 26  C: 32  E: x  F: x  G: x  

HPLC: 18  

V: –  UV: +  

Acid Spray: P.Yellow  LW UV: Purple  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: x  

Substance Class: 3,4-Benzocoumarins  

Biosynthetically Related Compounds: Alternariol, Graphislactone B

Notes: Occurs in mycobiont culture of *Graphis scripta* var. *pulverulenta*

**Graphislactone B**

A: 18  B: x  B': 4  C: 8  E: x  F: x  G: x  
HPLC: 11  
V: −  UV: +  
Acid Spray: P. Yellow  LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: x  
Substance Class: 3,4-Benzocoumarins  
Biosynthetically Related Compounds: Grapislactone A


Notes: Occurs in mycobiont culture of *Graphis scripta* var. *pulverulenta*

**Graphisquinone**

A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: x  
V: +  UV: +  
Acid Spray: x  LW UV: x  
Archers: x  
K: x  C: x  KC: x  PD: x  
Mass spectrum: Mass Spectrum: 222, 207, 193, 179  
Substance Class: Furoquinones  
Biosynthetically Related Compounds: x


Notes: Red pigment. Occurs in mycobiont of *Graphis desquamescens*

**Grayanic acid**

A: 38  B: 59  C: 44  E: x  F: x  G: x  
HPLC: 37  
V: −  UV: +  
Acid Spray: Orange-brown  LW UV: Pink  
Archers: Purple
K: No Result  C: No Result  KC: Yellow  PD: No Result
Mass spectrum: 414, 396, 370, 165
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Colensoic acid, Congrayanic acid, 4-O-Demethylgrayanic acid, Melacarpic acid
Notes: LW UV: purplish-pink, same as colensoic acid. Occurs in Cladonia grayi, Neophyllis melacarpa

(+)-Griseofulvin
A: 30  B: x  B': 6  C: 18  E: x  F: x  G: x
HPLC: 8
V: –  UV: +
Acid Spray: Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 354, 352, 214, 138
Substance Class: Spirobenzofuranones
Biosynthetically Related Compounds: (+)-Dechlorogriseofulvin
Notes: Occurs in Lecanora griseofulva

Griseoxanthone-C [3-O-Methylnorlichexanthone]
A: 56  B: x  B': 55  C: 35  E: 29  F: 75  G: x
HPLC: 53
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 272, 257, 244, 200
Substance Class: Xanthones
Biosynthetically Related Compounds: 4-Chloro-3-O-methylnorlichexanthone, Norlichexanthone
Notes: Pale yellow pigment. Occurs in Lecanora vinetorum

Gyrophoric acid
A: 24  B: 42  B': 42  C: 24  E: x  F: x  G: x
HPLC: 25
Acid Spray: Yellow  
LW UV: Green
Archers: Orange
K: No Result  C: P.Red
KC: PD: No Result
Mass Spectrum: -1, 318, 168, 150

Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 2,4-Di-O-methylgyrophoric acid, Lecanoric acid, Methyl gyrophorate, 4-O-Methylgyrophoric acid, 5-O-Methylhiascic acid, Orcinyl lecanorate, Ovoic acid, Umbilicaric acid


Notes: Acid Spray: strong-pale yellow, grey halo. Occurs in *Punctelia borreri*

**Haematammnolic acid**

A: 18  B: 35  B’: 34  C: 32  E: x  F: x  G: 49
HPLC: 26
V: –  UV: +
Acid Spray: Brown  
LW UV: Brown
Archers: x
K: Yellow  C: No Result
KC: PD: Yellow
Mass Spectrum: 360, 210, 193, 191

Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Cryptothamnolic acid, Hypothamnolic acid, Thamnolic acid


Notes: LW UV: brown, purple halo. Occurs in *Pertusaria moreliensis*

**Haematommic acid**

A: 40  B: x  B’: 67  C: 43  E: x  F: x  G: x
HPLC: 15
V: –  UV: +
Acid Spray: Orange  
LW UV: Orange
Archers: x
K: Yellow  C: No Result
KC: PD: Yellow
Mass Spectrum: 196, 179, 178, 152

Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Atranorin, Methyl haematommate

Notes: Possibly artefact, described from *Asahinea chrysantha*

**Haematommone**

A: 50  B: x  B': 60  C: 40  E: x  F: x  G: x  
HPLC: 38
V: +  UV: +

Acid Spray: Orange  LW UV: Pink

Archers: x  
K: Violet  C: No Result  KC: PD: No Result

Mass Spectrum: 314, 299

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Russulone


Notes: Red pigment. Occurs in *Haematomma africanum*

**Haemoventosin**

A: 38  B: 2  B': 2  C: 20  E: 0  F: x  G: x  
HPLC: 5
V: +  UV: +

Acid Spray: Purple  LW UV: Pink

Archers: x  
K: Violet  C: No Result  KC: PD: No Result

Mass Spectrum: 304, 302, 260

Substance Class: Naphthoquinones

Biosynthetically Related Compounds: Coronatoquinone


Notes: Red pigment. Occurs in *Ophioparma ventosa*

**Hafellic acid**

A: 50  B: x  B': 32  C: 33  E: x  F: x  G: x  
HPLC: 19
V: –  UV: +

Acid Spray: P.Yellow  LW UV: Sky Blue

Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: x

Substance Class: [structure not known]

Biosynthetically Related Compounds: x

Notes: Occurs in *Buellia subtropica*

**Hiascic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B: x</th>
<th>B': 8</th>
<th>C: 12</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
</table>

HPLC: 19

V: –

UV: +

Acid Spray: P. Yellow

LW UV: Green

Archers: x

K: Red

C: Red

KC: PD: No Result

Mass Spectrum: -1, 318, 274, 184

Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: 4,5-Di-O-methylhiascic acid, Gyrophoric acid, 5-O-Methylhiascic acid, 2,4,5-Tri-O-methylhiascic acid


Notes: Acid Spray: pale yellow, grey halo. Occurs in *Cetrariella delisei*

**Hierridin**

<table>
<thead>
<tr>
<th>A</th>
<th>B: x</th>
<th>B': x</th>
<th>C: 90</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
</table>

HPLC: 84

V: –

UV: +

Acid Spray: Yellow-brown

LW UV: Purple

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 448, 168, 167, 153

Substance Class: Monocyclic aromatic derivatives

Biosynthetically Related Compounds: x


Notes: Occurs in *Ramalina hierrensis*

**Hirtifructic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B: x</th>
<th>B': 38</th>
<th>C: 44</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
</table>

HPLC: 26

V: –

UV: +

Acid Spray: Orange

LW UV: Orange

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: [structure not known]
Biosynthetically Related Compounds: Conechinocarpic acid, Conhirtifructic acid, Echinocarpi
cacid
Notes: Occurs in Relicina hirtifructa

**Homoheveadride**

- A: 77  B: 51  C: 76  E: x  F: x  G: x
- HPLC: 26
- V: –  UV: –
- Acid Spray: No Result  LW UV: No Result
- Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 388, 342, 264, 194
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Heveadride
Notes: Occurs in Cladonia polycarpoides

**Homosekikaic acid**

- A: 45  B: 69  B': 65  C: 56  E: x  F: x  G: x
- HPLC: 35
- V: –  UV: +
- Acid Spray: Orange  LW UV: Green
- Archers: P.Red

K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 254, 236, 210
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Hyperhomosekikaic acid, 4'-O-Methylnorhomosekikaic acid, Paludosic acid, Ramalinolic acid, Sekikaic acid
Notes: Acid Spray: orange, yellow halo, darker orange on standing. Occurs in Relicina hirtifructa

**Hopane-6α,22-diol [Zeorin]**

- A: 52  B: 42  B': 43  C: 43  E: 19  F: 44  G: 50
- HPLC: x
<table>
<thead>
<tr>
<th>Compound</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Acid Spray</strong></td>
<td>P. Brown</td>
</tr>
<tr>
<td><strong>LW UV</strong></td>
<td>Orange</td>
</tr>
<tr>
<td><strong>Archers</strong></td>
<td>x</td>
</tr>
<tr>
<td><strong>K</strong></td>
<td>No Result</td>
</tr>
<tr>
<td><strong>C</strong></td>
<td>No Result</td>
</tr>
<tr>
<td><strong>KC</strong></td>
<td>No Result</td>
</tr>
<tr>
<td><strong>PD</strong></td>
<td>No Result</td>
</tr>
<tr>
<td><strong>Mass Spectrum</strong></td>
<td>444, 426, 207, 189</td>
</tr>
<tr>
<td><strong>Substance Class</strong></td>
<td>Terpenoids</td>
</tr>
<tr>
<td><strong>Biosynthetically Related Compounds</strong></td>
<td>6α-Acetoxyhopane-16β,22-diol, 6α-Acetoxyhopane-22-ol, Hopane-6α,16β,22-triol, 22-Hydroxyhopane-6-one</td>
</tr>
<tr>
<td><strong>Notes</strong></td>
<td>Acid Spray: brown fades to purple on standing. Occurs in <em>Heteroderma speciosa</em></td>
</tr>
</tbody>
</table>

**Hopane-7β,22-diol**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>x</td>
</tr>
<tr>
<td>B'</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>43</td>
</tr>
<tr>
<td>E</td>
<td>15</td>
</tr>
<tr>
<td>F</td>
<td>x</td>
</tr>
<tr>
<td>G</td>
<td>x</td>
</tr>
</tbody>
</table>

**HPLC:** x  
**V:** –  
**UV:** –  
**Acid Spray:** Purple  
**LW UV:** Yellow  
**Archers:** x  
**K**: No Result  
**C**: No Result  
**KC**: No Result  
**PD**: No Result  
**Mass Spectrum:** 444, 426, 411, 191  
**Substance Class:** Terpenoids  
**Biosynthetically Related Compounds:** 7β-Acetoxyhopane-22-ol, Hopane-6α,7β,22-triol  
**Notes:** Occurs in *Pseudocyphellaria crocata*

**Hopane-11β,22-diol**

<table>
<thead>
<tr>
<th>Letter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>x</td>
</tr>
<tr>
<td>B</td>
<td>x</td>
</tr>
<tr>
<td>B'</td>
<td>x</td>
</tr>
<tr>
<td>C</td>
<td>40</td>
</tr>
<tr>
<td>E</td>
<td>x</td>
</tr>
<tr>
<td>F</td>
<td>x</td>
</tr>
<tr>
<td>G</td>
<td>x</td>
</tr>
</tbody>
</table>

**HPLC:** x  
**V:** –  
**UV:** –  
**Acid Spray:** Purple  
**LW UV:** Yellow  
**Archers:** x  
**K**: No Result  
**C**: No Result  
**KC**: No Result  
**PD**: No Result  
**Mass Spectrum:** 444, 426  
**Substance Class:** Terpenoids  
**Biosynthetically Related Compounds:** x  
Notes: Occurs in *Pseudocyphellaria crocata*

**Hopane-15α,22-diol**

A: 40  B: x  B': 39  C: 36  E: 8  F: x  G: 42  
HPLC: x  
V: –  UV: –  
Acid Spray: Purple  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 444, 426, 411, 191  

Substance Class: Terpenoids  
Biosynthetically Related Compounds: 15α-Acetoxyhopan-22-ol  
Notes: Occurs in *Pseudocyphellaria billiardieri*

**Hopane-16β,22-diol**

A: x  B: x  B': x  C: 36  E: 12  F: x  G: x  
HPLC: x  
V: –  UV: –  
Acid Spray: Brown  LW UV: Orange  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: x  
Substance Class: Terpenoids  
Biosynthetically Related Compounds: 16β-Acetoxy-22-hydroxyhopane-4α-oic acid, 16β,22-Dihydroxyhopan-4α-oic acid, Hopane-6α,16β,22-triol  
Notes: Occurs in *Myelochroa entothieochroa*, *Septotrapelia usnica*

**Hopane-6α,7β,22-triol**

A: 38  B: x  B': 58  C: 36  E: 6  F: x  G: 38  
HPLC: x  
V: –  UV: –  
Acid Spray: Brown  LW UV: Orange  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 7β-Acetoxyhopane-6α,22-diol
Notes: Acid Spray: fades to purple. Occurs in Pseudocyphellaria neglecta

**Hopane-6α,16β,22-triol** [Leucotylin]
A: 17  B: x  B': 28  C: 21  E: 4  F: x  G: 30
HPLC: x
V: –  UV: –

Acid Spray: Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 460, 442, 409, 384

Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-16β,22-diol, 16β-Acetoxyhopan-6α,22-diol, 6α,16β-Diaceotoxyhopan-22-ol
Notes: Acid Spray: fades to purple. Occurs in Heterodermia tremulans

**Hybocarpone**
A: 16  B: x  B': 44  C: 14  E: x  F: x  G: x
HPLC: 11
V: +  UV: +

Acid Spray: Brown  LW UV: Brown
Archers: x
K: Red  C: No Result  KC: PD: No Result

Mass spectrum: 544, 264

Substance Class: Naphthaquinones
Biosynthetically Related Compounds: Boryquinone, Desmethylhybocarpone
Notes: Orange pigment. Occurs in Heterodermia hybocarponica

**3α-Hydroxybarbatic acid** [8-Hydroxybarbatic acid]
A: 20  B: 29  B': 28  C: 24  E: x  F: x  G: x
HPLC: 20
V: −  UV: +
Acid Spray: Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: Yellow  PD: No Result
Mass Spectrum: -1, 195, 194, 182
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Baeomycesic acid, Barbatic acid, 4-O-Demethylbarbatic acid, Squamatic acid
Notes: Acid Spray: yellow, grey halo. LW UV: purple, pale yellow halo. Occurs in Xanthoparmelia moctezumensis

3-Hydroxycolensoic acid
A: 39  B: 50  B': 50  C: 42  E: x  F: x  G: x
HPLC: 26
V: −  UV: +
Acid Spray: P.Brown  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: Yellow  PD: No Result
Mass Spectrum: 458, 440, 414, 236
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Colensoic acid, Lividic acid, Methoxycolensoic acid, 4-O-Methylphysodic acid, Norcolensoic acid, Physodic acid
Notes: Occurs in Hypotrachyna osseoalba

2-Hydroxyconviresnic acid
A: 5  B: x  B': 22  C: 4  E: x  F: x  G: 28
HPLC: 12
V: −  UV: +
Acid Spray: Orange  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 273, 231, 200
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Viresnic acid, 2-Hydroxyviresnic acid

Notes: Minor component in Sulcaria sulcata

3α-Hydroxydiffractaic acid [8-Hydroxydiffractaic acid]
A: 18  B: x  B': x  C: 20  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Diffractaic acid
Notes: Occurs in Usnea longissima

3β-Hydroxyfern-9(11)-ene-12-one
A: 50  B: x  B': 39  C: 38  E: 19  F: x  G: 51
HPLC: x
V: –  UV: –
Acid Spray: Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Substance Class: Terpenoids
Notes: Acid Spray: fades to purple. LW UV: brown, orange halo. Occurs in Pseudocyphellaria aurata

22-Hydroxyhopane-6-one [Zeorinone]
A: 54  B: x  B': 53  C: 49  E: 40  F: x  G: 64
HPLC: x
V: –  UV: –
Acid Spray: P.Yellow-brown  LW UV: P.Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 442, 424, 409, 189
Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-22-ol, Hopane-6α,22-diol
Notes: Occurs in *Rinodina thiomela*

**2-Hydroxyhypoprotocetraric acid**
A: 15  B: x  B': 29  C: 10  E: x  F: x  G: x
HPLC: 15
V: −  UV: +
Acid Spray: D.Blue  LW UV: D.Blue
Archers: x
K: x  C: x  KC: x  PD: x
Mass spectrum: x
Substance Class: β-Oracinol depsidones
Biosynthetically Related Compounds: 2-Hydroxynotatic acid, Hypoprotocetraric acid, Notatic acid
Notes: Quenches in visible light like oxyphysodic acid. Occurs in *Ocellularia arecae*

**3-Hydroxygyrophoric acid**
A: 13  B: x  B': 32  C: 16  E: x  F: x  G: x
HPLC: 20
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: x  C: x  KC: x  PD: x
Mass spectrum: -1, 184, 168, 150
Substance Class: Oracinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, 3-Hydroxy- 4-O-methylumbilicaric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid
Notes: Minor component in *Hypotrachyna subfascisens*

**5-Hydroxylecanoric acid**
A: 21  B: 36  B': 33  C: 11  E: x  F: x  G: x
HPLC: 8
V: −  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: 334, 184, 168, 150
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid
Notes: Acid Spray: yellow, grey halo. LW UV: strong-purpl, green halo. Minor component in Hypotrachyna neodamaziana

9α-Hydroxymenegazziaic acid  [8'-Hydroxymenegazziaic acid ]
A: 2  B: x  B': 2  C: 1  E: x  F: x  G: 13
HPLC: 2
V: -  UV: +
Acid Spray: Grey  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Orange
Mass spectrum: x
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: α-Acetylconstictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Norstictic acid, Stictic acid
Notes: Minor component in Parmotrema crinitum

2-Hydroxy-4-methoxy-6-pentylbenzoic acid  [4-O-Methylolivetolcarboxylic acid]
A: 56  B: 78  B': x  C: 60  E: x  F: x  G: x
HPLC: 12
V: -  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 238, 221, 220, 194
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: 2,4-Dihydroxy-6-pentylbenzoic acid, Perlatolic acid
Notes: Possibly an artefact, reported from Cladonia macaronesica
**6α-Hydroxyeugenitin** [6-Hydroxymethyleugenitin, 5-Hydroxy-6-hydroxymethyl-7-methoxy-2-methylchromone]

A: 31  B: x  B’: x  C: 18  E: 16  F: x  G: x  
HPLC: 5  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: Orange  KC: PD: No Result  
Mass Spectrum: 236, 235, 221, 219  
Substance Class: Chromones

Biosynthetically Related Compounds: Eugenitin, Eugenitol, Lepraric acid, Sordidone  
Notes: Pale yellow pigment. Acid Spray: deep mustard yellow, brown halo, fades to orange. LW UV: brownish-yellow. Occurs in *Roccella fuciformis*

**4-Hydroxyisovulpinic acid**

A: 52  B: x  B’: 37  C: 39  E: x  F: 42  G: x  
HPLC: x  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: x  
Substance Class: Pulvinic acid derivatives

Biosynthetically Related Compounds: Vulpinic acid, 4-Hydroxypulvinic dilactone  
Reference: New report  
Notes: Yellow pigment. Accessory substance in *Letharia vulpina*

**3-Hydroxy-4-0-methyllumbicaric acid**

A: 36  B: x  B’: 33  C: 35  E: x  F: x  G: x  
HPLC: 24  
V: –  UV: +  
Acid Spray: P.Yellow  LW UV: Green  
Archers: x  
K: x  C: x  KC: x  PD: x  
Mass spectrum: -1, 212, 195, 180  
Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, 3-Hydroxygyrophoric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid

Notes: Minor component in *Hypotrachyna subfaticens*

**2-Hydroxyxnonnotatic acid**

A: 9 B: 25 C: 6 E: x F: x G: x

HPLC: 9

V: – UV: +

Acid Spray: D.Brown LW UV: Brown

Archers: x

K: x C: x KC: x PD: x

Mass spectrum: x

Substance Class: Orcinol β-Orcinol Depsidones

Biosynthetically Related Compounds: 2-Hydroxyhypoprotocetraric acid, Hypoprotocetraric acid, Notatic acid


Notes: Quenches in visible light like oxyphysodic acid. Occurs in *Ocellularia arecae*

**22α-Hydroxy-3,4-secostict-4(23)-en-3-al**

A: 67 B: 70 C: 56 E: 52 F: x G: 76

HPLC: x

V: – UV: –

Acid Spray: Brown LW UV: Orange

Archers: x

K: No Result C: No Result KC: No Result PD: No Result

Mass spectrum: 442

Substance Class: Terpenoids

Biosynthetically Related Compounds: 2α-Acetoxyxstictane-3β,22α-diol, 3β-Acetoxyxstictane-2α,22-diol, 22α-Hydroxy-3,4-secostict-4(23)-en-3-oic acid, Stictane-3β,22-diol


Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in *Pseudocyphellaria degelii*

**22α-Hydroxy-3,4-secostict-4(23)-en-3-oic acid**

A: 52 B: x B': 54 C: 51 E: 11 F: x G: 62

HPLC: x

V: – UV: –

Acid Spray: Brown LW UV: Orange

Archers: x

K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 458
Substance Class: Terpenoids
Biosynthetically Related Compounds: 2α-Acetoxyystictane-3β,22α-diol, 3β-Acetoxyystictane-2α,22-diol, 22α-Hydroxy-3,4-secostict-4(23)-en-3-al, Stictane-3β,22-diol
Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in Pseudocyphellaria degelii

22α-Hydroxystictane-3-one
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 442, 427, 424, 409
Substance Class: Terpenoids
Biosynthetically Related Compounds: 3β-Acetoxyystictane-2α,22-diol, Stictane-3β,22-diol
Notes: Occurs in Pseudocyphellaria norvegica

3-Hydroxumbilicaric acid
A: 16  B: x  B': 26  C: 11  E: x  F: x  G: 46
HPLC: 16
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: Pink  PD: No Result
Mass spectrum: -1, 198, 181, 168, 150
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, 3-Hydroxygyrophoric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid, 3-Methoxyumbilicaric acid, Umbilicaric acid
Notes: Occurs in Hypotrachyna bonariensis

2-Hydroxyvirensic acid
A: 24  B: x  B': 45  C: 27  E: x  F: x  G: x
HPLC: 16
Acid Spray: Brown  LW UV: Brown
Archers: x
K: Brown C: No Result  KC: PD: Red
Mass spectrum: 375, 374, 357, 356
Substance Class: β-Orcinol Depsidones
Notes: Occurs in Sulcaria sulcata

4-Hydroxyvulpinic acid
A: 48  B: x  B': 34  C: 36  E: x  F: 25  G: x
HPLC: 14
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum:
Substance Class: Pulvinic acid derivatives
Biosynthetically Related Compounds: Vulpinic acid, 4-Hydroxypulvinic dilactone
Notes: Yellow pigment. Minor component in Letharia vulpina

Hyperconfluentic acid
A: 49  B: 45  B': 40  C: 59  E: x  F: x  G: x
HPLC: 35
V: −  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 280, 266, 262
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Confluentic acid, Insignin, Superconfluentic acid,
Notes: Occurs in Pseudobaeomyces pachycarpus
Hyperhomosekikaic acid
A: 56   B: x   B': 64   C: 61   E: x   F: x   G: x
HPLC: 38
V: −   UV: +
Acid Spray: Orange   LW UV: Green
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: -1, 238, 236, 221
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Homosekikaic acid, Sekikaic acid,
Reference: Culberson, CF/ Culberson, WL/ Johnson, A 1985: Orcinol-type depsides and depsidones in the
Notes: Occurs in Physcidia wrightii, Phyllopsora homosekikaica

Hyperlatolic acid
A: 53   B: x   B': 74   C: 52   E: x   F: x   G: x
HPLC: 54
V: −   UV: +
Acid Spray: P.Yellow   LW UV: Green
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: -1, 455, 454, 238
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isohyperlatolic acid, Perlatalic acid, Superlatolic acid
Reference: Culberson, CF/ Hale, ME/ Tønsberg, T/ Johnson, A 1984: New depsides from the lichen Dimelaena
Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in Rhopalospora viridis

Hyperpicrolitchenic acid
A: 41   B: x   B': 49   C: 40   E: x   F: x   G: x
HPLC: 45
V: −   UV: +
Acid Spray: P.Yellow   LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: Red   PD: No Result
Mass spectrum: 470, 426, 105, 88
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isohyperpicrolitchenic acid, Picrolitchenic acid, Subpicrolitchenic acid,
Superpicrolitchenic acid

Notes: Occurs in *Pertusaria truncata*

**Hyperplanaic acid**

A: 51  B: x  B': 44  C: 59  E: x  F: x  G: x  
HPLC: 51
V: −  UV: +  
Acid Spray: P.Yellow  LW UV: Purple  
Archers: No Result  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: -1, 236, 235  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Planaic acid, Isohyperplanaic acid, Superplanaic acid  
Notes: Occurs in *Lecanora planaica*

**Hypopectorialic acid**

A: 35  B: x  B': 40  C: 14  E: x  F: x  G: x  
HPLC: 21
V: −  UV: +  
Acid Spray: P.Grey  LW UV: Blue  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: -1, 182, 181, 180  
Substance Class: Benzyl esters  
Biosynthetically Related Compounds: Alectorialic acid  
Notes: Occurs in *Hypotrachyna hypopectorialica*

**Hypoconstictic acid**

A: 15  B: 7  B': 7  C: 4  E: x  F: x  G: 28  
HPLC: 7
V: −  UV: +  
Acid Spray: D.Red  LW UV: D.Red  
Archers: x  K: Yellow  C: No Result  KC: PD: No Result  
Mass spectrum: -1, 354, 336, 317
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: α-Acetylhypoconstictic acid, Hyposalazinic acid, Hypostictic acid
Notes: Acid Spray: dull red. LW UV: dull red. Occurs in Nephroma antarcticum

**Hyponephroarctin**

A: x     B: x     B': x     C: x     E: x     F: x     G: x
HPLC: x
V: −      UV: +
Acid Spray: x        LW UV: x
Archers: x
K: No Result    C: Red    KC: PD: Yellow
Mass spectrum: 358, 193, 166, 151
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Nephroarctin
Notes: Occurs in Nephroma arcticum

**Hypopannarin**

A: 42     B: x     B': 35     C: 33     E: x     F: x     G: x
HPLC: 20
V: −      UV: +
Acid Spray: Yellow-brown        LW UV: Orange
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No result
Mass spectrum: 328, 300, 285, 284
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Dechloropannarin, Norpannarin, Pannarin
Notes: Occurs in Leprocaulon adhaerens

**Hypophysciosporin**

A: 63     B: x     B': 58     C: 52     E: 34     F: x     G: x
HPLC: 40
V: −      UV: +
Acid Spray: Blue        LW UV: D.Blue
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 394, 392, 362, 360  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Argopsin, Hypoprotocetraric acid, Isovicanin, Methyl virensate, Norvicanin, Physciosporin, Vicanicin  
Notes: Occurs in *Erioderma phaeorhizum*

**Hypoprotocetraric acid**  
A: 22  B: 43  B': 37  C: 22  E: x  F: x  G: 48  
HPLC: 19  
V: –  UV: +  
Acid Spray: Blue  LW UV: D.Blue  
Archers: Brown  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 344, 326, 300  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Conhypoprotocetraric acid, Convirensic acid, 4-O-Demethylnotatic acid, 2-Hydroxyhypoprotocetraric acid, Isonotatic acid, 4-O-Methylhypoprotocetraric acid, Notatic acid  
Notes: Acid Spray: initially bright blue; fades to pale orange, grey halo. Occurs in *Xanthoparmelia hypoprotocetrarica*

**Hypopsoromic acid**  
A: 25  B: 32  B': x  C: 17  E: x  F: x  G: x  
HPLC: x  
V: –  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: x  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Psoromic acid  
Notes: Occurs in *Lecanora novomexicana*
Hyposalazinic acid
A: 34  B: 27  B': 26  C: 8  E: x  F: x  G: 44
HPLC: 8
V: –  UV: +
Acid Spray: P.Red  LW UV: Pink
Archers: x
K: Yellow then reddish  C: No Result  KC: PD: No Result
Mass spectrum: -1, 314, 297, 286
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Hypoconstictic acid, Hypoprotocetraric acid, Hypostictic acid
Notes: Acid Spray: pale pink-red. LW UV: bright pink. Occurs in Xanthoparmelia quintaria

Hypostictic acid
A: 50  B: 33  B': 32  C: 32  E: x  F: x  G: 61
HPLC: 13
V: –  UV: +
Acid Spray: P.Red  LW UV: Pink
Archers: x
K: Yellow  C: No Result  KC: PD: No Result
Mass spectrum: 372, 354, 328, 327
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Hypoconstictic acid, Hypoprotocetraric acid, Hyposalazinic acid, 4-O-Methylhypoprotocetraric acid
Notes: Acid Spray: pale pink-red. LW UV: bright pink. Occurs in Xanthoparmelia quintaria

Hypostictolide [Hypostictinolide]
A: 58  B: x  B': x  C: 52  E: 30  F: x  G: x
HPLC: 22
V: –  UV: +
Acid Spray: P.Red  LW UV: Pink
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 356, 328
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypoconstictic acid, Hypostictic acid
Notes: Minor component in Buellia lindigeri

**Hypostrepsilic acid** [Norascomatic acid]
A: 23 B: x B': 43 C: 25 E: x F: x G: x
HPLC: 17
V: − UV: +
Acid Spray: B.Blue LW UV: Purple
Archers: Green
K: No Result C: Green KC: PD: No Result
Mass spectrum: 272, 255, 254, 228
Substance Class: Dibenzoferans

Biosynthetically Related Compounds: Ascomatic acid, 7-O-Methylnorascomatic acid, Methyl ascomatate, Isostrepsilic acid, Strepsilin
Notes: Occurs in Bunodophoron patagonicum

**Hypothallin**
A: x B: x B': x C: x E: x F: x G: x
HPLC: 20 TLC: Rf 55 [hexane/diethyl ether/formic acid, 20/30/6]
V: − UV: +
Acid Spray: x LW UV: x
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum:
Substance Class: Amino acid derivatives
Biosynthetically Related Compounds: x
Notes: Occurs in Schismatomma hypothallinum

**Hypothamnolic acid**
A: 4 B: 25 B': 18 C: 23 E: x F: x G: 34
HPLC: 15
V: − UV: +
Acid Spray: Brown  
LW UV: Brown
Archers: x
K: Purple  C: P.Red  KC: PD: No Result
Mass spectrum: -1, 362, 209, 198, 191
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Cryptothamnolic acid, Haemathamnolic acid, Thamnolic acid
Notes: Occurs in Pertusaria novaezelandiae

**Hypotrachynic acid** [Dehydroisoobtusatic acid]
A: x  B: x  B': x  C: 18  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  
LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 370, 342
Substance Class: Orcinol β-Orcinol Depsides
Biosynthetically Related Compounds: Connostrictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Stictic acid
Notes: reported to occur in Hypotrachyna revoluta [but possibly a misdetermination of Parmotrema perlatum]

**Imbricaric acid**
A: 42  B: 75  B': 71  C: 50  E: x  F: x  G: x
HPLC: 34
V: –  UV: +
Acid Spray: Orange  
LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 238, 220, 196
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylimbricaric acid, Loxodellic acid, Perlatalic acid, Stenosporic acid

Notes: Acid Spray: pale orange, grey halo. LW UV: purple, green halo. Occur in *Cetraria cetrarioides*

### Insignin

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HPLC: 45

V: –

Acid Spray: P: Yellow

LW UV: B: Blue

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 380, 219, 206, 191

Substance Class: Isocoumarins

Biosynthetically Related Compounds: Confluentic acid, Glaucophaeic acid, Hyperconfluentic acid, Subconfluentic acid, Superconfluentic acid


Notes: Occurs in *Pseudobaeomyces pachycarpus*, *Porpidia glaucophaea*

### Islandicin

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HPLC: x

TLC: Rf 82 [benzene/hexane, 1/1]; Rf 85 [benzene/acetone, 4/1]

V: +

Acid Spray: Orange

LW UV: Red

Archers: x

K: Violet  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 270, 253, 242, 213

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Asahinin, Cynodontin


Notes: Red-orange pigment. Minor component in *Asahinea chrysantha*

### Isoarthothelin [2,5,7-Trichloronorlichexanthone]

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HPLC: 36

V: +

Acid Spray: Orange

LW UV: Green
Archers: x
K: No Result C: Orange KC: PD: No Result
Mass spectrum: 364, 362, 360, 331
Substance Class: Xanthones
Biosynthetically Related Compounds: 2,5-Dichloronorlichexanthone, 5,7-Dichloronorlichexanthone, Thiophanic acid, 2,5,7-Trichlorlichexanthone, 2,5,7-Trichloro-3-O-methylnorlichexanthone
Notes: Yellow pigment. Occurs in Buellia aeruginosa

**Isodidymic acid**

A: 42  B: x  B': 66  C: 50  E: x  F: x  G: x
HPLC: 37
V: –  UV: +
Acid Spray: D.Blue  LW UV: B.Blue
Archers: Green
K: No Result C: Green KC: PD: No Result
Mass spectrum: 370, 352, 326, 276
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Condidymic acid, Didymic acid, Subdidymic acid
Notes: Occurs in chemical race of Cladonia didyma

**Isofulgidin**

A: 66  B: x  B': 58  C: 52  E: 28  F: x  G: x
HPLC: 37
V: –  UV: +
Acid Spray: P.Yellow  LW UV: No Result
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 392, 390, 388, 357
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Caloploicin, Diploicin, Fulgidin, Fulgoicin
Notes: Best seen under SW UV before spraying. Acid Spray: very pale yellow. LW UV:strong brown.
Occurs in Buellia tetrapla

**Isohyperlatolic acid**
A: 48  B: x  B': 79  C: 52  E: x  F: x  G: x
HPLC: 55
V: −  UV: +

Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: -1, 454, 267, 266
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Hyperlatolic acid, Perlatolic acid, Superlatolic acid
Notes: Acid Spray: pale yellow, grey halo. LW UV: purple, green halo. Occurs in Ropalospora viridis

Isohyperpicrolichenic acid
A: 39  B: x  B': 47  C: 38  E: x  F: x  G: x
HPLC: 46
V: −  UV: +

Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: Red  PD: No Result

Mass spectrum: 426, 426, 69, 55
Substance Class: Depsones
Biosynthetically Related Compounds: Hyperpicrolichenic acid, Picrolichenic acid, Superpicrolichenic acid
Notes: Occurs in Pertusaria truncata

Isohyperplanaic acid
A: 54  B: x  B': 41  C: 58  E: x  F: x  G: x
HPLC: 51
V: −  UV: +

Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: -1, 264, 263
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Planaic acid, Hyperplanaic acid, Superplanaic acid
Australian Journal of Chemistry 47: 1199-1203.
Notes: Occurs in Lecanora planaica
### Isohypocrelline [Isohypocrellin]

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HPLC: 50

V: +  
UV: +  

Acid Spray: D.Red  
LW UV: D.Red  

Archers: x  

K: Green  
C: No Result  
KC: PD: No Result  

Mass spectrum: 546, 528, 485, 459  

Substance Class: Perylenequinones  

Biosynthetically Related Compounds: x  

Rapid Communications in Mass Spectrometry 8: 46-52.  
Notes: Deep red pigment. Occurs in *Thecaria montagnei*

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### Isolecanoric acid

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<td>x</td>
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<td>x</td>
</tr>
</tbody>
</table>

HPLC: 5

V: −  
UV: +  

Acid Spray: Yellow  
LW UV: Green  

Archers: x  

K: No Result  
C: Red  
KC: PD: No Result  

Mass spectrum: x  

Substance Class: Orcinol Depsides  

Biosynthetically Related Compounds: Lecanoric acid  

Notes: Occurs in *Parmotrema tinctorum*

---

### Isoleprapinic acid

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>67</td>
<td>x</td>
<td>35</td>
<td>59</td>
<td>x</td>
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<td>x</td>
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HPLC: 14

V: +  
UV: +  

Acid Spray: Yellow  
LW UV: B.Blue  

Archers: x  

K: No Result  
C: No Result  
KC: No Result  
PD: No Result  

Mass Spectrum: 352, 320, 292, 264  

Substance Class: Pulvinic acid derivatives  

Biosynthetically Related Compounds: Leprapinic acid
References: new report
Notes: Yellow pigment. Accessory substance in *Chrysothrix occidentalis*

**Isomegapicrolichenic acid**

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<tr>
<th></th>
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<th>B</th>
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<th>E</th>
<th>F</th>
<th>G</th>
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<td></td>
<td>44</td>
<td>x</td>
<td>62</td>
<td>x</td>
<td>x</td>
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HPLC: 55

- V: –
- UV: +

Acid Spray: P. Yellow

LW UV: Purple

Archers: x

<table>
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<th>K</th>
<th>C</th>
<th>KC</th>
<th>PD</th>
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<tr>
<td>No Result</td>
<td>No Result</td>
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</table>

Mass spectrum: 526, 483, 482, 355

Substance Class: Depsos

Biosynthetically Related Compounds: Hyperpicrolichenic acid, Isohyperpicrolichenic acid, Megapicrolichenic acid, Picrolichenic acid, Superpicrolichenic acid


Notes: Minor component in *Pertusaria truncata*

**Isomerchlorophaeic acid**

<table>
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<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td></td>
<td>49</td>
<td>x</td>
<td>56</td>
<td>54</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>

HPLC: 28

- V: –
- UV: +

Acid Spray: Orange

LW UV: Brown

Archers: x

<table>
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<tr>
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<th>C</th>
<th>KC</th>
<th>PD</th>
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<tbody>
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<td>No Result</td>
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<td>No Result</td>
<td>No Result</td>
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</table>

Mass spectrum: -1, 235, 196, 191

Substance Class: Orcinol Depsid

Biosynthetically Related Compounds: Merochlorophaeic acid, 4-O-Methylcryptochlorophaeic acid


Notes: Occurs in *Ramalina cf. leiodea*

**Isonephrosterinic acid**

<table>
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<th></th>
<th>A</th>
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<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td></td>
<td>43</td>
<td>x</td>
<td>55</td>
<td>40</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: 36

- V: –
- UV: –

Acid Spray: No Result

LW UV: Lilac

Archers: x

<table>
<thead>
<tr>
<th></th>
<th>K</th>
<th>C</th>
<th>KC</th>
<th>PD</th>
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<tbody>
<tr>
<td>No Result</td>
<td>No Result</td>
<td>No Result</td>
<td>No Result</td>
<td></td>
</tr>
</tbody>
</table>

Mass spectrum: x
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Lichesterinic acid, Nephrosterinic acid, Protolichesterinic acid
Reference: new report
Notes: Occurs in *Nephromopsis endocrocea*

**Isonorlobaridone**

A: 31  B: x  B': 14  C: 5  E: x  F: x  G: x
HPLC: 20
V: -  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 398, 370, 342, 221
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Norlobaridone, Norlobariol, Norlobariol methyl ester
Notes: Occurs in *Xanthoparmelia amplexula*

**Isonorobtusatic acid** [Norisoobtusatic acid]

A: 30  B: x  B': 53  C: 28  E: x  F: x  G: x
HPLC: 36
V: -  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: Orange
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: 332, 182, 168, 165
Substance Class: Orcinol β-Orcinol Depsides
Biosynthetically Related Compounds: Isoobtusatic acid, Norobtusatic acid, Obtusatic acid
Notes: Occurs in *Ramalina americana* s.lat.

**Isonorpannarin** [Norisopannarin]

A: 73  B: x  B': 63  C: 65  E: 38  F: 80  G: x
HPLC: 25
V: -  UV: +
Acid Spray: Yellow-brown  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Yellow-orange
Mass spectrum: 350, 348
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Norpannarin, Pannarin
Reference: Rosa, IN 2013. Las especies del género Lecanora sensu lato en la Argentina, Universidad Nacional del Comahue, 213pp
Notes: Occurs in Lecanora dispersa, L. torrida

**Isonotatic acid**
A: 38  B: x  B': 42  C: 43  E: x  F: x  G: 56
HPLC: 24
V: −  UV: +
Acid Spray: Yellow  LW UV: D.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 344, 326, 300, 298
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: 4-O-Methylhypoprotocetraric acid, Norisonotatic acid, Notatic acid, Subnotatic acid
Reference: Elix, JA/ Lajide, L 1984: The identification of further new depsidones in the lichen Parmelia notata
Notes: Occurs in Xanthoparmelia notata

**Isoobtusatic acid [3'-Methylevernic acid]**
A: 43  B: x  B': 62  C: 50  E: x  F: x  G: x
HPLC: 32
V: −  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 346, 182, 165, 164
Substance Class: Orcinol β-Orcinol Depsides
Biosynthetically Related Compounds: Isonorobtusatic acid, Norobtusatic acid, Obtusatic acid, Methyl 3'-methyllecanorate
Notes: Acid Spray: strong-pale orange, grey halo. LW UV: strong purple, green halo. Occurs in Ramalina americana s.lat.

**Isopatagonic acid**
A: 38  B: x  B': 33  C: 42  E: x  F: x  G: x
HPLC: 44
V: − UV: +
Acid Spray: Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: -1, 290, 206, 191, 177
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isosphaeric acid, 2-O-Methylpatagonic acid, Patagonic acid, Sphaerophorin
Notes: Occurs in Bunodophoron patagonicum

Isoplacodiolic acid [Mycousnine]
A: 49 B: x B': 63 C: 65 E: x F: x G: x
HPLC: 27
V: − UV: +
Acid Spray: P.Orange LW UV: Purple
Archers: x
K: Yellow C: No Result KC: Yellow PD: No Result
Mass spectrum: 376, 344, 260, 250
Substance Class: Usnic acid derivatives
Biosynthetically Related Compounds: Isousnic acid, Isopseudoplacodiolic acid, Placodioile acid, Pseudoplacodiolic acid, Usnic acid
Notes: Occurs in Haematomma flexuosum, H. mattogrossense

Isopseudocyphellarin A
A: 73 B: x B': 65 C: 78 E: 54 F: x G: x
HPLC: 44
V: − UV: +
Acid Spray: P.Yellow LW UV: P.Brown
Archers: x
K: No Result C: Red KC: PD: Yellow
Mass Spectrum: 402, 210, 194, 193
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: 2’-O-Methylphenarctin, 2’-O-Methylisopseudocyphellarin A, 2’-O-Methylpseudocyphellarin A, Phenarctin, Pseudocyphellarin A, Pseudocyphellarin B
Notes: Acid Spray: pale yellow, blue-grey halo. LW UV: pale yellow-brown, fades to orange. Occurs in Pseudocyphellaria pickeringii

**Isoseodoplacodiolic acid** [Isomycousnine]
A: 44  B: x  B’: 48  C: 53  E: x  F: x  G: x
HPLC: 25
V: –  UV: +
Acid Spray: P.Orange  LW UV: Purple
Archers: x
K: Yellow  C: No Result  KC: Yellow  PD: No Result
Mass spectrum: 376, 344, 260, 250
Substance Class: Usnic acid derivatives
Biosynthetically Related Compounds: Isousnic acid, Isoplacodiolic acid, Placodioile acid, Pseudoplacodiolic acid, Usnic acid
Notes: Occurs in Haematomma flexuosum, H. mattogrossense

**Isorangiformic acid**
A: 38  B: x  B’: 43  C: 42  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 368, 350, 336, 322
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Norrangiformic acid, Rangiformic acid
Notes: Occurs in Lecanora stenotropa

**Isochizopeltic acid**
A: 31  B: x  B’: 19  C: 36  E: x  F: x  G: x
HPLC: 15
Acid Spray: Purple  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 358, 343, 327, 325
Substance Class: Dibenzo[1,4]furans
Biosynthetically Related Compounds: Pannaric acid, Pannaric acid 6-methylester, Schizopeltic acid
Notes: Minor component in Schizopelte californica

**Isosphaeric acid**

A: 43  B: x  B': 69  C: 53  E: x  F: x  G: x
HPLC: 46

V:  −  UV:  +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 267, 266, 249
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylsphaerophorin, Sphaerophorin
Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in a chemotype of Dimelaena oreina

**Isostrepsilic acid**

A: 10  B: x  B': 11  C: 3  E: x  F: x  G: x
HPLC: 7

V: −  UV: +
Acid Spray: Blue  LW UV: Purple
Archers: Green
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: 270, 241, 228, 227
Substance Class: Dibenzo[1,4]furans
Biosynthetically Related Compounds: Hypostepsilic acid, Strepsilin
Notes: Occurs in Usnea orientalis mycobiont
Isosubpicrolichenic acid
A: 34  B: x  B’: 37  C: 34  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Grey  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: Red  PD: No Result
Mass Spectrum: 414, 380, 378, 370
Substance Class: Depsones
Biosynthetically Related Compounds: Hyperpicrolichenic acid, Isohyperpicrolichenic acid, Picrolichenic acid, Subpicrolichenic acid, Superpicrolichenic acid

Notes: Occurs in Pertusaria amara

Isousnic acid
A: 75  B: x  B’: 76  C: 79  E: 28  F: x  G: 93
HPLC: 41
V: –  UV: +
Acid Spray: Green  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: Yellow  PD: No Result
Mass Spectrum: 344, 326, 300
Substance Class: Usnic acid derivatives
Biosynthetically Related Compounds: Placodiolic acid, Pseudoplacodiolic acid, Usnic acid
Notes: Pale yellow pigment. Occurs in Cladonia pleurota

Isovicanicin
A: 68  B: 77  B’: 68  C: 70  E: 55  F: x  G: x
HPLC: 35
V: –  UV: +
Acid Spray: Green  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 384, 382, 349, 347
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: O-Methylvicanicin, Norvicanicin, Vicanicin
Notes: Occurs in Pannaria atrophylla

Jackinic acid
A: 38  B: x  B': 35  C: 37  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 340, 322, 309, 294
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Norjackinic acid, Toensbergianic acid
Notes: Occurs in Lepraria jackii

Japonene [Japonin]
A: 36  B: x  B': 29  C: 32  E: 5  F: x  G: 36
HPLC: x
V: –  UV: –
Acid Spray: P. Brown  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: 6α-Acetoxyhopane-16β,22-diol, 16β-Acetoxyhopan-6α,22-diol, 6α,16β-Diacetoxyhopane-22-ol, Hopane-6α,22-diol [Zeorin], Hopane-6α,16β,22-triol [Leucotylin]
Notes: Occurs in Heterodermia japonica

Lactothamnolic acid
A: 5  B: x  B': 20  C: 16  E: x  F: x  G: x
HPLC: 12
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
### Archers: x

<table>
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<tr>
<th>K</th>
<th>C</th>
<th>KC</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
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<td>No Result</td>
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<td>Orange</td>
</tr>
</tbody>
</table>

Mass spectrum: -1, 226, 209, 198

**Substance Class:** β-Orcinol Depsides

**Biosynthetically Related Compounds:** Hypothamnolic acid, Thamnolic acid, Neothamnolic acid


**Notes:** Occurs in *Siphula ramalinoides*

### Lanosterol

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<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>x</td>
<td>x</td>
<td>43</td>
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**HPLC:** x

<table>
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<tr>
<th>V</th>
<th>UV</th>
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</thead>
<tbody>
<tr>
<td>−</td>
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</tbody>
</table>

**Acid Spray:** P. Brown

**LW UV:** Brown

**Archers:** x

<table>
<thead>
<tr>
<th>K</th>
<th>C</th>
<th>KC</th>
<th>PD</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Result</td>
<td>No Result</td>
<td>No Result</td>
<td>No Result</td>
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</tbody>
</table>

**Mass Spectrum:** 468, 454, 453, 394

**Substance Class:** Terpenoids

**Biosynthetically Related Compounds:** x


**Notes:** Occurs in *Evernia prunastri*

### Lasallic acid

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<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>27</td>
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<td>37</td>
<td>13</td>
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**HPLC:** 21

<table>
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<th>UV</th>
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<tbody>
<tr>
<td>−</td>
<td>+</td>
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</table>

**Acid Spray:** P. Yellow

**LW UV:** Green

**Archers:** x

<table>
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<tr>
<th>K</th>
<th>C</th>
<th>KC</th>
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</thead>
<tbody>
<tr>
<td>No Result</td>
<td>Red</td>
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</tbody>
</table>

**Mass Spectrum:** x

**Substance Class:** Orcinol Tridepsides

**Biosynthetically Related Compounds:** Gyrophoric acid, Lecanoric acid


**Notes:** Occurs in *Lasallia asiae-orientalis*

### Lecanoric acid

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>28</td>
<td>44</td>
<td>44</td>
<td>22</td>
<td>x</td>
<td>x</td>
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</table>

**HPLC:** 14
V: −                UV: +

Acid Spray: Yellow        LW UV: Green
Archers: Orange
K: No Result    C: Red         KC: PD: No Result
Mass Spectrum: 318, 168, 151, 150
Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Diploschistesic acid, Evernic acid, Gyrophoric acid, Methyl lecanorate
Notes: Acid Spray: yellow, grey halo. Occurs in Parmotrema tinctorum

**Lecideoidin**

A: 48    B: 47    B': 35    C: 40    E: 4    F: x    G: x
HPLC: 24

V: −                UV: +

Acid Spray: No Result        LW UV: Lilac
Archers: x
K: No Result    C: No Result         KC: No Result    PD: No Result
Mass Spectrum: 400, 398, 368, 366
Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Chlorolecideoidin, 3'-Dechlorolecideoidin, Gangaleoidin, Norgangaleoidin
Notes: Occurs in Tylothallia verrucosa

**Leoidin**

A: 62    B: x    B': 54    C: 52    E: x    F: x    G: x
HPLC: 36

V: −                UV: +

Acid Spray: No Result        LW UV: Lilac
Archers: x
K: No Result    C: No Result         KC: No Result    PD: No Result
Mass Spectrum: 414, 412
Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Gangaleoidin, Norgangaleoidin
Notes: Occurs in Lecanora gangaleoides, L. sulphurescens
**Lepranthin**

A: 52  B: x  B': x  C: 28  E: x  F: x  G: x  
HPLC: x  
V: –  UV: –  
Acid Spray: No Result  LW UV: No Result  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 642, 600, 582, 572  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: x  
Notes: Occurs in *Arthonia pruinata*  

**Leprapinic acid**

A: 71  B: 59  B': 53  C: 78  E: 35  F: x  G: x  
HPLC: 28  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Brown  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 352, 320, 292, 264  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Isoleprapinic acid, Leprapinic acid methyl ether  
Notes: Yellow pigment. LW UV: orange-brown. Occurs in *Chrysothrix chlorina*  

**Leprapinic acid methyl ether**

A: 62  B: x  B': 32  C: 54  E: 20  F: x  G: x  
HPLC: 14  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 366, 334  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Leprapinic acid
Notes: Yellow pigment. LW UV: brownish yellow. Occurs in *Chrysothrix chlorina*

**Lepraric acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>25</td>
<td>11</td>
<td>8</td>
<td>24</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 10

V: –

UV: +

Acid Spray: P.Brown

LW UV: P.Brown

Archers: x

K: Yellow  C: Green  KC: PD: No Result


Substance Class: Chromones

Biosynthetically Related Compounds: *6α*-Hydroxyeugenitin


Notes: Acid Spray: dull yellowish brown; fades to pale red-brown. LW UV: pale green-brown. Occurs in *Roccella fuciformis*

**Leprolomin**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>63</td>
<td>55</td>
<td>49</td>
<td>54</td>
<td>35</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>

HPLC: 19

V: –

UV: +

Acid Spray: Green

LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 390, 348, 194, 181

Substance Class: Diphenyl ethers

Biosynthetically Related Compounds: Usnic acid


Notes: Acid Spray: pea-green, eventually fades to dull yellow. LW UV: brown, green halo. Occurs in *Pannaria farinosa*

**Letrouitic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>58</td>
<td>x</td>
<td>50</td>
<td>46</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</tbody>
</table>

HPLC: 26

V: –

UV: +
Acid Spray: Blue
Archers: Green
K: No Result  C: Green  KC: PD: No Result
Mass spectrum: 390, 374, 372
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: 8-Chlorodioxocondidymic acid, 8-Chlorodioxodidymic acid, 8-Chlorooxididymic acid, Dioxocondidymic acid, Dioxodidymic acid, Oxididymic acid
Notes: Minor component in Letrouitia vulpina

Lichesterinic acid
A: 44  B: 63  B': 58  C: 43  E: x  F: x  G: x
HPLC: 42
V: −  UV: −
Acid Spray: No Result  LW UV: Lilac
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Constipatic acid, Isoneprosterinic acid, Protolichersterinic acid
Notes: Occurs in Cetraria islandica

Lichexanthone
A: 72  B: 72  B': 66  C: 75  E: 52  F: x  G: x
HPLC: 45
V: −  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 286, 257, 243, 200
Substance Class: Xanthones
Biosynthetically Related Compounds: Griseoxanthone-C, Norlichexanthone
Notes: Occurs in Hypotrachyna osseoalba
**Lividic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>32</td>
<td>35</td>
<td>37</td>
<td>31</td>
<td>x</td>
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</table>

HPLC: 20

V: –

UV: +

Acid Spray: Green

LW UV: Purple

Archers: x

K: P.Yellow

C: No Result

KC: Red-brown

PD: No Result

Mass Spectrum: 456, 279, 278, 262

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Colensoic acid, 4-O-Methylphysodic acid, Oxyphysodic acid, Physodic acid


Notes: Acid Spray: pea-green, same as oxyphysodic acid. Occurs in *Hypotrachyna osseoalba*

**Lobaric acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>30</td>
<td>46</td>
<td>47</td>
<td>38</td>
<td>x</td>
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</table>

HPLC: 30

V: –

UV: +

Acid Spray: Grey

LW UV: B.Blue

Archers: x

K: P.Yellow

C: No Result

KC: PD: No Result

Mass Spectrum: 456, 438, 412, 235

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Oxolobaric acid, Norlobaridone, Sublobaric acid


Notes: Acid Spray: weak-grey; strong-green. Medulla flouresces blue if large amount present. Occurs in *Protoparmelia badia*

**Lobodirin**

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<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>x</td>
<td>x</td>
<td>x</td>
<td>x</td>
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<td>x</td>
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</table>

HPLC: x

V: +

UV: +

Acid Spray: P.Brown

LW UV: P.Brown

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 494, 452, 331, 289
Substance Class: Chromones

Biosynthetically Related Compounds: 6α-Hydroxyeugenitin


Notes: Pale yellow pigment. Occurs in *Roccellina cerebriformis*

### Loxodellinic acid

A: 39  B: 42  B': 42  C: 38  E: x  F: x  G: x
HPLC: 22

V: –  UV: +

Acid Spray: Orange  LW UV: B.Blue

Archers: x

K: No Result  C: No Result  KC: Pink  PD: No Result

Mass Spectrum: -1, 252, 235, 234

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: 4-O-Demethylloxodellinic acid, Glomellic acid, Glomelliferic acid, Perlatic acid


Notes: Acid Spray: pale orange, grey halo. LW UV: pale blue. Occurs in *Xanthoparmelia loxodella*

### Loxodellonic acid

A: 38  B: x  B': 35  C: 35  E: x  F: x  G: x
HPLC: 19

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 384, 235, 234

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Glomelliferonic acid, Glomellonic acid


Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-dark blue, purple halo. Occurs in *Xanthoparmelia subincerta*

### Loxodin [Methyl norlobariate]

A: 50  B: 40  B': 40  C: 36  E: 28  F: x  G: x
HPLC: 28

V: –  UV: +
Acid Spray: Green LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: Pink  PD: No Result
Mass Spectrum: 456, 424
Substance Class: Orcinol Dipsidones
Biosynthetically Related Compounds: Conloxdin, Conorlobarine, Norlobaridone
Notes: Occurs in Xanthoparmelia flavescentireagens

Lupeol
A: 60  B: x  B': 70  C: 56  E: 52  F: x  G: 70
HPLC: x
V: –  UV: –
Acid Spray: P.Purple LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 426, 411, 383, 218
Substance Class: Terpenoids
Biosynthetically Related Compounds: Lupeone
Notes: LW UV: pale orange, fades to pale pink. Occurs in Flavocetraria nivalis

Lupeone [Lup-20(29)-ene-3-one]
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: x LW UV: x
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 242, 204, 203, 189
Substance Class: Terpenoids
Biosynthetically Related Compounds: Lupeol
Notes: Occurs in Cladonia macronesica

Lusitanic acid
A: 39  B: x  B': 7  C: 26  E: x  F: x  G: 49
HPLC: 12
UV: +
V: –

Acid Spray: Orange
LW UV: Orange
Archers: x
K: x C: x KC: x PD: x

Mass spectrum: 416, 372, 224, 191
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Constictic acid, Cryptostictic acid, Verrucigeric acid, Norstictic acid, Stictic acid, Methyl stictic acid

Notes: Minor component in *Xanthoparmelia verrucigera*

**Malonprotocetraric acid**

A: 2 B: x B': 16 C: 4 E: x F: x G: 21

HPLC: 17
UV: +
V: –

Acid Spray: Grey
LW UV: Purple
Archers: x
K: No Result C: No Result KC: No Result PD: Red

Mass Spectrum: -1, 356, 314, 312
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Fumarprotocetraric acid, Protocetraric acid, Succinprotocetraric acid

Notes: Occurs in *Parmotrema conformatum*

**Megapicrolichenic acid**

A: 46 B: x B': 65 C: 46 E: x F: x G: x

HPLC: 53
UV: +
V: –

Acid Spray: P.Yellow
LW UV: Purple
Archers: x
K: No Result C: No Result KC: Red PD: No Result

Mass spectrum: 527, 526, 498, 483
Substance Class: Depsides
Biosynthetically Related Compounds: Hyperpicrolichenic acid, Isohyperpicrolichenic acid, Isomegapicrolichenic acid, Picrolichenic acid, Superpicrolichenic acid

Notes: Minor component in *Pertusaria truncata*

**Melacarpic acid**

A: 48  B: 75  B': 54  C: 49  E: x  F: x  G: x  
HPLC: 40  
V: −  UV: +  
Acid Spray: Grey  
LW UV: Lilac  
Archers: Green  
K: No Result  C: Green  KC:  
PD: No Result  
Mass Spectrum: 370, 353, 352, 326  
Substance Class: Dibenzoferans  
Biosynthetically Related Compounds: Congrayanic acid, 4-O-Demethylgrayanic acid, Grayanic acid  
Notes: Acid Spray: blue-grey. LW UV: dark purple, bright violet halo. Occurs in *Neophyllis melacarpa*

**Menegazziaic acid**

A: 19  B: x  B': 14  C: 12  E: x  F: x  G: 36  
HPLC: 5  
V: −  UV: +  
Acid Spray: Grey  
LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 374, 356, 328, 180  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Constictic acid, Cryptostictic acid, Norstictic acid, Peristictic acid, Stictic acid  
Notes: Occurs in *Menegazzia terebrata*

**Meritosporic acid**

A: 36  B: x  B': x  C: 40  E: x  F: x  G: x  
HPLC: 10  
V: −  UV: +  
Acid Spray: Blue-green  
LW UV: Purple  
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass Spectrum: x
Substance Class: unknown
Biosynthetically Related Compounds: x
Reference: New report
Notes: Occurs in *Laurera meritospora*

**Merochlorophaeic acid**

A: 52    B: 56    B': 50    C: 53    E: x    F: x    G: x
HPLC: 26

V: –    UV: +

Acid Spray: P.Brown    LW UV: Purple
Archers: Orange
K: D.Red    C: Red    KC: PD: No Result
Mass Spectrum: -1, 240, 224, 208
Substance Class: Orcinol Dipsides

Biosynthetically Related Compounds: Boninic acid, Cryptochromeic acid, Homosekikaic acid 4-O-Methylcryptochromeic acid, Paludosic acid, Ramalinolic acid

Notes: Acid Spray: fades to pink. Occurs in *Cladonia merochlorophaea*

**3-Methoxycolensoic acid**

A: 44    B: x    B': 61    C: 47    E: x    F: x    G: x
HPLC: 50

V: –    UV: +

Acid Spray: P.Yellow    LW UV: Pink
Archers: x
K: No Result    C: No Result    KC: Red-brown    PD: No Result
Mass Spectrum: 472, 454, 428, 250
Substance Class: Orcinol Dipsides

Biosynthetically Related Compounds: Colensoic acid, Hydroxycolensoic acid, Lividic acid, Oxyphysodic acid

Physodic acid

Notes: Acid Spray: pale yellow, fades to yellow-brown. LW UV: purple-pink. Occurs in *Hypotrachyna livida*

**3-Methoxy-2,4-di-O-methylgyrophoric acid**
A: 30  B: 33  B': 37  C: 39  E: x  F: x  G: x
HPLC: 26
V: –  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: D.Red  C: Red  KC: PD: No Result
Mass Spectrum: -1, 482, 226, 209
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 2,4-Di-O-methylgyrophoric acid, Gyrophoric acid, 3-Hydroxyumbilicaric acid, 3-Methoxyumbilicaric acid, 5-O-Methylhiascic acid, Umbilicaric acid
Notes: Acid Spray: strong yellow, grey halo. Occurs in Hypotrachyna subfatiscens.

5-Methoxylecanoric acid
A: 33  B: x  B': 40  C: 29  E: x  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: 348, 198, 181, 180
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lecanoric acid, 5-O-Methylhiascic acid
Notes: Minor component in Melanelia glabratula

Methoxymicareic acid
A: 45  B: x  B': 69  C: 54  E: x  F: x  G: x
HPLC: 50
V: –  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 530, 486, 452, 248
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Micareic acid, Superlatolic acid
Notes: Occurs in *Micarea micrococca*

**3-Methoxy-5-pentylphenol**

<table>
<thead>
<tr>
<th></th>
<th>A: 65</th>
<th>B: 70</th>
<th>B': x</th>
<th>C: 53</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
</table>

HPLC: x

V: – \[+\]  

Acid Spray: Yellow  
LW UV: Green  
Archers: x

K: No Result  
C: No Result  
KC: No Result  
PD: No Result

Mass Spectrum: 194

Substance Class: Monocyclic aromatic derivatives  
Biosynthetically Related Compounds: 2-Hydroxy-4-methoxy-6-pentylbenzoic acid, Olivetol, Perlatolic acid  

Notes: Possibly an artefact, reported to occur in *Cladonia macronesica*

**2-Methoxypsoromic acid**

<table>
<thead>
<tr>
<th></th>
<th>A: 35</th>
<th>B: x</th>
<th>B': 44</th>
<th>C: 39</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
</table>

HPLC: 22

V: - \[+\]  

Acid Spray: Brown  
LW UV: Brown  
Archers: No Result

K: No Result  
C: No Result  
KC: No Result  
PD: P.Yellow

Mass spectrum: 388, 360, 359, 342

Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: 2-Hydroxypsoromic acid  

Notes: Occurs in *Sulcaria sulcata*

**3-Methoxyumbilicaric acid**

<table>
<thead>
<tr>
<th></th>
<th>A: 28</th>
<th>B: x</th>
<th>B': 32</th>
<th>C: 32</th>
<th>E: x</th>
<th>F: x</th>
<th>G: 52</th>
</tr>
</thead>
</table>

HPLC: 21

V: – \[+\]  

Acid Spray: P.Yellow  
LW UV: Green  
Archers: x

K: No Result  
C: No Result  
KC: No Result  
PD: No Result

Mass Spectrum: -1, 212, 195, 180

Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, 3-Hydroxygyrophoric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid, 3-Hydroxyumbilicaric acid, Umbilicaric acid


Notes: Occurs in *Hypotrachyna bonariensis*

**Methyl 3-O-acetoxypyxinate**

A: x  B: x  B': x  C: 38  E: 19  F: x  G: 44

HPLC: x

V: –  UV: –

Acid Spray: Pink  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 530, 515, 470, 455

Substance Class: Terpenoids

Biosynthetically Related Compounds: 3β-Acetoxy-20,24-epoxydammarane-12β,25-diol, 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, 20,24-Epoxymmmarane-3β,12β,25-triol, Methyl pxinate


Notes: Occurs in *Pxyine endochrysina*

**9-O-Methylalternariol** [Alternariol monomethyl ether]

A: 45  B: x  B': 37  C: 32  E: x  F: x  G: x

HPLC: 17

V: –  UV: +

Acid Spray: Pink  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 272

Substance Class: 3,4-Benzocoumarins

Biosynthetically Related Compounds: Alternariol


Notes: Occurs in *Pertusaria praecipua*

**2'-O-Methylanziaic acid**

A: 46  B: 40  B': 42  C: 34  E: x  F: x  G: x

HPLC: 29

V: –  UV: +
Acid Spray: P.Yellow
Archers: x
K: No Result C: Red KC: PD: No Result
Mass Spectrum: -1, 238, 224, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, 2'-O-Methylperlatolic acid
Notes: Acid Spray: strong yellow, grey halo. Occurs in Lecidea diducens, L. spierodes

6-O-Methylarthothelin [2,4,5-Trichloro-6-O-methylnorlichexanthone]
A: 63 B: x B': 56 C: 60 E: 8 F: 36 G: x
HPLC: 48
V: + UV: +
Acid Spray: Orange LW UV: Yellow
Archers: x
K: No Result C: Orange KC: PD: No Result
Mass Spectrum: 380, 378, 376, 374
Substance Class: Xanthones
Biosynthetically Related Compounds: Arthothelin, 2,5-Dichloro-6-O-methylnorlichexanthone, 4,5-Dichloro-6-O-methylnorlichexanthone, Thiophaninic acid, 2,4,5-Trichlorolichexanthone
Notes: Pale yellow pigment. Occurs in Dimelaena elevata

Methyl ascomatate
A: 67 B: x B': 53 C: 53 E: 48 F: 86 G: x
HPLC: 42
V: − UV: +
Acid Spray: B.Blue LW UV: Purple
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 314, 299, 284, 283
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Ascomatic acid, 7-O-Methylnorascomatic acid, Norascomatic acid
Notes: Occurs in Bunodophoron patagonicum

3-O-Methylasemone [4,5,7-Trichloro-3-O-methylorlichexanthone]
A: 66  B: x  B': 64  C: 65  E: 11  F: 32  G: x
HPLC: 51
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 380, 378, 376, 374
Substance Class: Xanthones
Biosynthetically Related Compounds: Asemone, 5,7-Dichloro-3-O-methylnorlichexanthone, 3-O-Methylthiophanic acid, Thiophanic acid, 4,5,7-Trichlorolichexanthone
Notes: Pale yellow pigment. Occurs in Lecidella asema

6-O-Methylasefone [4,5,7-Trichloro-6-O-methylnorlichexanthone]
A: 64  B: x  B': 74  C: 49  E: 27  F: 39  G: x
HPLC: 49
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: Orange  KC:  PD: No Result
Mass Spectrum: 378, 376, 374, 340
Substance Class: Xanthones
Biosynthetically Related Compounds: Asemone, 6-O-Methylthiophanic acid, Thiophanic acid, 4,5,7-Trichlorolichexanthone
Notes: Pale yellow pigment. Occurs in Pertusaria pycnothelia

2'-O-Methylatranorin
A: 73  B: 53  B': 51  C: 72  E: 43  F: x  G: x
HPLC: x
V: −  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Yellow  C: No Result  KC:  PD: Yellow
Mass Spectrum: 388, 210, 179, 178
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Atranorin

Notes: LW UV: orange, pale yellow halo. Occurs in *Oropogon loxensis*

### 6-O-Methylaverantin

<table>
<thead>
<tr>
<th>A</th>
<th>x</th>
<th>B</th>
<th>x</th>
<th>B'</th>
<th>x</th>
<th>C</th>
<th>x</th>
<th>E</th>
<th>x</th>
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<tr>
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<td>Anthraquinones</td>
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<tr>
<td>Biosynthetically Related Compounds:</td>
<td>Averythrin, 6-O-Methylaverythrin, Norsolorinic acid, Solorinic acid</td>
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<tr>
<td>Notes:</td>
<td>Yellow-orange pigment. Occurs in <em>Solorina crocea</em></td>
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### 6-O-Methylaverythrin

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<tr>
<th>A</th>
<th>62</th>
<th>B</th>
<th>x</th>
<th>B'</th>
<th>61</th>
<th>C</th>
<th>49</th>
<th>E</th>
<th>31</th>
<th>F</th>
<th>x</th>
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<td>Rf</td>
<td>74 [benzene/ethyl formate/formic acid, 80/20/1]</td>
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<tr>
<td>Acid Spray:</td>
<td>P.Red</td>
<td></td>
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<tr>
<td>LW UV:</td>
<td>Pink</td>
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<td>Archers:</td>
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<tr>
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<td>Violet</td>
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<tr>
<td>KC:</td>
<td>PD: No Result</td>
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<tr>
<td>Mass Spectrum:</td>
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<td>Substance Class:</td>
<td>Anthraquinones</td>
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<td>Biosynthetically Related Compounds:</td>
<td>Averythrin, 6-O-Methylaverantin, Norsolorinic acid, Solorinic acid</td>
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<tr>
<td>Notes:</td>
<td>Red-orange pigment. Occurs in <em>Solorina crocea</em></td>
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### Methyl barbatate

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<tr>
<th>A</th>
<th>77</th>
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<th>x</th>
<th>B'</th>
<th>73</th>
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<th>86</th>
<th>E</th>
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<th>F</th>
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<tr>
<td>Acid Spray:</td>
<td>P.Yellow</td>
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<td>LW UV:</td>
<td>P.Yellow</td>
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<tr>
<td>KC:</td>
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<td>PD: No Result</td>
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<tr>
<td>Mass Spectrum:</td>
<td>374, 196, 179, 178</td>
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</tbody>
</table>
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 4-O-demethylbarbatate, Methyl 3α-hydroxy-4-O-demethylbarbatate
Notes: Acid Spray: Pale yellow, grey halo. LW UV: strong purple, pale yellow halo. Occurs in Haematoma ochrophaeum

4-O-Methylhypoprotocetraric acid
A: 45  B: x  B': x  C: 31  E: x  F: x  G: 46
HPLC: 15
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 278, 223, 205
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 4-O-Methylhypoprotocetraric acid, Conhypoprotocetraric acid
Notes: Occurs in Xanthoparmelia competita

Methyl 5-chloro-4-O-demethylbarbatate
A: 68  B: x  B': 74  C: 71  E: 60  F: x  G: x
HPLC: 40
V: –  UV: +
Acid Spray: P.Yellow  LW UV: P.Yellow
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: 396, 394, 201, 199
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 4-O-Demethylbarbatic acid, Methyl barbatate, Methyl 5-chloronorobtusatate, Methyl 4-O-demethylbarbatate, Methyl eriodermate
Notes: Occurs in a chemotype of Erioderma pycnidiferum

Methyl 5-chloronorobtusatate
A: 68  B: x  B': 68  C: 72  E: 56  F: x  G: x
HPLC: 32

V: – UV: +

Acid Spray: P. Yellow LW UV: Green
Archers: x
K: No Result C: Red KC: PD: No Result

Mass Spectrum: 380, 201, 200, 199

Substance Class: Orcinol β-Orcinol Dipsides

Biosynthetically Related Compounds: 4-O-Demethylbarbaratic acid, Methyl barbatate, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 4-O-demethylbarbatate, Methyl eriodermate


Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in a chemotype of Erioderma pycnidiferum

2-O-Methylconfluentic acid

A: 43 B: x B': 25 C: 44 E: x F: x G: x

HPLC: 28

V: – UV: +

Acid Spray: P. Yellow LW UV: B. Blue

Archers: x
K: No Result C: No Result KC: No Result PD: No Result

Mass Spectrum: -1, 276, 247, 238

Substance Class: Orcinol Dipsides

Biosynthetically Related Compounds: Confluentic acid, 2-O-Methylperlatolic acid, Planaic acid


Notes: Acid Spray: strong yellow, grey halo. Occurs in an Lecidea fuscoatra

3-O-Methylconsalazinic acid

A: 1 B: 1 B': 1 C: 1 E: x F: x G: 6

HPLC: 0

V: – UV: +

Acid Spray: Orange LW UV: Orange

Archers: x
K: No Result C: No Result KC: No Result PD: No Result

Mass spectrum: x

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Consalazinic acid, Constictic acid, Stictic acid


Notes: Minor component in Parmotrema crinitum
8'-Methylconstictic acid [Methyl pseudoconsticate]
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Yellow  C: No Result  KC: PD: Orange
Mass spectrum: 370, 342
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Stictic acid
Notes: reported to occur in Hypotrachyna revoluta [but probably a misdetermination of Parmotrema perlatum]

6-Methylcristazarin [2-Ethyl-3,5,8-trihydroxy-6-methoxy-7-methylnaphtho-1,4-quinone]
A: 44  B: x  B': 50  C: 35  E: 4  F: x  G: x
HPLC: x
V: +  UV: +
Acid Spray: Purple  LW UV: Magenta
Archers: x
K: Red  C: No Result  KC: PD: No Result
Mass Spectrum: 278, 263
Substance Class: Naphthaquinones
Biosynthetically Related Compounds: Boryquinone, Cristazarin, Norcristazarin
Notes: Purple pigment. Occurs in cultures of Cladonia cristatella

4'-O-Methylcryptochlorophaeic acid
A: 32  B: x  B': 18  C: 27  E: x  F: x  G: x
HPLC: 26
V: –  UV: +
Acid Spray: Orange  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: x  PD: No Result
Mass Spectrum: -1, 254, 238, 210
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Cryptochlorophaeic acid, 2,4'-Di-\textit{O}-methylorsekikaic acid, 4'-\textit{O}-Methylnorsekikaic acid, 4'-\textit{O}-Methylpaludosic acid


Notes: Acid Spray: pale orange. LW UV: strong-purple, green halo. Occurs in \textit{Ramalina asahinae}

\textbf{4-O-Methylcryptochlorophaeic acid}

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<th>A</th>
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<tr>
<td>V</td>
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<tr>
<td>UV</td>
<td>+</td>
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</table>

Acid Spray: Pink

LW UV: Brown

Archers: Red-brown

K: No Result  C: No Result  KC: x  PD: No Result

Mass Spectrum: -1, 252, 235, 222

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Cryptochlorophaeic acid, Homorsekikaic acid, Merochlorophaeic acid, Paludosic acid


Notes: Occurs in \textit{Cladonia merochlorophaea}

\textbf{Methyl 4-O-demethylbarbatate}

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<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
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<tr>
<td>V</td>
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<td>UV</td>
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</table>

Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result  C: Red  KC: PD: No Result

Mass Spectrum: 360, 196, 195, 165

Substance Class: \(\beta\)-Orcinol Depsides

Biosynthetically Related Compounds: Atranorin, 4-\textit{O}-Demethylbarbatic acid, Methyl barbatate, Methyl 5-chloro-4-\textit{O}-demethylbarbatate, Methyl 3\(\alpha\)-hydroxy-4-\textit{O}-demethylbarbatate


Notes: Acid Spray: yellow, grey halo. LW UV: strong-purple, grey halo. Occurs in \textit{Oropogon loxensis}

\textbf{Methyl 2'-O-demethylpsoromate}

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<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
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<tr>
<td>V</td>
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<td>UV</td>
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</tbody>
</table>
Acid Spray: Brown                LW UV: Brown
Archers: x
K: No Result    C: No Result    KC: No Result    PD: P.Yellow
Mass spectrum: 358
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Psoromic acid, 2'-O-Demethylpsoromic acid, Methyl psoromate
Notes: Minor component in Lecanora intumescens

Methyl 3,4-dicarboxy-3-hydroxy-19-oxoeicosanoate
A: 10   B: x   B': x   C: x   E: x   F: x   G: x
HPLC: x
V: –       UV: –
Acid Spray: No Result                LW UV: No Result
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass Spectrum: 408, 377, 350, 323
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Caperatic acid, Norcaperatic acid
Notes: Best seen on wet plate after spraying but before charring. Occurs in Usnea meridensis

Methyl 3,5-dichlorolecanorate [Tumidulin]
A: 67   B: 62   B': 57   C: 58   E: 21   F: x   G: x
HPLC: 24
V: –       UV: +
Acid Spray: Yellow                LW UV: Green
Archers: x
K: No Result    C: Red    KC: PD: No Result
Mass Spectrum: 404, 402, 400, 370
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 3,5-Dichlorolecanoric acid
Notes: Acid Spray: yellow, grey halo. Occurs in Ramalina timidula

Methyl 2,7-dichloronorpsoromate[Methyl 5,1'-dichloronorpsoromate]
A: 55   B: 47   B': x   C: 50   E: 17   F: x   G: x
HPLC: 22
V: – UV: +
Acid Spray: Yellow LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: P.Yellow
Mass Spectrum: 430, 428, 426, 393
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Methyl 2,7-dichlororsoromate, Methyl psoromate
Notes: Occurs in *Phyllopsora swinscowii*

**Methyl 2,7-dichlororsoromate** [Methyl 5,1’-dichlororsoromate]
A: 73  B: x  B’: 60  C: 78  E: 27  F: x  G: x
HPLC: 32
V: – UV: +
Acid Spray: Yellow LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: P.Yellow
Mass Spectrum: 444, 442, 440, 414
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Methyl 2,7-dichloronorsoromate, Methyl psoromate
Notes: Occurs in *Phyllopsora swinscowii*

**Methyl 2,2’-di-O-methyldivaricatate**
A: 64  B: x  B’: 42  C: 64  E: 50  F: x  G: x
HPLC: 27
V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 430, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methyldivaricatic acid, Methyl 2-O-methyldivaricatate
Notes: Minor component in *Pertusaria oraraensis*
**Methyl 2,2′-di-O-methyleryiodermate**

A: 63  B: x  B': 47  C: 58  E: 35  F: x  G: x  

HPLC: 25  

V: −  UV: +  

Acid Spray: P.Yellow  LW UV: P.Yellow  

Archers: x  

K: No Result  C: No Result  KC: No Result  PD: No Result  


Substance Class: Orcinol Depsides  

Biosynthetically Related Compounds: Methyl barbatate, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 5-chloronorobtusatate, Methyl eriodermate, Methyl 2′-O-methyleryiodermate, Methyl 2-O-methyleryiodermate, Methyl 4-O-methyleryiodermate  


Notes: Acid Spray: pale yellow, grey halo. LW UV: strong-purple, pale yellow halo. Minor component in *Erioderma pycnidiferum*  

**Methyl 2′,2″-di-O-methylgyrophorate**

A: 47  B: x  B': 22  C: 32  E: 20  F: x  G: x  

HPLC: 28  

V: −  UV: +  

Acid Spray: P.Yellow  LW UV: Green  

Archers: No Result  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: 360, 329, 196, 165  

Substance Class: Orcinol Tridepsides  

Biosynthetically Related Compounds: Gyrophoric acid, Methyl gyrophorate, Tenuiorin, Methyl ovoate, 2″-O-Methyltenuiorin, 2′-O-Methyltenuiorin, 2′,2″-Di-O-Methyltenuiorin, Methyl 2″-O-methylgyrophorate  


Notes: Minor component in *Pseudocyphellaria billardieri*  

**Methyl 2,2′-di-O-methylstenosporate**

A: 66  B: x  B': 44  C: 66  E: 50  F: x  G: x  

HPLC: 36  

V: −  UV: +  

Acid Spray: P.Yellow  LW UV: Green  

Archers: No Result  

K: No Result  C: No Result  KC: No Result  PD: No Result  

Mass spectrum: 458, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2,2'Di-O-methylstenosporic acid, 2,2'Di-O-methyldivaricatic acid, Planaic acid, 2'-O-methylstenosporic acid
Notes: Minor component in Pertusaria subplanaica

2'-O-Methyldivaricatic acid
A: 45 B: x B': 48 C: 50 E: x F: x G: x
HPLC: 28
V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 210, 194, 193, 192
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2,2'Di-O-methyldivaricatic acid, 2'-O-Methylstenosporic acid
Notes: Occurs in Pertusaria velloziae

2-O-Methyldivaricatic acid
A: 44 B: 52 B': 51 C: 47 E: x F: x G: x
HPLC: 28
V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: -1, 224, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Divaricatic acid, 2-O-Methylperlatolic acid, 2-O-Methylstenosporic acid
Notes: Acid Spray: strong yellow, grey halo. LW UV: strong purple, green halo. SW UV: bright blue.
Occurs in Ramalina sayreana

3-O-Methyldiploicin [4-O-Methyldiploicin]
A: 84 B: x B': 85 C: 90 E: 68 F: x G: x
HPLC: 59
**Acid Spray:** No Result  
**LW UV:** No Result  

**Archers:** x  

**K:** No Result  
**C:** No Result  
**KC:** No Result  
**PD:** No Result  

**Mass Spectrum:** 440, 438, 436, 403  

**Substance Class:** Orcinol Depsidones  

**Biosynthetically Related Compounds:** Caloploicin, Diploicin, 3-Dechloro-4-\(O\)-methyl Diploicin  

**Reference:** Spillane, PA/ Keane, J/ Nolan, TJ 1936: The chemical constituents of lichens found in Ireland.  

**Notes:** LW UV: strong-dark purple. Best seen under SW UV before spraying. Occurs in *Diploicia canescens* ssp. australasica

### (-)-2-Methylene-3(R)-carboxy-18(R)-hydroxynonadecanoic acid [\(\alpha\)-(15-Hydroxyhexadecyl)itaconic acid]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>27</td>
<td>x</td>
<td>x</td>
<td>33</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

**HPLC:** 32  
**V:** –  
**UV:** –  

**Acid Spray:** No Result  
**LW UV:** No Result  

**Archers:** x  

**K:** No Result  
**C:** No Result  
**KC:** No Result  
**PD:** No Result  

**Mass Spectrum:** 337, 334, 308, 290  

**Substance Class:** Aliphatic acids  

**Biosynthetically Related Compounds:** x  

**Reference:** Keogh, MF/ Zurita, ME 1977: \(\alpha\)-(15-Hydroxyhexadecyl)itaconic acid from *Usnea aliphatica*.  
*Phytochemistry* 16: 134-135.  

**Notes:** Occurs in *Parmotrema xanthinum*

### Methyl erioderimate

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>69</td>
<td>x</td>
<td>71</td>
<td>77</td>
<td>57</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

**HPLC:** 39  
**V:** –  
**UV:** +  

**Acid Spray:** Grey  
**LW UV:** P. Yellow  

**Archers:** x  

**K:** No Result  
**C:** Red  
**KC:** PD: No Result  

**Mass Spectrum:** 408, 210, 201, 200  

**Substance Class:** \(\beta\)-Orcinol Depsides  

**Biosynthetically Related Compounds:** Methyl barbatate, Methyl 5-chloro-4-\(O\)-demethylbarbatate, Methyl 5-chloronorobtusatate, Methyl 2,2'-di-\(O\)-methyl erioderimate, Methyl 2'-\(O\)-methylerioderimate, Methyl 2-\(O\)-methylerioderimate, Methyl 4-\(O\)-methylerioderimate  

Notes: Acid Spray: pale yellow-orange, grey halo. Minor component in *Erioderma pycnidiferum*

**Methyl evernate**

A: 71  B: x  B': 64  C: 76  E: 52  F: x  G: x  
HPLC: 16

V: –  UV: +

Acid Spray: P. Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 346, 182, 165, 150

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Evernic acid, Lecanoric acid, Methyl gyrophorate, Methyl lecanorate, Tenuiorin


Notes: Acid Spray: blue-grey fades to yellow. Minor component in *Peltigera aphthosa*

**2'-O-Methylevernic acid**

A: 38  B: x  B': 33  C: 43  E: x  F: x  G: x  
HPLC: x

V: –  UV: +

Acid Spray: Orange  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 302, 182, 165

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Evernic acid, 4,2''-Di-O-methylgyrophoric acid, Lecanoric acid


Notes: Acid Spray: pale orange, grey halo. Minor component in *Evernia prunastri*

**Methyl everninate** [Methyl 4-O-methylorsellinate]

A: 70  B: 70  B': x  C: 74  E: 50  F: x  G: x  
HPLC: 8

V: –  UV: +

Acid Spray: Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 196, 165, 164, 136

Substance Class: Monocyclic aromatic derivatives

Biosynthetically Related Compounds: Ethyl everninate, Evernic acid, Everninic acid
Notes: Possibly an artefact. Reported to occur in *Evernia prunastri*

2-O-Methylglomelliferic acid
A: 42  B: x  B’: 42  C: 52  E: x  F: x  G: x
HPLC: x
V: −  UV: +
Acid Spray: Yellow  LW UV: Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Glomelliferic acid, 2-O-Methylperlatolic acid, 2-O-Methylstenosporic acid
Notes: Occurs in *Ramalina americana* s. lat.

Methyl gyrophorate
A: 52  B: 44  B’: 42  C: 43  E: 17  F: x  G: x
HPLC: 30
V: −  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: Orange
K: No Result  C: P.Red  KC: PD: No Result
Mass Spectrum: -1, 332, 182, 151
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, 4-O-Methylgyrophoric acid, Methyl lecanorate, Tenuiorin
Notes: Acid Spray: yellow, grey halo. Occurs in *Solorina crocea*

2"-O-Methylgyrophoric acid
A: 25  B: x  B’: 33  C: 22  E: x  F: x  G: x
HPLC: 22
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result     C: P.Red     KC: PD: No Result
Mass spectrum: -1, 348, 182, 165

Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Umbilicaric acid, Lecanoric acid
Notes: Occurs in Diploschistes gyrophoricus, Rinodina alba

4-O-Methylgyrophoric acid
A: 32  B: 56  B’: 50  C: 46  E: x  F: x  G: x
HPLC: 34
V: −     UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result     C: P.Red     KC: PD: No Result
Mass Spectrum: -1, 182, 168, 164
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 2,4-Di-O-methylgyrophoric acid, Gyrophoric acid, Lecanoric acid, Methyl gyrophorate, Methyl lecanorate, Tenuiorin
Notes: Acid Spray: strong yellow, grey halo. Occurs in Lobaria dissecta

Methyl haematommate
A: 78  B: x  B’: 85  C: 77  E: 85  F: x  G: x
HPLC: 23
V: −     UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Yellow     C: No result     KC: PD: Yellow
Mass Spectrum: 210, 179, 178
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Atranorin, Haematommic acid
Notes: Possibly an artefact, described from Stereocaulon ramuloseum

O-Methylhaematommone
A: 41  B: x  B': 36  C: 20  E: 6  F: x  G: x  

HPLC: 43  V: +  UV: +  

Acid Spray: Yellow-gree  LW UV: Pink  
Archers: x  
K: Violet  C: No result  KC: PD: No Result  
Mass Spectrum: 328, 213  
Substance Class: Anthraquinones  
Biosynthetically Related Compounds: Haematommone  
Reference: new report  
Notes: Orange pigment. Occurs in *Ramboldia aurea*  

*2'-O-Methylhiascic acid*  
A: 10  B: x  B': 28  C: 12  E: x  F: x  G: x  

HPLC: 18  V: −  UV: +  

Acid Spray: Yellow  LW UV: Green  
Archers: x  
K: No Result  C: Red  KC: PD: No Result  
Mass spectrum: -1, 255, 199, 165  
Substance Class: Orcinol Tridepsides  
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Hiascic acid  
Notes: Minor component in *Melanelia pseudoglabra*  

*2-O-Methylhiascic acid*  
A: 11  B: x  B': 20  C: 8  E: x  F: x  G: 39  

HPLC: 17  V: −  UV: +  

Acid Spray: Orange  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: -1, 413, 383, 196, 168  
Substance Class: Orcinol Tridepsides  
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Hiascic acid, Umbilicaric acid  
Notes: Acid Spray: pale orange, grey halo. Minor component in *Hypotrachyna neodamaziana*
4-O-Methylhiascic acid
A: 26 B: 26 B’: 19 C: 35 E: x F: x G: x
HPLC: 19
V: – UV: +
Acid Spray: B.Blue LW UV: Green
Archers: x
K: No Result C: P.Red KC: Red PD: No Result
Mass Spectrum: -1, 198, 196, 180
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 4,5-Di-O-methylhiascic acid, Gyrophoric acid, Hiascic acid, Lecanoric acid, 5-O-Methylhiascic acid, 2,4,5-Tri-O-methylhiascic acid
Notes: Acid Spray: pale bright blue initially; fades to pale yellow, grey halo. Minor component in Hypotrachyna schindleri

5-O-Methylhiascic acid
A: 21 B: 35 B’: 36 C: 29 E: x F: x G: x
HPLC: 24
V: – UV: +
Acid Spray: Orange LW UV: Green
Archers: x
K: No Result C: Red KC: Red PD: No Result
Mass Spectrum: -1, 348, 318, 196
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 4,5-Di-O-methylhiascic acid, Gyrophoric acid, Hiascic acid, Lecanoric acid, 4-O-Methylhiascic acid, 2,4,5-Tri-O-methylhiascic acid
Notes: Acid Spray: pale orange, grey halo. Occurs in Hypotrachyna horrescens

Methyl 3α-hydroxy-4-O-demethylbarbatate [Methyl 8-hydroxy-4-O-demethylbarbatate]
A: 46 B: 36 B’: 35 C: 35 E: x F: x G: x
HPLC: 27
V: – UV: +
Acid Spray: Orange LW UV: Yellow
Archers: Orange
K: No Result C: Red KC: Red PD: No Result
Mass Spectrum: 376, 243, 196, 164
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Atranorin, 3α-Hydroxy-4-O-demethylbarbatatic acid, Methyl barbatate, Methyl 4-O-demethylbarbatate,


Notes: Occurs in Oropogon loxensis

**Methyl 3α-hydroxybarbatate** [Methyl 8-hydroxybarbatate]

A: 63  B: x  B': 38  C: 47  E: x  F: x  G: x

HPLC: 31

V: –  UV: +

Acid Spray: Yellow  LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: Orange  PD: No Result

Mass Spectrum: -1, 372, 196, 195

Substance Class: β-Orcinol Depsides

Biosynthetically Related Compounds: Atranorin, Elatinic acid, Methyl barbatate, Methyl 4-O-demethylbarbatate, Methyl 3α-hydroxy-4-O-demethylbarbatate


Notes: Occurs in an Erioderma pycnidiferum

**2'-O-Methylhyperlatolic acid**

A: 59  B: x  B': 62  C: 55  E: x  F: x  G: x

HPLC: 44

V: –  UV: +

Acid Spray: P. Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 266, 183, 182

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 2'-O-Methylisohyperlatolic acid, 2'-O-Methylperlatolic acid, 2'-O-Methylstenosporic acid, 2'-O-Methylsuperlatolic acid


Notes: Occurs in Lecanora helva, L. pseudistera

**2-O-Methylsuperlatolic acid**

A: 45  B: x  B': 58  C: 63  E: x  F: x  G: x

HPLC: 45
V: −  UV: +  
Acid Spray: P. Yellow  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: -1, 235, 91  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: 2-O-Methylisohyperlatolic acid, 2-O-Methylperlatolic acid, 2-O-Methylstenosporic acid, 2-O-Methylsuperlatolic acid  
Notes: Occurs in Pertusaria folmanniana  

4-O-Methylhyperolivetoric acid  
A: 50  B: x  B': 53  C: 58  E: x  F: x  G: x  
HPLC: 34  
V: −  UV: +  
Acid Spray: Yellow  LW UV: B. Blue  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: x  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: 4-O-Methylolivetoric acid, 4-O-Methylsuperolivetoric acid, Olivetoric acid  
Notes: Occurs in Pseudobaemyces pachycarpus  

2'-O-Methylhyperphyllinic acid [2'-O-Methylhyperphyllinic acid B]  
A: 46  B: x  B': 33  C: 41  E: x  F: x  G: x  
HPLC: 31  
V: −  UV: +  
Acid Spray: Orange  LW UV: B. Blue  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: -1, 291, 290, 206, 165  
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Glaucohaenic acid, 2'-O-Methylmicrophyllinic acid, 2'-O-Methylsuperphyllinic acid


Notes: Occurs in *Pseudobaeomyces pachycarpus*

**Methyl Hyperplaniate**

A: 72  B: x  B': 49  C: 72  E: 55  F: x  G: x  
HPLC: 50
V: −  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 514, 236, 235
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Planaic acid, Isohyperplanaic acid, Methyl planaiate, Methyl isohyperplanaic acid
Notes: Occurs in *Pertusaria manamensis*

**4-O-Methylhypophysciosporin**

A: 72  B: x  B': 67  C: 76  E: 49  F: x  G: x  
HPLC: 55
V: −  UV: +
Acid Spray: Grey  LW UV: D.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 408, 406, 376, 374
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Argopsin, Hypophysciosporin, Isovicacinic, Methyl virensate, Norvicacinic, Phyciosporin, Vicacinic
Notes: Occurs in *Erioderma phaeorhizum*

**4-O-Methylhypoprotocetraric acid**

A: 35  B: 58  B': 51  C: 45  E: x  F: x  G: 61
HPLC: 28
V: – UV: +
Acid Spray: Grey LW UV: D.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 358, 340, 314, 179
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Hypoconstictic acid, Hypoprotocetraric acid, Hypostictic acid, Isonotatic acid, Notatic acid, Subnotatic acid
Notes: Occurs in Xanthoparmelia notata

1’-Methyl Hypothamnolate
A: 28  B: x  B’: 20  C: 33  E: x  F: x  G: x
HPLC: 25
V: – UV: +
Acid Spray: Brown LW UV: Brown
Archers: x
K: Purple  C: P.Red  KC:  PD: No Result
Mass spectrum: -1, 377, 362, 223
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Hypothamnolic acid, Thamnolic acid
Notes: Minor component in Pertusaria tropica

2’-O-Methylimbricaric acid
A: 46  B: x  B’: 50  C: 59  E: x  F: x  G: x
HPLC: 36
V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 430, 238, 222, 221
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2’-O-Methylhyperlatolic acid, 2’-O-Methylisohyperlatolic acid, 2’-O-Methylperlatolic acid, 2’-O-Methylstenosporic acid, 2’-O-Methylsuperlatolic acid

Notes: Occurs in *Lecidella cf. cyanosarca*

**4-O-Methylisocryptochlorophaeic acid**

A: 43  B: x  B': 54  C: 48  E: x  F: x  G: x  
HPLC: 30  
V: –  UV: +  
Acid Spray: Grey  LW UV: Brown  
Archers: x  
K: No Result  C: Red  KC:  PD: No Result  
Mass Spectrum: -1, 252, 251, 236, 235  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Cryptochlorophaeic acid, 4'-O-Methylcryptochlorophaeic acid, 4-O-Methylcryptochlorophaeic acid, 4'-O-Methylnorcryptochlorophaeic acid  
Notes: Occurs in *Pertusaria paradoxica*

**2'-O-Methylisohyperlatolic acid**

A: 51  B: x  B': 58  C: 63  E: x  F: x  G: x  
HPLC: 44  
V: –  UV: +  
Acid Spray: P.Yellow  LW UV: Green  
Archers: x  
Mass Spectrum: -1, 238, 221, 182  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: 2'-O-Methylhyperlatolic acid, 2'-O-Methylimbricaric acid, 2'-O-Methylperlatolic acid, 2'-O-Methylnorperlatolic acid, 2'-O-Methylperlatolic acid, 2'-O-Methylstenosporic acid, 2'-O-Methylsuperlatolic acid  
Notes: Occurs in *Pseudobaemyces pachycarpus, Lecanora austrosorediosa, L. pseudistera*

**2-O-Methylisohyperlatolic acid**

A: 44  B: x  B': 63  C: 60  E: x  F: x  G: x  
HPLC: 45  
V: –  UV: +  
Acid Spray: P.Yellow  LW UV: Green
Archers: x
Mass Spectrum: -1, 264, 263, 91
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methylhyperlatic acid, 2-O-Methylperlatic acid, 2-O-Methylstenosporic acid, 2-O-Methylsuperlatic acid
Notes: Occurs in Pertusaria follmanniana

2'-O-Methylisohyperphyllinic acid [2'-O-Methylhyperphyllinic acid A]
A: 42    B: x    B': 27    C: 41    E: x    F: x    G: x
HPLC: 32
V: −      UV: +
Acid Spray: Orange       LW UV: B.Blue
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass Spectrum: -1, 308, 206, 165
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Glaucophaeic acid, 2'-O-Methylhyperphyllinic acid, 2'-O-Methylmicrophyllinic acid, 2'-O-Methylsuperphyllinic acid
Notes: Occurs in Pseudobaeomyces pachycarpus

Methyl Isohyperplaniate
A: 74    B: x    B': 51    C: 72    E: 58    F: x    G: x
HPLC: 50
V: −      UV: +
Acid Spray: P.Yellow       LW UV: Green
Archers: No Result
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass spectrum: 514, 264, 263
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Planaic acid, Hyperplanaic acid, Methyl hyperplaniate, Methyl planiate, Isohyperplanaic acid
Notes: Occurs in *Pertusaria manamensis*

**Methyl isoplacodiolic acid**

A: 50  B: x  B': 55  C: 61  E: x  F: x  G: x  
HPLC: 30  
V:  -  
UV: +  
Acid Spray: Grey  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: x  
Substance Class: Usnic acid derivatives  
Biosynthetically Related Compounds: Isoplacodiolic acid, Isopseudoplacodiolic acid, Methyl placodiolic acid, Placodiolic acid, Pseudoplacodiolic acid  
Notes: Occurs in *Haematomma matogrossense*

**2'-O-Methylisopseudocyphellarin A**

A: 69  B: x  B': 49  C: 65  E: 40  F: x  G: x  
HPLC: x  
V:  -  
UV: +  
Acid Spray: P.Yellow  
Archers: No Result  
K: No Result  C: Red  KC: Yellow  PD: Yellow  
Cortex: Medulla:  
Mass Spectrum: 416, 224, 194, 193  
Substance Class: β-Orcinol Depsidens  
Biosynthetically Related Compounds: Isopseudocyphellarin A, 2'-O-Methylphenarctin, 2'-O-Methylpseudocyphellarin A, Nephroarctin, Phenarctin, Pseudocyphellarin A, Pseudocyphellarin B  
Notes: Acid Spray: pale green, fades to pale yellow, grey halo. LW UV: pale purple-brown, fades to orange. Occurs in *Pseudocyphellaria pickeringii*

**Methyl lecanorate**

A: 52  B: x  B': 48  C: 39  E: 30  F: x  G: x  
HPLC: 18  
V:  -  
UV: +  
Acid Spray: P.Yellow  
Archers: No Result
K: No Result     C: Red     KC: PD: No Result
Mass Spectrum: 332, 182, 150, 122
Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Lecanoric acid, Methyl gyrophorate, Methyl orsellinate, Tenuiorin
Notes: Acid Spray: pale yellow, grey halo. Occurs in Pseudocyphellaria crocata

2'-O-Methyllecanoric acid
A: 26     B: x     B': 24     C: 20     E: x     F: x     G: x
HPLC: 10
V: −      UV: +
Acid Spray: Yellow     LW UV: Green
Archers: x
K: No Result     C: Red     KC: PD: No Result
Mass spectrum: -1, 331, 210, 182
Substance Class: Orcinol depsides

Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Ovoic acid, 2-O-Methyllecanoric acid
Notes: Minor component in Hypotrachyna everniiformis

2-O-Methyllecanoric acid
A: 23     B: x     B': 30     C: 18     E: x     F: x     G: x
HPLC: 12
V: −      UV: +
Acid Spray: Yellow     LW UV: Green
Archers: x
K: No Result     C: No Result     KC: No Result     PD: No Result
Mass spectrum: 332, 182, 168, 165
Substance Class: Orcinol depsides

Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Ovoic acid, 2'-O-Methyllecanoric acid
Notes: Minor component in Hypotrachyna everniiformis

4-O-Methylvidic acid [3-O-Methylvidic acid]
A: 41     B: x     B': 46     C: 39     E: x     F: x     G: x
HPLC: 34
V: −      UV: +
Acid Spray: P.Yellow LW UV: Purple
Archers: x
K: No Result C: No Result KC: Red PD: No Result
Mass Spectrum: 470, 293, 292, 277
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Hydroxycolensoic acid, Lividic acid, Methoxycolensoic acid, 4-O-Methylphysodic acid, Oxyphysodic acid
Notes: Occurs in Hypotrachyna immaculata

8'-Methylmenegazziaic acid [Methyl pseudomenegazziaate]
A: x B: x B’: x C: x E: x F: x G: x
HPLC: x V: – UV: +
Acid Spray: Orange LW UV: Orange
Archers: x
K: Yellow C: No Result KC: No Result PD: No Result
Mass spectrum: 370, 342
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Constictic acid, Cryptostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Stictic acid
Notes: reported to occur in Hypotrachyna revoluta [probably a misdetermination of Parmotrema perlatum]

Methyl 2-O-Methyldivaricatate
A: 75 B: x B’: 54 C: 70 E: 60 F: x G: x
HPLC: 28 V: – UV: +
Acid Spray: P.Yellow LW UV: Green
Archers: Orange
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 416, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methyldivaricatic acid, Methyl 2,2’-di-O-methyldivaricatate
Notes: A minor component in Pertusaria oraraensis

Methyl 2-O-methyleriodermate
A: 66  B: x  B': 61  C: 66  E: 46  F: x  G: x
HPLC: 31
V: −  UV: +
Acid Spray: Grey  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 422, 215, 214, 213
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Methyl barbatate, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 5-chloronorobtusatate, Methyl 2,2'-di-O-methyleriodermate, Methyl eriodermate, Methyl 2'-O-methyleriodermate, Methyl 4-O-methyleriodermate
Notes: Acid Spray: pale blue-grey, fades to pale yellow. LW UV: purple-brown, fades to orange. Occurs in a chemotype of Erioderma pycnidiferum

Methyl 2'-O-methyleriodermate
A: 67  B: x  B': 58  C: 65  E: 47  F: x  G: x
HPLC: 30
V: −  UV: +
Acid Spray: Grey  LW UV: Brown
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: 422, 225, 224, 201
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Methyl barbatate, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 5-chloronorobtusatate, Methyl 2,2'-di-O-methyleriodermate, Methyl eriodermate, Methyl 2-O-methyleriodermate, Methyl 4-O-methyleriodermate
Notes: Acid Spray: pale blue-grey, fades to pale yellow. LW UV: purple-brown, fades to orange. Occurs in a chemotype of Erioderma pycnidiferum

Methyl 4-O-methyleriodermate
A: 77  B: x  B': 78  C: 87  E: 71  F: x  G: x
HPLC: 37
V: −  UV: +
Acid Spray: Grey  LW UV: P.Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 422, 215, 214, 213

Substance Class: β-Orcinol Depsides

Biosynthetically Related Compounds: Methyl barbatate, Methyl 5-chloro-4-O-demethylbarbatate, Methyl 5-chloronorobtusatic acid, Methyl 2,2’-di-O-methyleryiodermate, Methyl eriodermate, Methyl 2-O-methyleryiodermate, Methyl 2’-O-methyleriodermate


Notes: Acid Spray: pale blue-grey, fades to pale yellow. LW UV: strong-purple, pale yellow halo. Occurs in a chemotype of Erioderma pycnidiferum

Methyl 2’-O-methylgyrophorate

A: 50  B: x  B’: 30  C: 35  E: 32  F: x  G: x
HPLC: 29
V: –  UV: +
Acid Spray: P: Yellow  LW UV: Green
Archers: No Result
K: No Result  C: Red  KC: PD: No Result

Mass spectrum: 346, 256, 196, 165

Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: Gyrophoric acid, Methyl gyrophorate, Tenuiorin, Methyl ovoate, 2’-O-Methyltenuiorin, 2’-O-Methyltenuiorin, 2’,2”-Di-O-Methyltenuiorin, Methyl 2’,2”-di-O-methylgyrophorate


Notes: Minor component in Pseudocypellanaria billardieri

Methyl 3’-methyllecanorate [Methyl isonorobtusatic acid]

A: 55  B: x  B’: 53  C: 40  E: 30  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x

Mass Spectrum: 346, 196, 164, 151

Substance Class: Orcinol β-Orcinol Depsides

Biosynthetically Related Compounds: Isonorobtusatic acid, Isoobtusatic acid, Norobtusatic acid, Obtusatic acid, Re


Notes: Acid Spray: yellow, grey halo. LW UV: strong orange, green halo. Minor component in Evernia prunastri

Methyl 2’-O-methylmicrophyllinate
A: 68  B: x  B': 42  C: 69  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 294, 262, 206, 196
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2'-O-Methylhyperpyllinic acid, 2'-O-Methylmicrophyllinic acid, 2'-O-Methylsuperphyllinic acid
Notes: Occurs in *Porpidia contraponenda*

**Methyl 7-O-methylnorascomate**

A: 70  B: x  B': 55  C: 55  E: 60  F: x  G: x
HPLC: 39
V: –  UV: +
Acid Spray: B.Blue  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 300, 269, 268, 169
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Ascomatic acid, Methyl ascomate, 7-O-Methylnorascomatic acid, Norascomatic acid
Notes: Occurs in *Bunodophoron patagonicum*

**Methyl 2-O-methylperlatolate**

A: 76  B: x  B': 60  C: 75  E: 68  F: x  G: x
HPLC: 45
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 472, 236, 235
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methylperlatolic acid, Planaic acid, Methyl planiate

Notes: Minor component in *Pertusaria xenismota*

**2'-O-Methylmicrophyllinic acid**

A: 41  B: 29  B': 19  C: 36  E: x  F: x  G: x

HPLC: 25

V: –  UV: +

Acid Spray: Orange  LW UV: B.Blue

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 1, 262, 236, 207

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Confluentic acid, Glaucophaic acid, 2'-O-Methylhyperphyllinic acid, Methyl 2'-O-methylmicrophyllinate, 2'-O-Methylperlatic acid, 2'-O-Methylsuperphyllinic acid


Notes: Acid Spray: pale orange, grey halo. Occurs in *Paraporpidia leptocarpa*

**7-O-Methylnorascomatic acid**

A: 39  B: x  B': 63  C: 47  E: x  F: x  G: x

HPLC: 35

V: –  UV: +

Acid Spray: B.Blue  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 286, 268, 243, 242

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: Ascomatic acid, Methyl ascomatate, Methyl 7-O-Methylnorascomate, Norasomatic acid


Notes: Occurs in *Bunodophoron patagonicum*

**2'-O-Methylnobarbatic acid**

A: 39  B: x  B': 54  C: 36  E: x  F: x  G: 51

HPLC: x

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Purple

Archers: x
K: No Result   C: Red   KC: PD: No Result
Mass Spectrum: 360, 197, 196, 180
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, 4-O-Demethylbarbatic acid, 4-O-Demethyldiffractaic acid, 2'-O-Methylnorobtusatic acid
Notes: Minor component in Pseudocyphellaria norvegica.

4'-O-Methylnorcryptochlorophaeic acid
A: 36   B: x   B': 48   C: 34   E: x   F: x   G: x
HPLC: 34
V: –    UV: +
Acid Spray: P.Yellow    LW UV: P.Yellow
Archers: x
K: No Result   C: Red   KC: PD: No Result
Mass Spectrum: -1, 252, 210, 180
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Cryptochlorophaeic acid, 4'-O-Methylnorhomosekikaic acid, 4'-O-Methylnorsekikaic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Cladonia meroclorophaea

2-O-Methylnordivaricatic acid
A: 28   B: x   B': 33   C: 27   E: x   F: x   G: x
HPLC: x
V: –    UV: +
Acid Spray: P.Yellow    LW UV: Green
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass Spectrum: x
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methylnorstenosporic acid, Nordivaricatic acid
Notes: Occurs in Ramalina americana s. lat.

4'-O-Methylnorhomosekikaic acid
A: 39   B: x   B': 46   C: 32   E: x   F: x   G: x
**HPLC:** 24  
**V:** –  
**UV:** +  
Acid Spray: Orange  
LW UV: Green  
Archers: x  
K: No Result  
C: Red  
KC: PD: No Result  
Mass Spectrum: -1, 254, 236, 210  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Homosekikaic acid, 4'-O-Methylnorsekikaic acid, Sekikaic acid  
Notes: Occurs in *Ramalina luciae*

**2'-O-Methylnorobtusatic acid**  
A: 27  
B: x  
B': 48  
C: 30  
E: x  
F: x  
G: 48  
HPLC: x  
**V:** –  
**UV:** +  
Acid Spray: P.Yellow  
LW UV: Green  
Archers: x  
K: No Result  
C: Red  
KC: PD: No Result  
Mass Spectrum: 183, 182, 165, 164  
Substance Class: β-Orcinol Depsides  
Biosynthetically Related Compounds: 2'-O-Methylnorbarbatic acid, Norobtusatic acid, Obtusatic acid  
Notes: Minor component in *Pseudocyphellaria norvegica*.

**4'-O-Methylnorsekikaic acid**  
A: 35  
B: x  
B': 29  
C: 27  
E: x  
F: x  
G: x  
HPLC: 20  
**V:** –  
**UV:** +  
Acid Spray: Orange  
LW UV: Green  
Archers: x  
K: No Result  
C: Red  
KC: PD: No Result  
Mass Spectrum: 404, 258, 226, 208  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Homosekikaic acid, 4'-O-Methylnorhomosekikaic acid, Sekikaic acid  
Notes: Acid Spray: pale orange, grey halo; fades to deep orange. LW UV: strong-purple, green halo.  
Occurs in *Ramalina luciae*
**2'-O-Methylnorsuperphyllinic acid**

A: 34  B: x  B': 43  C: 29  E: x  F: x  G: x  

HPLC: 26

V: –  UV: +

Acid Spray: Orange  LW UV: B.Blue

Archers: x

K: No Result  C: Red  KC: PD: No Result

Mass Spectrum: -1, 291, 290, 192, 164

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 2'-O-Methylsuperphyllinic acid


Notes: Occurs in *Stirtonia ramosa* s.lat.

**2-O-Methylnorstenosporic acid**

A: 34  B: x  B': 43  C: 29  E: x  F: x  G: x  

HPLC: 26

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 224, 210, 206, 193

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 4-O-Demethylstenosporic acid, 2-O-Methylnordivaricatic acid


Notes: Occurs in *Ramalina americana* s.lat.

**2-O-Methylobtusatic acid**

A: 42  B: 56  B': 52  C: 45  E: x  F: x  G: x  

HPLC: 22

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 360, 193, 150

Substance Class: Orcinol β-Orcinol Depsides

Biosynthetically Related Compounds: Barbatic acid, Diffractaic acid, Obtusatic acid

Notes: Acid Spray: yellow, grey halo. LW UV: strong-purple, green halo. Occurs in Xanthoparmelia tucsonensis

**4-O-Methylolivetoric acid**

A: 44    B: 51    B': 49    C: 48    E: x    F: x    G: x

HPLC: 33

V: −    UV: +

Acid Spray: P.Yellow    LW UV: B.Blue

Archers: x

K: No Result    C: No Result    KC: Pink    PD: No Result

Mass Spectrum: -1, 280, 262, 224

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 4-O-Methylhyperolivetoric acid, 4-O-Methylsuperolivetoric acid, Microphyllinic acid, Olivetoric acid, Perlatolic acid


Notes: SW UV: flouresces bright blue before spraying. Occurs in Xanthoparmelia brattii

**Methyl orsellinate**

A: 54    B: x    B': 56    C: 37    E: 41    F: x    G: x

HPLC: 5

V: −    UV: +

Acid Spray: P.Yellow    LW UV: Green

Archers: x

K: No Result    C: Red    KC: PD: No Result

Cortex: No Result    Medulla: No Result

Mass Spectrum: 180, 150, 122

Substance Class: Monocyclic aromatic derivatives

Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Methyl gyrophorate, Methyl lecanorate, Orsellinic acid, Tenuiorin


Notes: Acid Spray: pale yellow-orange, grey halo. Occurs in Pseudocyphellaria crocata

**Methyl β-orsellinate** [Methyl β-orcinolcarboxylate]

A: 64    B: 70    B': x    C: 52    E: 51    F: x    G: x

HPLC: 10

V: −    UV: +
Methyl Ovoate

A: 50  B: x  B': 40  C: 35  E: 32  F: x  G: x

HPLC: 29

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: Orange

K: No Result  C: P.Red  KC:  PD: No Result

Mass spectrum: 346, 182, 165, 151

Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: Gyrophoric acid, Methyl gyrophorate, Tenuiorin, 2'-O-Methyltenuiorin, 2,2'-Di-O-methyltenuiorin, Ovoic acid, Methyl 2''-O-methylgyrophorate, Methyl 2',2''-Di-O-methylgyrophorate


Notes: Minor component in Pseudocyphellaria billardieri

4-O-Methylloxocryptochlorophaeic acid

A: 46  B: x  B': 41  C: 48  E: x  F: x  G: x

HPLC: 19

V: –  UV: +

Acid Spray: Orange  LW UV: Brown

Archers: x

K: No Result  C: P.Red  KC:  PD: No Result

Mass spectrum: x

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 4-O-Methylcryptochlorophaeic acid, Merochlorophaeic acid


Notes: Occurs in Ramalina subfraxinea sens. lat.
4'-O-Methylpaludosic acid
A: 35  B: 30  B': 30  C: 22  E: x  F: x  G: x
HPLC: 22
V: -        UV: +
Acid Spray: Orange        LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 254, 236, 210
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Boninic acid, 2,4'-Di-O-methylnorsekikaic acid, 4'-O-Methylcryptochlorophaeic acid, Paludosic acid
Notes: Acid Spray: pale orange, grey halo. LW UV: purple, green halo. Occurs in Ramalina asahinae

3-O-Methylpannaric acid
A: 10  B: x  B': 14  C: 10  E: x  F: x  G: 28
HPLC: 5
V: -        UV: +
Acid Spray: Purple        LW UV: B.Blue
Archers: x
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: -1, 286, 268, 253
Substance Class: Dibenzoferans
Biosynthetically Related Compounds: Isoschizopeltic acid, Pannaric acid, Pannaric acid 2-methyl ester, Pannaric acid 6-methyl ester, Schizopeltic acid
Notes: Occurs in Schizopelte californica

1-O-Methyparietin
A: 60  B: x  B': 36  C: 49  E: 28  F: x  G: x
HPLC: 36
V: +        UV: +
Acid Spray: Yellow        LW UV: Yellow
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass spectrum: 298, 280, 269, 252
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 1-O-Methylemodin, Parietin

Notes: Yellow-orange pigment. Acid Spray: Yellow when cold, magenta when hot. Occurs in Protoblastenia lilacina

8-O-Methylparietin
A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: 37  
V: +  UV: +

Acid Spray: Yellow  LW UV: Yellow

Archers: x
K: Violet  C: No Result  KC: PD: No Result

Mass spectrum: 298, 280, 269, 252

Substance Class: Anthraquinones

Biosynthetically Related Compounds: 8-O-Methylemodin, Parietin


Notes: Yellow-orange pigment. Occurs in Caloplaca sp.

Methyl parietinate
A: 75  B: x  B': 55  C: 72  E: 25  F: x  G: x  
HPLC: x  
V: +  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x
K: Violet  C: No Result  KC: PD: No Result

Mass Spectrum: 342

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Fallacinal, Parietin, Parietinic acid, Teloschistin


Notes: Orange pigment. Occurs in Caloplaca obesimarginata

2-O-Methylpatagonic acid
A: 38  B: x  B': 33  C: 42  E: x  F: x  G: x  
HPLC: 41  
V: −  UV: +

Acid Spray: P. Yellow  LW UV: Green

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 277, 276, 193

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Patagonic acid, Isopatagonic acid

Reference: new report

Notes: Occurs in *Bunodophoron patagonicum*

**2'-O-Methylperlatolic acid**

A: 52  B: 50  B': 48  C: 53  E: x  F: x  G: x

HPLC: 39

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: Orange

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 238, 221, 182

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Confluentic acid, 2'-O-Methylhyperlatolic acid, 2'-O-Methylisohyperlatolic acid, 2'-O-Methylmicrophyllinic acid, 2'-O-Methylstenosporic acid, 2'-O-Methylsuperlatolic acid


Notes: Acid Spray: strong-pale yellow, grey halo. LW UV: strong-purple, green halo. Occurs in *Pertusaria pertractata*

**2-O-Methylperlatolic acid**

A: 44  B: 60  B': 58  C: 52  E: x  F: x  G: x

HPLC: 42

V: –  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: Orange

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 252, 235, 224

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 2-O-Methyldivaricatic acid, 2-O-Methylhyperlatolic acid, 2-O-Methylisohyperlatolic acid, 2-O-Methylstenosporic acid, 2-O-Methylsuperlatolic acid, Planaic acid


Notes: Acid Spray: strong-pale yellow, grey halo. LW UV: strong-purple, green halo. SW UV bright blue. Occurs in *Pertusaria gergeana var. georgeana*

**2'-O-Methylphenarctin**
A: 63  B: x  B': 32  C: 53  E: 10  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Brown
Archers: x
K: No Result  C: Red  KC: PD: Yellow

Mass Spectrum: 430, 224, 193, 192
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 1'-Chloronephroarctin, Isopseudocyphellarin A, 2'-O-Methylisopseudocyphellarin A, 2'-O-Methylpseudocyphellarin A, Nephroarctin, Phenarctin, Pseudocyphellarin A, Pseudocyphellarin B

Notes: Acid Spray: pale yellow, grey halo; fades to orange. LW UV: orange-brown, fades to orange. Occurs in Pseudocyphellaria pickeringii

2'-O-Methylphysodic acid
A: 39  B: 34  B': 28  C: 22  E: x  F: x  G: x
HPLC: 21
V: –  UV: +
Acid Spray: Grey  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 440, 384, 249, 248
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Alectoronic acid, 4-O-Methylphysodic acid, Oxyphysodic acid, physodic acid, vittatolic acid
Notes: Acid Spray: yellow, grey halo. Occurs in Hypogymnia billardieri

4-O-Methylphysodic acid
A: 39  B: 43  B': 45  C: 42  E: x  F: x  G: x
HPLC: 36
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: Red  PD: No Result
Mass Spectrum: 484, 440, 263, 262
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Colensoic acid, Lividic acid, Oxyphysodic acid, Physodic acid


Notes: Acid Spray: pale yellow, grey halo. Occurs in Hypotrachyna livida

**Methyl placodiolic acid**

A: 65 B: x B': 44 C: 50 E: x F: x G: x
HPLC: 26
V: − UV: +

Acid Spray: Grey LW UV: P.Brown
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: x

Substance Class: Usnic acid derivatives

Biosynthetically Related Compounds: Isoplacodiolic acid, Isopseudoplacodiolic acid, Methyl isoplacodiolic acid, Placodiolic acid, Pseudoplacodiolic acid


Notes: Occurs in Haematomma hilare

**Methyl Planiate**

A: 70 B: x B': 47 C: 70 E: 50 F: x G: x
HPLC: 40
V: − UV: +

Acid Spray: P.Yellow LW UV: Green
Archers: No Result
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 486, 236, 235

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Methyl hyperplanaiate, Methyl isohyperplanaiate, Hyperplanaic acid, Isohyperplanaic acid, Planaic acid


Notes: Minor component in Pertusaria manamensis

**Methyl porphyrilale**

A: 23 B: x B': 17 C: 11 E: 5 F: x G: 38
HPLC: 13
V: − UV: +
Acid Spray: No Result
Archers: x
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: 328, 299, 270, 241
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Porphyrilic acid
Notes: LW UV: dark purple, UV quenching. Occurs in Psoroma tenue

**Methyl pseudoalectoronate**

A: 54  B: x  B': 35  C: 38  E: 31  F: x  G: x
HPLC: 33
V: –  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: P.Red  PD: No Result
Mass spectrum: 508, 482, 476
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Alectoronic acid, α-Collatolic acid, Dehydrocollatolic acid, 4-O-Methylphysodic acid
Notes: Minor component in Parmotrema poolii

**2'-O-Methylpseudocyphellarin A**

A: 71  B: x  B': 59  C: 66  E: 52  F: x  G: x
HPLC: 41
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Brown
Archers: x
K: No Result  C: Red  KC: PD: Yellow
Mass Spectrum: 416, 224, 193, 192
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 1'-Chloronephroarctin, Isopseudocyphellarin A, 2'-O-Methylphenarctin, 2'-O-Methylisopseudocyphellarin A, Phenarctin, Pseudocyphellarin A, Pseudocyphellarin B
Notes: Acid Spray: pale yellow, grey halo; fades to orange. LW UV: orange-brown, fades to orange. Occurs in Pseudocyphellaria pickeringii
Methyl pseudonorstictate
A: 70  B: x  B’: 32  C: 54  E: 14  F: x  G: x
HPLC: 29
V: –  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Red  C: No Result  KC:  PD: Orange
Mass spectrum: 387, 386, 383
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Norstictic acid, Salazinic acid, Connorstictic acid
Notes: Minor component in Pertusaria falklandica

Methyl pseudosalazinate
A: 28  B: x  B’: 14  C: 17  E: 2  F: x  G: x
HPLC: 19
V: –  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Red  C: No Result  KC:  PD: Orange
Mass spectrum: 402, 384, 369
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Norstictic acid, Salazinic acid, Consalazinic acid
Notes: Occurs in Pertusaria sp.

Methyl psoromate
A: 70  B: x  B’: 47  C: 67  E: 46  F: x  G: x
HPLC: 42
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: x
K: No Result  C: No Result  KC: No Result  PD: P.Yellow
Mass spectrum: 372, 357, 342
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Psoromic acid, 2-O-Demethylpsoromic acid, Methyl 2’-O-demethylpsoromate

Notes: Minor component in Lecanora intumescent

**Methyl pyxinate**

A: x  B: x  B': x  C: 48  E: 34  F: x  G: 60

HPLC: x

V: –  UV: +

Acid Spray: Pink  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 488, 470, 455, 437

Substance Class: Terpenoids

Biosynthetically Related Compounds: 3β-Acetoxy-20,24-epoxydammarane-12β,25-diol, 3β,25-Diacetoxy-20,24-epoxydammarane, 3β,25-Diacetoxy-20,24-epoxydammarane-12β-ol, 20,24-Epoxydammarane-3β,12β,25-triol, Methyl 3-O-acetoxypyxinate, Methyl 3-O-acetoxypyxinate


Notes: Occurs in Pyxine coccifera, P. endochrysina

**9α-O-Methylsalazinic acid**

A: 30  B: x  B': 19  C: 18  E: x  F: x  G: 42

HPLC: 19

V: –  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: Red  C: No Result  KC: PD: Orange

Mass spectrum: x

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Salazinic acid, Quaesitic acid, 6α,9α-Di-O-methylsalazinic acid


Notes: Minor component in Cetrellopsis rhytidocarpa, Hypotrachyna quaesita, Xanthoparmelia subnuda

**Methyl sekikiate**

A: 72  B: x  B': 62  C: 77  E: 53  F: x  G: x

HPLC: 29

V: –  UV: +

Acid Spray: Orange  LW UV: Green

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 432, 240, 208, 193
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Sekikaic acid
Notes: Acid Spray: pale orange, grey halo; fades to dark orange. LW UV: purple, green halo. Occurs in Usnea dusenii

2-O-Methylsekikaic acid
A: 41  B: 31  B': 40  C: 43  E: x  F: x  G: x
HPLC: 25
V: −  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 227, 224, 208
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Boninic acid, 4,4'-Di-O-methylcrypectlorphaeic acid, 2,4'-Di-O-methylnoresekikaic acid, Homosekikaic acid, 4-O-Methylcryptochromeic acid, Sekikaic acid
Notes: Acid Spray: pale yellow-orange, grey halo. LW UV: strong-purple, green halo. Occurs in Usnea dusenii

2-O-Methylsquamic acid
A: 15  B: x  B': 25  C: 23  E: x  F: x  G: 37
HPLC: 13
V: −  UV: +
Acid Spray: Grey  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 365, 223, 209, 193
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Elatinic acid, Squamic acid
Notes: SW UV: bright blue before spraying. Occurs in Usnea magellanica

2'-O-Methylstenosporic acid
A: 47  B: x  B’: 53  C: 53  E: x  F: x  G: x
HPLC: 35
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 430, 239, 238, 221
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2’-O-Methylhyperlatic acid, 2’-O-Methylisohyperlatic acid, 2’-O-Methylhyperlatic acid, 2’-O-Methylsuperlatic acid
Notes: Occurs in Physcida cylindrophora

2-O-Methylstensporic acid
A: 49  B: 56  B’: 56  C: 49  E: x  F: x  G: x
HPLC: 35
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 224, 208, 207
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 2-O-Methyldivaricatic acid, 2-O-Methylperlatic acid, Stenosporic acid
Notes: Acid Spray: strong-pale yellow, grey halo. LW UV: strong-purple, green halo. SW UV bright blue
Occurs in Ramalina sayreana

Methyl stictic acid
A: 50  B: x  B’: 15  C: 38  E: x  F: x  G: 49
HPLC: 14
V: –  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Yellow  C: No Result  KC: PD: Orange
Mass Spectrum: 400, 368
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Constrictic acid, Cryptostictic acid, Hypostictic acid, Menegazziaic acid, Norstictic acid, Stictic acid

Notes: Minor component in Lobaria oregana

2'-O-Methyleralolace acid

A: 62  B: x  B': 65  C: 58  E: x  F: x  G: x
HPLC: 48
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 266, 222, 182, 181
Substance Class: Orcinol Dpsides
Biosynthetically Related Compounds: 2'-O-Methylhyperlatolace acid, 2'-O-Methylimbricaric acid, 2'-O-Methylisohyperlatolace acid, 2'-O-Methylperlatolace acid, 2'-O-Methylstenosporic acid
Notes: Occurs in Lecanora austrosorediosa, L. pseudistera

2-O-Methyleralolace acid

A: 46  B: x  B': 66  C: 64  E: x  F: x  G: x
HPLC: 50
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 264, 263, 91
Substance Class: Orcinol Dpsides
Biosynthetically Related Compounds: 2-O-Methylhyperlatolace acid, 2-O-Methylisohyperlatolace acid, 2-O-Methylperlatolace acid, 2-O-Methylstenosporic acid
Notes: Occurs in Pertusaria follmanniana

4-O-Methyleralolace acid

A: 54  B: x  B': 57  C: 60  E: x  F: x  G: x
HPLC: 42
V: –  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 291, 290, 164, 137
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 4-O-Methylhyperolivetoric acid, 4-O-Methylolivetoric acid, Olivetoric acid
Notes: Occurs in *Pseudobaeomyces pachycarpus*

2'-O-Methylsuperphyllinic acid
A: 43  B: x  B': 32  C: 44  E: x  F: x  G: x
HPLC: 41
V: −  UV: +
Acid Spray: Pink  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 292, 291, 290
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 2'-O-Methylhyperphyllinic acid, 2'-O-Methylmicrophyllinic acid, Glaucophaeic acid
Notes: Occurs in *Pseudobaeomyces pachycarpus, Porpidia glaucophaea*

2'-O-Methyltenuiorin
A: 70  B: x  B': 44  C: 72  E: 31  F: x  G: x
HPLC: 37
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 347, 182, 165
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: 4,2'-Di-O-methylgyrophoric acid, 2',2'-Di-O-Methyltenuiorin, Methyl gyrophorate, 2''-O-Methyltenuiorin, Tenuiorin

Notes: Minor component in *Pseudocyphellaria faveolata*

**2''-O-Methyltenuiorin**

- A: 73, B: 44, B': 38, C: 66, E: 26, F: x, G: x
- HPLC: 33
- V: –, UV: +
- Acid Spray: P: Yellow, LW UV: Green
- Archers: x
- K: No Result, C: No Result, KC: No Result, PD: No Result
- Mass Spectrum: -1, 331, 328, 196
- Substance Class: Orcinol Tridepsides
- Biosynthetically Related Compounds: 4,2''-Di-O-methylgyrophoric acid, 2',2''-Di-O-Methyltenuiorin, Methyl gyrophorate, 2''-O-Methyltenuiorin, Tenuiorin


Notes: Minor component in *Pseudocyphellaria faveolata*

**8-O-Methylthiomelin**

- A: 66, B: x, B': 47, C: 56, E: 34, F: x, G: x
- HPLC: 43
- V: +, UV: +
- Acid Spray: Orange, LW UV: Orange
- Archers: x
- K: No Result, C: No Result, KC: No Result, PD: No Result
- Mass Spectrum: 356, 354, 336, 324
- Substance Class: Xanthones
- Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 4-Dechloro-8-O-methylthiomelin, 4-Dechlorothiomelin, Thiomelin


Notes: Pale yellow pigment. Minor component in *Rinodina thiomela*

**3-O-Methyliophanic acid**

- A: 65, B: x, B': 69, C: 61, E: 3, F: 8, G: x
- HPLC: 53
- V: +, UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 414, 412, 410, 408
Substance Class: Xanthones
Biosynthetically Related Compounds: 5,7-Dichloro-3-O-methylnorlichexanthone, 3-O-Methylasemone, 2,5,7-Trichloro-3-O-methylnorlichexanthone, Thiophanic acid, Thuringione
Notes: Yellow pigment. Minor component in *Lecidella meiococca*

6-O-Methylthiophanic acid

A: 65  B: x  B': 71  C: 60  E: 3  F: 13  G: x
HPLC: 56
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: No Result  C: Orange  KC: PD: No Result
Mass Spectrum: 414, 412, 410, 408
Substance Class: Xanthones
Biosynthetically Related Compounds: 6-O-Methylnorlarchothelin, 6-O-Methylasemone, Thiophanic acid
Notes: Yellow pigment. Occurs in *Micarea isabellina*

4-O-Methylvicanicin [Vicanicin methyl ether]

A: 77  B: x  B': 65  C: 84  E: 70  F: x  G: x
HPLC: 54
V: -  UV: +
Acid Spray: Green  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 398, 396, 363, 361
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 7-Dechlorovicanicin, Isovicanicin, Norvicanicin, Vicanicin
Notes: Acid Spray: pale dull brownish-green. Minor component in *Lecidella sublapicida*

Methyl virensate
A: 72  B: x  B': 55  C: 77  E: 50  F: x  G: x
HPLC: 30
V: −  UV: +
Acid Spray: Purple  LW UV: Grey
Archers: x
K: No Result  C: No Result  KC: No Result  PD: Orange
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Hypophysciosporin, Physciosporin, Virensic acid
Notes: Minor component in Pseudocyphellaria faveolata

**Micareic acid**

A: 44  B: x  B': 69  C: 52  E: x  F: x  G: x
HPLC: 65
V: −  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 500, 456, 372, 249
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Methoxymicareic acid, Superlatolic acid
Notes: LW UV: bright turquoise, fades to bright light blue then orange. Occurs in Micarea prasina

**Microphyllinic acid**

A: 41  B: 39  B': 39  C: 41  E: x  F: x  G: x
HPLC: 30
V: −  UV: +
Acid Spray: Pink  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 280, 262, 244
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: 4-O-Demethylmicrophyllinic acid, Hyperphyllinic acid, 4-O-Methylolivetoric acid, Olivetoric acid, Superphyllinic acid

Notes: SW UV: flouresces bright blue before spraying. Occurs in *Cetrelia japonica*

**Miriquidic acid**

<table>
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<th>A</th>
<th>B</th>
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<th>C</th>
<th>E</th>
<th>F</th>
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<td>48</td>
<td>46</td>
<td>44</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: 30

V: –

UV: +

Acid Spray: Green

LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 252, 234, 224

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Normiriquidic acid


Notes: Acid Spray: bright yellow-green, eventually fades to bright turquoise. Occurs in *Lecidea leucophaea*


Notes: Acid Spray: bright yellow-green, fades to bright turquoise. Occurs in *Lecidea leucophaea*

**Mollin**

<table>
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<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
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<tr>
<td>x</td>
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<td>x</td>
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</tr>
</tbody>
</table>

HPLC: x

V: +

UV: +

Acid Spray: x

LW UV: x

Archers: x

K: Yellow  C: No Result  KC: PD: No Result

Mass spectrum: x

Substance Class: Chromones

Biosynthetically Related Compounds: Galapagin, Roccellin


Notes: Pale yellow pigment. Occurs in *Roccellaria mollis*

**Monoacetylgraciliformin** [Acetylgraciliformin]

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<th>A</th>
<th>B</th>
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<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>46</td>
<td>x</td>
<td>12</td>
<td>36</td>
<td>7</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
HPLC: 29
V: +     UV: +
Acid Spray: Green     LW UV: Grey
Archers: x
K: Red     C: No Result     KC: No Result
Mass Spectrum: 584, 524, 254
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Diacetylgraciliformin, Graciliformin, Skyrin
Phytochemistry 14: 277-279.
Notes: Bright yellow pigment. Acid Spray: colour like skyrin. Occurs in Cladonia graciliformis

(+)-Montagnetol
A: x     B: x     B': x     C: x     E: x     F: x     G: x
HPLC: 2
V: −     UV: +
Acid Spray: Green     LW UV: Green
Archers: x
K: No Result     C: D.Red     KC: No Result
Mass Spectrum: 272, 256, 254, 236
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Erythrin
Notes: Occurs in Roccella montagnei

Moretenone  [Hop-22(29)-en-3-one]
A: 60     B: x     B': 75     C: x     E: x     F: x     G: x
HPLC: x
V: −     UV: −
Acid Spray: Brown     LW UV: Pink
Archers: x
K: No Result     C: No Result     KC: No Result     PD: No Result
Mass Spectrum: 424, 409, 368, 204
Substance Class: Terpenoids
Biosynthetically Related Compounds: 29-Nor-21α-hopane-3,22-dione
Reference: Nicollier, G/ Tabacchi, R/ Gavin, J/ Breton, JL/ Gonzales, AG 1979: Triterpenes de la ‘mousse de
Notes: Occurs in Evernia prunastri
**Murolic acid**

A: 23  B: x  B': 27  C: 24  E: x  F: x  G: x  
HPLC: 30  
V: –  UV: –  
Acid Spray: Purple  LW UV: White  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 368, 353, 350, 324  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: Isomuronic acid, Neodihymruolic acid, Neuropogolic acid  
Notes: Optical antipode of protoconstipatic acid. Occurs in Lecanora muralis

**Muronic acid** [Dehydroprotoconstipatic acid]

A: 40  B: x  B': 35  C: 35  E: x  F: x  G: x  
HPLC: 29  
V: –  UV: –  
Acid Spray: P.Brown  LW UV: Lilac  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 366, 348, 308, 306  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: Constipatic acid, Dehydroconstipatic acid, Protoconstipatic acid  
Notes: Occurs in Neoropogon trachycarpus

**Myeloconone A1**

A: 5  B: x  B': 12  C: 10  E: x  F: x  G: 30  
HPLC: 17  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 338, 336, 320, 318  
Substance Class: Phenalenones  
Biosynthetically Related Compounds: Myeloconone A2

Notes: Yellow-orange pigment. Occurs in *Myeloconis erumpens, M. guyanensis*

**Myeloconone A2**

A: 5  B: x  B': 12  C: 10  E: x  F: x  G: 30  
HPLC: 17  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 302, 284,274  
Substance Class: Phenalenones  
Biosynthetically Related Compounds: Myeloconone A1  
Notes: Yellow pigment. Occurs in *Myeloconis erumpens, M. guyanensis*

**Myeloconone B**

A: 30  B: x  B': 9  C: 15  E: x  F: x  G: 32  
HPLC: 4  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 290, 263,262, 247  
Substance Class: Phenalenones  
Biosynthetically Related Compounds: Myeloconone C  
Notes: Yellow pigment. Occurs in *Myeloconis erumpens, M. guyanensis*

**Myeloconone C**

A: 30  B: x  B': 2  C: 13  E: x  F: x  G: 33  
HPLC: 9  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 290, 261, 247, 245
Substance Class: Phenalenones
Biosynthetically Related Compounds: Myeloconone B
Notes: Yellow pigment. Occurs in *Myeloconis parva*

**Neodihydromurolic acid**

A: 30  B: x  B': 29  C: 29  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 370, 355, 334, 326
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Isomuronic acid, Murolic acid, Neuropogolic acid
Notes: Occurs in *Lecanora muralis*

**Neothamnolic acid**

A: 5  B: x  B': 20  C: 16  E: x  F: x  G: x
HPLC: 13
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: x
K: Purple  C: P.Red  KC: PD: No Result
Mass spectrum: -1, 226, 209, 198
Substance Class: Orcinol m-depsides
Biosynthetically Related Compounds: Hypothamnolic acid, Thamnolic acid, Lactothamnolic acid
Notes: Occurs in *Siphula ramlalinoides*

**Neotricone**

A: 4  B: x  B': 26  C: 7  E: x  F: x  G: x
HPLC: 11
V: -  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: No Result  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 372, 328, 313, 300  
Substance Class: β-Orcinol Depsidones  
Biosynthetically Related Compounds: Norperistic acid, Norstictic acid, Peristic acid  
Notes: Occurs in Phaeographis neotricosa, Ph. syngraphizans

**Neproarctin**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
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<td>53</td>
<td>52</td>
<td>63</td>
<td>21</td>
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</table>

HPLC: 34  
V: -  UV: +  
Acid Spray: P.Yellow  LW UV: P.Brown  
Archers: x  
K: Yellow  C: Red  KC: PD: Yellow  
Mass spectrum: 372, 207, 166, 151  
Substance Class: β-Orcinol Depsidones  
Notes: Acid Spray: pale yellow, grey halo. Occurs in Nephroma arcticum

**Nephromopsis acid**

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<th>A</th>
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<td>x</td>
<td>47</td>
<td>x</td>
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</tr>
</tbody>
</table>

HPLC: x  TLC: Rf 70 [diethyl ether/butanoic acid, 30/1]  
V: -  UV: -  
Acid Spray: No Result  LW UV: No Result  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 326, 117, 99, 56  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: allo-Protolichesterinic acid  
Notes: Occurs in Nephromopsis stracheyi
Nephrosteranic acid
A: 42  B: x  B': 48  C: 46  E: x  F: x  G: x
HPLC: x  TLC: Rf 82 [diethyl ether/butanoic acid, 20/1]
V: –  UV: –
Acid Spray: No Result  LW UV: No Result
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Isonephrosterinic acid, Nephrosterinic acid
Notes: Occurs in Lepraria rigidula

Nephrosterinic acid
A: 33  B: x  B': 42  C: 35  E: x  F: x  G: x
HPLC: 33  TLC: Rf 61 [diethyl ether/butanoic acid, 20/1]
V: –  UV: –
Acid Spray: No Result  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Isonephrosterinic acid, Lichesterinic acid, Nephrosteranic acid, Protolichesterinic acid
Notes: Occurs in Nephromopsis endocrocea

Neuropogolic acid
A: 31  B: x  B': 27  C: 29  E: x  F: x  G: x
HPLC: 33
V: –  UV: –
Acid Spray: No Result  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 368, 353, 350, 324
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Isomuronic acid, Murolc acid
Notes: Isomer of constipatic acid. Occurs in Neoropogon trachycarpus

Norargopsin

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>62</td>
<td>x</td>
<td>63</td>
<td>63</td>
<td>29</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: 30
V: –
UV: +
Acid Spray: P. Yellow
LW UV: Green
Archers: x

K: No Result  C: No Result  KC: No Result  PD: Yellow


Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Argopsin, Isovicanicin, Nordechloropannarin, Norpannarin, Norvicanicin, Pannarin, Vicanicin

Notes: Acid Spray: pale yellow, grey halo. LW UV: pale green. Occurs in Erioderma chilense

Norbaeomycesic acid [4-O-Demethylbaeomycesic acid]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>38</td>
<td>x</td>
<td>35</td>
<td>30</td>
<td>x</td>
<td>x</td>
<td>57</td>
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</tbody>
</table>

HPLC: 26
V: –
UV: +
Acid Spray: Orange
LW UV: Orange
Archers: Orange

K: P. Yellow  C: No Result  KC: PD: P. Yellow

Mass spectrum: 316, 194, 182

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: 4-O-Demethylbarbatic acid, Atranorin, Baeomycesic acid

Notes: Occurs in Hypotrachyna orientalis

Norcaperatic acid

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<td>26</td>
<td>x</td>
<td>1</td>
<td>x</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: x
V: –
UV: –
Acid Spray: No Result
LW UV: No Result
Archers: x
Mass Spectrum: x
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Caperatic acid
Notes: Occurs in *Melania stygia*

**Norcolensoic acid**

A: 28  B: 54  B': 53  C: 31  E: x  F: x  G: x
HPLC: 28
V: –  UV: +
Acid Spray: P.Brown  LW UV: Purple
Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 384, 356, 343, 341
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Colensoic acid
Notes: LW UV: fades to bright violet. Occurs in *Hypotrachyna dactylifera*

**Nordechloropannarin**

A: 51  B: x  B': 46  C: 40  E: 28  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 314, 286, 179, 177
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Argopsin, Dechloropannarin, Norargopsin, Norpannarin, Pannarin, Virensic acid
Notes: Acid Spray: fades to green. Occurs in *Lecanora dispersa*

**Nordivaricatic acid**

A: 33  B: 55  B': 52  C: 29  E: x  F: x  G: x
HPLC: 22
V: −  UV: +

Acid Spray: Grey  LW UV: Green
Archers: Orange
K: No Result  C: Red  KC: Red  PD: No Result
Mass Spectrum: -1, 196, 179, 178
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, 4-O-Demethylstenosporic acid, Divaricatic acid
Notes: Acid Spray: pale orange, grey halo. LW UV: strong-purple, green halo. Occurs in *Cladia beaugleholei*

**Norgangaleoidin**

A: 59  B: x  B': 40  C: 47  E: x  F: x  G: x
HPLC: 15
V: −  UV: +

Acid Spray: P.Yellow  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 402, 400, 398, 366
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Gangaleoidin, Lecideoidin, Leoidin
Notes: Occurs in *Lecanora chlorotera*

**29-Nor-21α-hopane-3,22-dione**

A: 70  B: x  B': 59  C: 59  E: 58  F: x  G: 54
HPLC: x
V: −  UV: −

Acid Spray: Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 426, 411, 265, 205
Substance Class: Terpenoids
Biosynthetically Related Compounds: Moretenone
Notes: Acid Spray: brown, fades to purple. LW UV: pale orange, fades to pale pink. Occurs in *Evernia prunastri*

**Norisonotatic acid** [O-Methylolivaceic acid]
A: 12 B: x B’: 23 C: 14 E: x F: x G: x 
HPLC: 15
V: – UV: +

Acid Spray: Brown LW UV: Blue
Archers: x
K: No Result C: No Result KC: Red PD: No Result

Mass Spectrum: 330, 312, 286

Substance Class: Orcinol β-Orcinol Depsidones

Biosynthetically Related Compounds: Isonotatic acid, Notatic acid, Olivaceic acid


Notes: Occurs in Ramalina americana, ?Myriotrema olivaceum

Norjackinic acid

A: 10 B: x B’: 38 C: x E: x F: x G: x 
HPLC: x
V: – UV: –

Acid Spray: No Result LW UV: No Result
Archers: x
K: No Result C: No Result KC: No Result PD: No Result

Mass Spectrum: x

Substance Class: Aliphatic acids

Biosynthetically Related Compounds: Jackinic acid

Reference: New report.

Notes: Occurs in Lepraria jackii

Norlichexanthone

A: 35 B: x B’: 40 C: 11 E: 14 F: x G: x 
HPLC: 15
V: – UV: +

Acid Spray: P.Yellow LW UV: B.Blue
Archers: x
K: No Result C: Orange-red KC: PD: No Result

Mass Spectrum: 258, 257, 229, 201

Substance Class: Xanthones

Biosynthetically Related Compounds: Griseoxanthone-C, Lichexanthone


Notes: Occurs in Lecanora reuteri
Norlobaridone

A: 40  B: 36  B’: 36  C: 20  E: 18  F: x  G: x
HPLC: 26
V: –  UV: +
Acid Spray: P. Green  LW UV: B.Blue
Archers: Lilac
K: No Result  C: No Result  KC: Pink  PD: No Result
Mass Spectrum: 398
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Conorlobaridone, Isonorlobaridone, Loxodin, Norlobario, Norlobariol methyl ester
Notes: Acid Spray: dull green, fades to grey; weak-grey. Occurs in Xanthoparmelia scabrosa

Norlobariol

A: 12  B: x  B’: 18  C: 1  E: 5  F: x  G: x
HPLC: 11
V: –  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC: PD: No Result
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Isonorlobaridone, Norlobaridone, Norlobariol methyl ester
Notes: Acid Spray: pale grey fades to strong-dull green. Occurs in Xanthoparmelia scabrosa

Norlobariol methyl ester  [Norlobariol methyl pseudoester]

A: 28  B: x  B’: 23  C: 3  E: 10  F: x  G: x
HPLC: 16
V: –  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: 430, 398, 370, 342
Substance Class: Diphenyl ethers
Biosynthetically Related Compounds: Isonorobaridone, Norlorbaridone, Norlorbariol
Notes: Acid Spray: pale grey fades to strong-dull green. Occurs in Xanthoparmelia scabrosa

**Normiriquidic acid**

A: 31  B: x  B': 38  C: 23  E: x  F: x  G: x
HPLC: 21
V: –  UV: +
Acid Spray: Green  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: -1, 220, 207, 180
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Miriquidic acid
Notes: Acid Spray: light yellow-green, grey halo; eventually fades to bright turquoise. Occurs in Lecidea leucophaea

**Norobtusatic acid**

A: 27  B: 50  B': 48  C: 30  E: x  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: 332, 182, 168, 165
Substance Class: Orcinol β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, 4-O-Demethylbarbatic acid, Obtusatic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Hypotrachyna chicitae

**Norpannarin**

A: 51  B: x  B': 48  C: 42  E: 21  F: x  G: x
HPLC: 27
V: −          UV: +
Acid Spray: Grey          LW UV: Brown
Archers: x
K: No Result   C: No Result   KC: No Result   PD: Orange
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Argopsin, Dechloropannarin, Norargopsin, Nordechloropannarin, Pannarin
Notes: Occurs in *Erioderma chilense*

**Norperistictic acid**
A: 2      B: x     B': 12      C: 3      E: x      F: x      G: x
HPLC: 4
V: −          UV: +
Acid Spray: Yellow          LW UV: Yellow
Archers: No Result
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass spectrum: 388, 370, 357, 344
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Neotricone, Norstictic acid, Peristictic acid
Notes: Occurs in *Phaeographis neotricosa, Ph. syngraphizans*

**Norrangiformic acid**
A: 10      B: x     B': 36      C: x      E: x      F: x      G: x
HPLC: x
V: −          UV: −
Acid Spray: No Result          LW UV: No Result
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass Spectrum: 354, 336, 318, 308
Substance Class: Aliphatic acids
Notes: Best seen on plate after spraying but before charring. Occurs in *Cladonia mitis*
**Norrussulone**

A: x  B: x  B': x  C: 30  E: x  F: x  G: x
HPLC: 29

V: +  UV: +

Acid Spray: P.Red  LW UV: Pink

Archers: x

K: Purple  C: No Result  KC: PD: No Result

Mass spectrum: 338, 323, 309

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Russulone

Reference: New report

Notes: Red pigment. Occurs in *Ramboldia laeta*

**Norsolorinic acid**

A: 55  B: x  B': 66  C: 41  E: 19  F: x  G: x
HPLC: 46

V: +  UV: +

Acid Spray: Orange  LW UV: Pink

Archers: x

K: Purple  C: No Result  KC: PD: No Result

Mass Spectrum: 370, 352, 327, 299

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Averythrin, 6-O-Methylaverythrin, Solorinic acid


Notes: Orange-red pigment. Occurs in *Solorina crocea*

**Norstictic acid**

A: 40  B: 29  B': 32  C: 30  E: x  F: x  G: 57
HPLC: 12

V: −  UV: +

Acid Spray: Yellow  LW UV: Orange

Archers: No Result

K: Red  C: No Result  KC: PD: No Result

Mass Spectrum: 372, 354, 179, 177

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Connorstictic acid, Consalazinic acid, Hyposalazinic acid, Peristictic acid, Protocetraric acid, Salazinic acid, Stictic acid

Notes: Occurs in Xanthoparmelia substrigosa

**Northiomelin**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tr>
<td>69</td>
<td>x</td>
<td>70</td>
<td>47</td>
<td>85</td>
<td>x</td>
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</tbody>
</table>

HPLC: 34

V: +

UV: +

Acid Spray: Yellow

LW UV: Yellow

Archers: No Result

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 330, 328, 326, 205

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 2-Dechlorothiomelin, 4-Dechlorothiomelin, 8-O-Methylthiomelin, Thiomelin


Notes: Pale yellow pigment. Minor component in Rinodina thiomela

**Norvicanicin**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
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<td>55</td>
<td>58</td>
<td>63</td>
<td>36</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 23

V: −

UV: +

Acid Spray: Green

LW UV: Purple

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 370, 368, 335, 333

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Isovicinicin, Norpannarin, Vicanicin


Notes: Acid Spray: pale blue-green, fades to grey. LW UV: purple, green halo. Occurs in a chemical race of Pannaria sphinctrina

**Notatic acid**

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>34</td>
<td>49</td>
<td>44</td>
<td>38</td>
<td>x</td>
<td>x</td>
<td>55</td>
</tr>
</tbody>
</table>

HPLC: 19

V: −

UV: +

Acid Spray: P:Yellow

LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass Spectrum: 344, 326, 300, 298
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: 4-O-Demethylnotatic acid, Hypoprotocetraric acid, Isonotatic acid, 4-O-Methylhypoprotocetraric acid, Subnotatic acid
Notes: Acid Spray: pale yellow, grey halo. LW UV: violet, purple halo, fades to deep blue. Occurs in Xanthoparmelia notata

**Obtusatic acid**

A: 40   B: 64   B’: 61   C: 47   E: x   F: x   G: x
HPLC: 32
V: –   UV: +
Acid Spray: Grey   LW UV: Green
Archers: x
K: No Result   C: No Result   KC: Yellow   PD: No Result
Mass Spectrum: 346, 196, 179, 178
Substance Class: Orcinol β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, 4-O-Demethylbarbatic acid, 2-O-Methylobtusatic acid, Norobtusatic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in Ramalina obtusata

**Olivaceic acid**

A: 3   B: x   B’: 14   C: 3   E: x   F: x   G: x
HPLC: 12
V: –   UV: +
Acid Spray: Brown   LW UV: Blue
Archers: x
K: No Result   C: No Result   KC: No Result   PD: No Result
Mass Spectrum: x
Substance Class: Dipsidones
Biosynthetically Related Compounds: Isonotatic acid, Norisonotatic acid
Notes: Occurs in Myriotrema olivaceum
Olivetoric acid

A: 29  B: 37  B': 39  C: 25  E: x  F: x  G: x

HPLC: 27

V: –       UV: +

Acid Spray: Orange       LW UV: B.Blue

Archers: x

K: No Result  C: Pink   KC: D.Red  PD: No Result

Mass Spectrum: -1, 266, 248, 224

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Anziaic acid, 4-O-Demethylmicrophyllinic acid, Hyperolivetoric acid, 4-O-Methylolivetoric acid, Microphyllinic acid, Superolivetoric acid


Notes: Acid Spray: pale orange, grey halo. SW UV flouresces bright blue before spraying. Occurs in Cetreria olivetorum

Olivetol [3-Hydroxy-5-pentylphenol]

A: 65  B: 70  B': x  C: 53  E: x  F: x  G: x

HPLC: 6

V: –       UV: +

Acid Spray: Yellow       LW UV: Green

Archers: x

K: No Result  C: Red   KC: PD: No Result

Mass spectrum: 180, 165, 151, 138

Substance Class: Monocyclic aromatic derivatives

Biosynthetically Related Compounds: 2,4-Dihydroxy-6-pentylbenzoic acid, Perlatolic acid


Notes: Possibly an artefact, reported from Cladonia macaronesica

Orcinyl lecanorate [Decarboxygyrophoric acid]

A: 30  B: 37  B': 38  C: 20  E: 11  F: x  G: x

HPLC: 20

V: –       UV: +

Acid Spray: P.Yellow       LW UV: Green

Archers: x

K: No Result  C: Red   KC: Red  PD: No Result

Mass Spectrum: -1, 275, 274, 152
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Orsellinic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in *Punctelia borreri*

**Orsellinic acid**
A: 37  B: x  B': 49  C: 22  E: x  F: x  G: x
HPLC: 0
V: – UV: +
Acid Spray: Yellow  LW UV: Green
Archers: x
K: No Result  C: Red  KC: Red  PD: No Result
Mass Spectrum: 168, 150, 124, 122
Substance Class: Monocyclic aromatic derivatives
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Methyl gyrophorate, Methyl lecanorate
Notes: Acid Spray yellow-orange, grey halo. Occurs in *Pseudocyphellaria crocata*

**Ovoic acid**
A: 25  B: x  B': 34  C: 23  E: 11  F: x  G: x
HPLC: 23
V: – UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: x
K: No Result  C: P.Red  KC: Red  PD: No Result
Cortex: No Result  Medulla: No Result
Mass Spectrum: -1, 182, 165, 151
Substance Class: Orcinol Tridepsides
Biosynthetically Related Compounds: Gyrophoric acid, Lecanoric acid, Orsellinic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in *Melanelia substygia*

**Oxodidymic acid**
A: 60  B: x  B': 55  C: 48  E: x  F: x  G: x
HPLC: 37
V: – UV: +
Acid Spray: Blue  LW UV: Purple
**Archers:** x
K: No Result  C: Green  KC: PD: No Result
Mass spectrum: 384, 366, 340
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: 8-Chlorodioxocondidymic acid, 8-Chlorodioxodidymic acid, 8-Chlorooxodidymic acid, Dioxocondidymic acid, Dioxodidymic acid, Letrouitic acid,
Notes: Occurs in *Letrouitia vulpina*

**Oxolobaric acid**
A: 19  B: x  B': 23  C: 23  E: x  F: x  G: x
HPLC: 36
V: –  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: D.Red  PD: No Result
Mass spectrum: 470, 453, 452, 428
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Lobaric acid, Sublobaric acid, Norlobaridone
Notes: Minor component in *Lobaria hypoleucoides*

**Oxostenosporic acid**
A: 41  B: 43  B': 46  C: 41  E: x  F: x  G: x
HPLC: 28
V: –  UV: +
Acid Spray: P.Yellow  LW UV: B.Blue
Archers: P.Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 262, 238, 220
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylstenosporic acid, Divaricatic acid, Glomelliferic acid, Perlatolic acid, Stenosporic acid
Notes: Acid Spray: pale yellow, grey halo. Occurs in *Xanthoparmelia pulla*.

**4-Oxypannaric acid 2-methyl ester** [9-Methyl 4-hydroxypannarate]
A: 15  B: x  B': x  C: 19  E: x  F: x  G: 21  
HPLC: 5  
V: –  UV: +  
Acid Spray: Blue  LW UV: Purple  
Archers: x  
K: No Result  C: Green  KC: PD: No Result  
Mass spectrum: 346, 314, 302  
Substance Class: Dibenzofurans  
Biosynthetically Related Compounds: 4-Oxypannaric acid 6-methyl ester, Pannaric acid, Pannaric acid 2-methyl ester, Porphyrilic acid  
Notes: Occurs in Lepraria diffusa

4-Oxypannaric acid 6-methyl ester
A: 5  B: x  B': x  C: 4  E: x  F: x  G: x  
HPLC: 10  
V: –  UV: +  
Acid Spray: Blue  LW UV: Purple  
Archers: x  
K: No Result  C: Green  KC: PD: No Result  
Mass Spectrum: 346, 328, 302  
Substance Class: Dibenzofurans  
Biosynthetically Related Compounds: 4-Oxypannaric acid 2-methyl ester, Pannaric acid, Pannaric acid 2-methyl ester, Pannaric acid 6-methyl ester, Porphyrilic acid  
Notes: Occurs in Lepraria vouauxii, L. sipmaniana

Oxyprophodic acid [3-Hydroxyrophodic acid]
A: 15  B: 36  B': 34  C: 13  E: x  F: x  G: x  
HPLC: 17  
V: +  UV: +  
Acid Spray: Green  LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 468, 442, 265, 264  
Substance Class: Orcinol Depsidones  
Biosynthetically Related Compounds: Colensoic acid, Hydroxycolensoic acid, Lividic acid, Methoxycolensoic acid, 2'-O-Methylphysodic acid, 4-O-Methylphysodic acid, Physodic acid

Notes: Visible: pale dull yellow. Occurs in Hypogymnia billardieri

**Oxysiphulin**

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: 398, 355, 341, 327
Substance Class: Chromones
Biosynthetically Related Compounds: Protosiphulin, Siphulin
Notes: Occurs in Siphula ceratites

**Oxyskyrin**

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x  TLC Rf 45 [chloroform/acetone, 2:1]
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass Spectrum: 596
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Skyrin, Skyrinol
Notes: Orange pigment in Trypetheliopsis boninensis

**Paludosic acid**

A: 39  B: 35  B': 42  C: 33  E: x  F: x  G: x
HPLC: 17
V: –  UV: +
Acid Spray: Orange  LW UV: B.Blue
Archers: Orange
K: Red  C: Red  KC: PD: No Result
Mass Spectrum: -1, 240, 222, 210
Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: Boninic acid, Cryptochlorophaeic acid, Homosekikaic acid, Merochlorophaeic acid, 4'-O-Methylpaludosic acid


Notes: Acid Spray: pale orange, grey halo. LW UV: strong green, fades to bright blue. Occurs in Ramalina paludosa

### Pannaric acid

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
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<tbody>
<tr>
<td>5</td>
<td>28</td>
<td>10</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: 6

V: –

UV: +

Acid Spray: Purple

LW UV: B.Blue

Archers: x

K: No Result

C: Green

KC: PD: No Result

Mass Spectrum: 316, 298, 272, 254

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: 4-Oxypannaric acid 6-methyl ester, Pannaric acid 2-methyl ester, Pannaric acid 6-methyl ester, Porphyrilic acid, Schizopeltic acid


Notes: LW UV: dark purple, blue halo. Occurs in Lepraria membranacea

### Pannaric acid 2-methyl ester [9-Methyl pannarate]

<table>
<thead>
<tr>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td>25</td>
<td>x</td>
<td>21</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 8

V: –

UV: +

Acid Spray: Purple

LW UV: B.Blue

Archers: x

K: No Result

C: Green

KC: PD: No Result

Mass Spectrum: 330, 312, 298, 286

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: 4-Oxypannaric acid 2-methyl ester, 4-Oxypannaric acid 6-methyl ester, Pannaric acid, Pannaric acid 6-methyl ester, Porphyrilic acid, Schizopeltic acid


Notes: Occurs in Roccella capensis
**Pannaric acid 6-methyl ester** [15-Methyl pannurate]

A: 23  B: x  B': 33  C: 17  E: x  F: x  G: x

HPLC: 11

V: −  UV: +

Acid Spray: Purple  LW UV: B.Blue

Archers: x

K: No Result  C: Green  KC: PD: No Result

Cortex:  Medulla:

Mass Spectrum: 330, 312, 302, 286

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: 4-Oxypannamic acid 2-methyl ester, 4-Oxypannamic acid 6-methyl ester, Pannaric acid, Pannaric acid 2-methyl ester, Porphyrilic acid, Schizopeltic acid


Notes: Acid Spray: strong purple-grey. LW UV:strong-dark purple. Occurs in *Lepraria vouauxii*.

---

**Pannarin**

A: 73  B: 68  B': 63  C: 79  E: 40  F: 64  G: x

HPLC: 36

V: −  UV: +

Acid Spray: B.Blue  LW UV: Brown

Archers: No Result

K: No Result  C: No Result  KC: No Result  PD: Orange

Mass Spectrum: 364, 362, 213, 211

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Argopsin, Dechloropannarin, Isonorpannarin, Nordechloropannarin, Norargopsin, Norpannarin, Vicanicin


Notes: Acid Spray: purple-blue, brown halo if strong. Occurs in *Pannaria conoplea*.

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**Parietin** [Physcoin]

A: 75  B: 72  B': 71  C: 82  E: 59  F: x  G: 90

HPLC: 50

V: +  UV: +

Acid Spray: Yellow  LW UV: Orange

Archers: No Result

K: Violet  C: No Result  KC: PD: No Result

Mass Spectrum: 284, 269, 256, 255
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Fallacinal, Fragilin, Parietinic acid, Parietin bisanthrone, Teloschistin
Notes: Yellow-orange pigment. Occurs in Xanthoria parietina

**Parietin bisanthrone** [Physcoin bisanthrone]
A: 67 B: x B’: 38 C: 65 E: x F: x G: x
HPLC: 55
V: + UV: +
Acid Spray: Grey LW UV: Brown
Archers: No Result
K: Violet C: No Result KC: PD: No Result
Mass Spectrum: x

Substance Class: Anthraquinones
Biosynthetically Related Compounds: Fallacinal, Fragilin, Parietinic acid, Parietin, Teloschistin
Notes: Minor component in Letrouitia corallina

**Parietinic acid**
A: 40 B: x B’: 45 C: 47 E: x F: x G: x
HPLC: 22
V: + UV: +
Acid Spray: Orange LW UV: Orange
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass Spectrum: 328, 284

Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Fallacinal, Fragilin, Parietin, Parietin bisanthrone, Teloschistin
Notes: Yellow-orange pigment. Occurs in Xanthoria parietina

**Patagonic acid**
A: 38 B: x B’: 47 C: 42 E: x F: x G: x
HPLC: 42
V: – UV: +
Acid Spray: Yellow
LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 277, 276, 193, 192
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isopatagonic acid, Isosphaeric acid, 2-O-Methylpatagonic acid, Sphaerophorin
Notes: Occurs in Bunodophoron patagonicum

**Peristictic acid**

A: 4  B: x  B’: 11  C: 3  E: x  F: x  G: 23
HPLC: 4  
V: – UV: +
Acid Spray: Yellow  
LW UV: Yellow
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 402, 385, 384, 370
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Constrictic acid, Cryptostictic acid, Neotricone, Norstictic acid, Stictic acid
Notes: Minor component in Relicina sydneyensis

**Perlatolic acid**

A: 44  B: 77  B’: 75  C: 54  E: x  F: x  G: x
HPLC: 47
V: – UV: +
Acid Spray: Yellow  
LW UV: Green
Archers: Orange
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 238, 224, 220
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Anziaic acid, Divaricatic acid, Glomelliferic acid, Hyperlatolic acid, Imbricaric acid, Isohyperlatolic acid, Stenosporic acid, Superlatolic acid

Notes: Acid Spray: pale yellow, grey halo. LW UV: deep purple, bright green halo. Occurs in Cetrelia cetrarioides, Stereocaulon ramulosum

(-)-allo-Pertusaric acid
A: 37   B: 31   B': 33   C: 32   E: x   F: x   G: x
HPLC: x
V: −   UV: −
Acid Spray: P.Brown      LW UV: Lilac
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 366, 348, 309, 290
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: allo-Dihydropertusaric acid, allo-Protolichesterinic acid

Notes: Acid Spray: pale pink-brown, fades to mauve. Occurs in Pertusaria albescens

Phenarctin
A: 66   B: x   B': 42   C: 61   E: 21   F: x   G: x
HPLC: 34
V: −   UV: +
Acid Spray: Yellow      LW UV: Orange
Archers: x
K: Yellow  C: Red  KC:  PD: Yellow
Mass Spectrum: 416, 210, 207, 178
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: 1'-Chloronephroarctin, 2'-O-Methylisopseudocyphellarin A, 2'-O-Methylphenarctin, 2'-O-Methylpseudocyphellarin A, Isopseudocyphellarin A, Nephroarctin, Pseudocyphellarin A, Pseudocyphellarin B

Notes: Visible: pale orange. Acid Spray: dark orange, dark yellow halo; weak yellow, grey halo. Occurs in Nephroma arcticum

Phlebic acid A
A: 38   B: x   B': 35   C: 40   E: 8   F: x   G: 45
HPLC: x
Acid Spray: P.Brown

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 516, 498, 456, 443

Substance Class: Terpenoids

Biosynthetically Related Compounds: Phlebic acid B, Phlebic acid C, Phlebic acid D


Notes: Acid Spray: fades to purple. Occurs in *Peltigera aphthosa*

### Phlebic acid B

A: 44  B: x  B': 42  C: 48  E: 26  F: x  G: 50

HPLC: x

V: –  UV: –

Acid Spray: P.Brown  LW UV: Lilac

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 458, 440, 415, 387

Substance Class: Terpenoids

Biosynthetically Related Compounds: Phlebic acid A, Phlebic acid C, Phlebic acid D


Notes: Acid Spray: fades to purple. Occurs in *Peltigera aphthosa*

### Phlebic acid C

A: x  B: x  B': x  C: 46  E: x  F: x  G: x

HPLC: x

V: –  UV: –

Acid Spray: P.Brown  LW UV: Lilac

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 458, 443, 440, 425

Substance Class: Terpenoids

Biosynthetically Related Compounds: Phlebic acid A, Phlebic acid B, Phlebic acid D


Notes: Acid Spray: fades to purple. Occurs in *Peltigera aphthosa*
Phlebic acid D

A: x  B: x  B’: x  C: 38  E: x  F: x  G: x

HPLC: x

V: –  UV: –

Acid Spray: P.Brown  LW UV: Lilac

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 516, 498, 474, 456

Substance Class: Terpenoids

Biosynthetically Related Compounds: Phlebic acid A, Phlebic acid B, Phlebic acid C


Notes: Acid Spray: fades to purple. Occurs in Peltigera aphthosa

Phyllopsorin

A: 66  B: x  B’: 45  C: 64  E: 8  F: x  G: x

HPLC: 22

V: –  UV: +

Acid Spray: Yellow  LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: Orange

Mass Spectrum: 378, 376, 350, 348

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Allorhizin, Argopsin, Chlorophyllopsorin, Methyl 2,7-dichloronorphoromate, Methyl 2,7-dichloropsoromate, Pannarin


Notes: Occurs in Phyllopsora ochroxantha

Physciosporin

A: 73  B: x  B’: 59  C: 78  E: 37  F: x  G: x

HPLC: 38

V: –  UV: +

Acid Spray: P.Brown  LW UV: Brown

Archers: P.Red

K: No Result  C: No Result  KC: No Result  PD: Orange

Mass Spectrum: 408, 406, 374, 346

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: 2-Chlorovirensic acid, Hypophysciosporin, Methyl virensate, Virensic acid
Physodic acid

A: 10  B: 31  B': 33  C: 19  E: x  F: x  G: 46
HPLC: 18

V: –  UV: +

Acid Spray: Grey  LW UV: Purple

Archers: No Result

K: P.Brown  C: No Result  KC: PD: Orange

Mass Spectrum: -1, 356, 314, 312

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Conphysodic acid, Fumarprotocetraric acid, Malonprotocetraric acid, Protocetraric acid, Succinprotocetraric acid, Virensic acid


Notes: Occurs in Hypogymnia physodes

Physodic acid

A: 25  B: 35  B': 35  C: 18  E: x  F: x  G: x
HPLC: 25

V: –  UV: +

Acid Spray: P.Orange  LW UV: Purple

Archers: No Result

K: No Result  C: No Result  KC: P.Red  PD: No Result

Mass Spectrum: 452, 426, 249, 248

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Colensoic acid, Lividic acid 2'-O-Methylphysodic acid, 4'-O-Methylphysodic acid, Oxyphysodic acid, Vittatolic acid


Notes: Acid Spray: very pale orange, fades to grey. Occurs in Hypogymnia physodes

Picolichenic acid

A: 38  B: 39  B': 45  C: 36  E: x  F: x  G: x
HPLC: 22

V: –  UV: +
Acid Spray: P. Yellow  
LW UV: Purple  
Archers: x  
K Mass Spectrum: 442, 424, 398, 384  
Substance Class: Depsones  
Biosynthetically Related Compounds: Hyperpicrolichenic acid, Isohyperpicrolichenic acid, Isosubpicrolichenic acid, Subpicrolichenic acid, Superpicrolichenic acid  
Notes: Occurs in *Pertusaria amara*

**Pigmentosin A**  
A: 54  B: x  B': 13  C: 55  E: x  F: x  G: x  
HPLC: 26  
V: +  UV: +  
Acid Spray: Brown  
LW UV: Yellow  
Archers: x  
K: Red  C: No Result  KC: PD: No Result  
Mass spectrum: 547, 546, 528, 249  
Substance Class: Naphthpyrones  
Biosynthetically Related Compounds: Vioxanthin  
Notes: Yellow-green pigment. Minor component in *Hypotrachyna immaculata*

**Pinastric acid**  
A: 70  B: 57  B': 55  C: 78  E: 22  F: x  G: x  
HPLC: 29  
V: +  UV: +  
Acid Spray: Yellow  
LW UV: Yellow  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 352, 322, 320  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Calycin, Pulvinic acid, Pulvinic dilactone, Leprapinic acid  
Notes: Yellow pigment. LW UV: deep mustard yellow. Occurs in *Vulpicida pinastris*
**Placodiolic acid**

A: 65  B: 63  B’: 60  C: 67  E: 21  F: x  G: x

HPLC: 27

V: –  UV: +

Acid Spray: Orange  LW UV: Purple

Archers: x

K: Yellow  C: No Result  KC: D. Yellow  PD: No Result

Mass Spectrum: 376, 361, 235, 233

Substance Class: Usnic acid derivatives

Biosynthetically Related Compounds: Isoplacodiolic acid, Isopseudoplacodiolic acid, Isousnic acid, Methylplacodiolic acid, Pseudoplacodiolic acid, Usnic acid


Notes: Yellow pigment. LW UV: deep mustard yellow. Occurs in *Rhizoplaca chrysoleuca*

**Planaic acid**

A: 47  B: 38  B’: 36  C: 50  E: x  F: x  G: x

HPLC: 34

V: –  UV: +

Acid Spray: P. Yellow  LW UV: Purple

Archers: No Result

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 236, 235

Substance Class: Orcinol Depsides

Biosynthetically Related Compounds: 4-O-Demethylplanasic acid, Hyperplanasic acid, 2-O-Methylconfluentic acid, 2-O-Methylperlatolic acid, Methyl planate, Isohyperplanasic acid, Superplanasic acid


Notes: Acid Spray: pale yellow, grey halo. LW UV spray: purple, green halo. Occurs in *Lecidea plana*

**Platysporic acid**  [Platysporum unknown]

A: 55  B: x  B’: 51  C: 60  E: x  F: x  G: x

HPLC: x

V: –  UV: +

Acid Spray: D.Brown  LW UV: Purple

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: x

Substance Class: Unknown [Depsidone?]
Biosynthetically Related Compounds: Psoromic acid
Notes: Occurs in *Fibrillithecis halei*

**Polyporic acid**

A: 29  B: 28  B': 29  C: 19  E: 22  F: x  G: x
HPLC: 11
V: +  UV: +
Acid Spray: P.Red  LW UV: D.Red
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 292, 290, 149, 145
Substance Class: Terphenyl quinones

Biosynthetically Related Compounds:
Notes: Deep red pigment. Occurs in *Pseudocyphellaria coronata*

**Porphyric acid**

A: 9  B: 11  B': 11  C: 5  E: 27  F: x  G: x
HPLC: 7
V: –  UV: +
Acid Spray: P.Grey  LW UV: Purple
Archers: x
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: 314, 298, 270, 241
Substance Class: Dibenzofurans

Biosynthetically Related Compounds: Methyl porphyrilate. Pannaric acid
Notes: Occurs in *Haematomma ochroleucum*

**Portentol**

A: x  B: x  B': x  C: x  E: x  F: x  G: x
V: –  UV: –
Acid Spray: x  LW UV: x
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 310, 197, 181, 141
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Acetylportentol
Notes: Occurs in Roccella galapagoensis

**Præsorediosic acid**

A: 30  B: x  B': 39  C: 35  E: x  F: x  G: x
HPLC: 32
V: –  UV: –
Acid Spray: P.Brown  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 364, 350, 346
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Protopræsorediosic acid
Notes: Occurs in Parmotrema praesorediosum

**Protocetraric acid**

A: 3  B: 19  B': 19  C: 5  E: x  F: x  G: 27
HPLC: 13
V: –  UV: +
Acid Spray: Grey  LW UV: Purple
Archers: x
K: P.Brown  C: No Result  KC: PD: Red
Mass Spectrum: -1, 358, 314, 312
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Conprotocetraric acid, Fumarprotocetraric acid, Malonprotocetraric acid, Physodalic acid, Salazinic acid, Subvirensic acid, Succinprotocetraric acid, Virensic acid
Notes: Lichen spot test: K+ pale dingy yellowish brown. Occurs in Flavoparmelia caperata

**Protoconstipatic acid**

A: 26  B: x  B': 17  C: 26  E: x  F: x  G: x
HPLC: 27
Acid Spray: P.Brown
LW UV: Yellow

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 368, 353, 350, 324
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Constipatic acid, Dehydroconstipatic acid, Lichesterinic acid, Murolic acid, Protolichesterinic acid
Notes: Optical antipode of murolic acid. Occurs in Xanthoparmelia constipata

**allo-Protolichesterinic acid**
A: 42  B: x  B': x  C: 44  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: P.Lilac
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 324, 306, 280, 279
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: allo-Pertusaric acid
Notes: Occurs in Cetraria ericetorum

**Protolichesterinic acid**
A: 35  B: 47  B': 46  C: 37  E: x  F: x  G: x
HPLC: 48
V: –  UV: –
Acid Spray: No Result  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Constipatic acid, Dehydroconstipatic acid, Lichesterinic acid, Murolic acid, Protoconstipatic acid
Notes: LW UV: weak spot difficult to detect, often UV-quenching. Best seen as wet plate dries.
Occurrences in *Cetraria islandica*

**Protoneuropogolic acid**

A: 26  B: x  B': 17  C: 26  E: x  F: x  G: x  HPLC: 30  
V: –  UV: –  
Acid Spray: No Result  LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: 368, 353, 350  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: Neuropogolic acid  
Reference: New report  
Notes: Occurs in Neuropogon trachycarpus

**Protopraesorediosic acid**

A: 26  B: x  B': 32  C: 31  E: x  F: x  G: x  HPLC: 29  
V: –  UV: –  
Acid Spray: No Result  LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: -1, 365, 364, 350  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: Praesorediosic acid  
Notes: Occurs in Parmotrema praesorediosum

**Protosiphulin**

A: x  B: x  B': x  C: x  E: x  F: x  G: x  HPLC: 11  
V: –  UV: +  
Acid Spray: Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: Red  KC: Red  PD: No Result  
Mass Spectrum: 382, 339, 325, 311  
Substance Class: Chromones
Biosynthetically Related Compounds: Oxysiphulin, Siphulin
Notes: Occurs in _Siphula ceratites_

**Pseudocyphellarin A**
A: 75  B: 67  B’: 74  C: 80  E: 66  F: x  G: x
HPLC: 44
V: –  UV: +
Acid Spray: P.Brown  LW UV: Brown
Archers: x
K: Yellow  C: Red  KC: PD: Yellow
Mass Spectrum: 402, 210, 193, 178
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Isopseudocyphellarin A, 2’-O-Methylisopseudocyphellarin A, 2’-O-Methylpseudocyphellarin A, Pseudocyphellarin B
Notes: Acid Spray: pale brown, grey halo. Occurs in _Pseudocyphellaria endochrysea_

**Pseudocyphellarin B**
A: 55  B: x  B’: 54  C: 48  E: 32  F: x  G: x
HPLC: 30
V: –  UV: +
Acid Spray: P.Brown  LW UV: Brown
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass Spectrum: -1, 210, 178, 150
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Isopseudocyphellarin A, 2’-O-Methylisopseudocyphellarin A, 2’-O-Methylpseudocyphellarin A, Pseudocyphellarin A
Notes: Acid Spray: pale brown, grey halo. Occurs in _Pseudocyphellaria endochrysea_

**Pseudoplacodiolic acid**
A: 58  B: 52  B’: 46  C: 57  E: 22  F: x  G: x
HPLC: 25
V: –  UV: +
K: Yellow  C: No Result  KC: D.Yellow  PD: No Result
Archers: x
Mass Spectrum: 376, 361, 235, 233
Substance Class: Usnic acid derivatives
Biosynthetically Related Compounds: Isoplacodiolic acid, Isopseudoplacodiolic acid, Usousnic acid, Methyl isoplacodiolic acid, Methylplacodiolic acid, Placodiolic acid, Usnic acid
Notes: Occurs in Rhizoplaca chrysoleuca

Psoromic acid

A: 36  B: 41  B': 46  C: 41  E: x  F: x  G: 57
HPLC: 21
V: -  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: No Result
K: Yellow  C: Yellow  KC: PD: Yellow
Mass Spectrum: 358, 330, 314, 179
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: 2'-O-Demethylpsoromic acid, Methyl psoromate, Subpsoromic acid
Notes: Occurs in Usnea inermis

Pulvinamide

A: 43  B: x  B': 31  C: 43  E: 13  F: x  G: x
HPLC: 18
V: +  UV: +
Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 307, 290, 261, 234
Substance Class: Pulvinic acid derivatives
Biosynthetically Related Compounds: Calycin, Pulvinic acid, Pulvinic dilactone
Notes: Yellow pigment. LW UV: deep brownish yellow. Occurs in Pseudocyphellaria crocata
**Pulvinic acid**

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<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td></td>
<td>9</td>
<td>36</td>
<td>42</td>
<td>7</td>
<td>10</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 6

V: +

UV: +

Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 308, 290, 262, 234

Substance Class: Pulvinic acid derivatives

Biosynthetically Related Compounds: Calycin, Pulvinamide, Pulvinic dilactone, Vulpinic acid


Notes: Yellow pigment. LW UV: deep brownish yellow. Occurs in *Pseudocyphellaria crocata*

---

**Pulvinic dilactone** [Pulvinic acid lactone]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td></td>
<td>80</td>
<td>82</td>
<td>82</td>
<td>90</td>
<td>81</td>
<td>x</td>
<td>x</td>
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</table>

HPLC: 43

V: +

UV: +

Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 290, 261, 234, 178

Substance Class: Pulvinic acid derivatives

Biosynthetically Related Compounds: Calycin, Pulvinamide, Pulvinic acid, Vulpinic acid


Notes: Yellow pigment. LW UV: deep brownish yellow. Occurs in *Pseudocyphellaria crocata*

---

**Quaesitic acid**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>x</td>
<td>9</td>
<td>6</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 10

V: –

UV: +

Acid Spray: Orange

LW UV: Orange

Archers: No Result

K: Red

C: No Result

KC: Orange

PD: Orange

Mass spectrum: -1, 305, 205, 149

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Consalazinic acid, Galbinic acid, Salazinic acid, Succinsalazinic acid

Notes: Occurs in *Hypotrachyna quaesita*

**Ramalinaic acid**

A: 9   B: x   B': 6   C: x   E: x   F: x   G: 18

HPLC: 10

V: –   UV: +

Acid Spray: Yellow   LW UV: Orange

Archers: No Result

K: No Result   C: Red   KC:   PD: No Result

Mass Spectrum: -1, 218, 165, 164, 138

Substance Class: Orcinol β-Orcinol Depsidess

Biosynthetically Related Compounds: Consalazinic acid, Galbinic acid, Salazinic acid

Reference: Griffin, FK 1993: Structure determination and synthesis of some β-orcinol para-depsides. MSc Thesis, Australian National University, Canberra

Notes: Occurs in *Ramalina americana*

**Ramalinolic acid**

A: 44   B: x   B': 57   C: 43   E: x   F: x   G: x

HPLC: 30

V: –   UV: +

Acid Spray: P.Yellow   LW UV: Green

Archers: No Result

K: No Result   C: Red   KC:   PD: No Result

Mass Spectrum: -1, 240, 222, 211, 210

Substance Class: Orcinol Depsidess

Biosynthetically Related Compounds: 4'-O-Demethylsekikaic acid, Homosekikaic acid, 4'-O-Methylnorhomosekikaic acid, 4'-O-Methylnorsekikaic acid, Sekikaic acid


Notes: Acid Spray: pale yellow, grey halo; fades to pale orange. Occurs in *Ramalina nervulosa*

**Rangiformic acid**

A: 29   B: 38   B': 41   C: 33   E: x   F: x   G: x

HPLC: x

V: –   UV: –

Acid Spray: No Result   LW UV: No Result

Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 368, 350, 336, 322
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Isorangiformic acid, Norrangiformic acid
Notes: Occurs in *Caldonia rangiformis*

**Retigeranic acid A**
A: 73  B: x  B': 95  C: 83  E: 81  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: P.Yellow
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 370, 325
Substance Class: Terpenoids
Biosynthetically Related Compounds: Retigeranic acid B
Notes: Acid Spray: pale brown, grey halo; fades to purple, violet halo. LW UV: fades to pale pink. Occurs in *Lobaria isidiosa*

**Retigeranic acid B**
A: 73  B: x  B': 95  C: 80  E: 78  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: P.Yellow
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 370, 325
Substance Class: Terpenoids
Biosynthetically Related Compounds: Retigeranic acid A
Notes: Acid Spray: pale brown, grey halo; fades to purple, violet halo. LW UV: fades to pale pink. Occurs in *Lobaria isidiosa*
A: 17  B: x  B': 22  C: 19  E: x  F: x  G: 68
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: Pink
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 486, 471, 453, 435
Substance Class: Terpenoids
Biosynthetically Related Compounds: Retigeric acid B
Notes: Acid Spray: pale pinkish brown. LW UV: pale pink with whitish halo. Occurs in Lobaria retigera

Retigeric acid B
A: 4  B: x  B': 13  C: 10  E: x  F: x  G: 12
HPLC: x
V: –  UV: –
Acid Spray: P.Brown  LW UV: Pink
Archers: No Result
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: Terpenoids
Biosynthetically Related Compounds: Retigeric acid A
Notes: Acid Spray: pale pinkish brown. LW UV: pale pink with whitish halo. Occurs in Lobaria retigera

Rhein
A: 61  B: x  B': 62  C: 47  E: x  F: x  G: x
HPLC: 22
V: +  UV: +
Acid Spray: Red-orange  LW UV: Magenta
Archers: x
K: Red-violet  C: No Result  KC: PD: No Result
Mass Spectrum: 268
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Chrysophanal, Chrysophanol
Notes: Yellow pigment. Occurs in Caloplaca rheinigera
**Rhizocarpic acid**

A: 67  B: 41  B’: 41  C: 65  E: 22  F: x  G: x  
HPLC: 34  
V: +  UV: +  
Acid Spray: Yellow  LW UV: Orange  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 469, 290, 234, 145  
Substance Class: Pulvinic acid derivatives  
Biosynthetically Related Compounds: Epanorin, Pulvinic acid, Pulvinic dilactone  
Notes: Yellow pigment. Occurs in *Rhizocarpon geographicum*

**Rhodocladonic acid**

A: 0  B: x  B’: 1  C: 0  E: x  F: x  G: x  
HPLC: 8  
V: +  UV: +  
Acid Spray: Red  LW UV: Red  
Archers: x  
K: Violet  C: No Result  KC:  PD: No Result  
Mass Spectrum: 318, 272, 257, 247  
Substance Class: Naphthquinones  
Biosynthetically Related Compounds: Chiodectonic acid  
Notes: Red-purple pigment. Occurs in *Cladonia floerkeana*

**Roccellaric acid**

A: 50  B: x  B’: x  C: x  E: x  F: x  G: x  
HPLC: x  
V: −  UV: −  
Acid Spray: No Result  LW UV: No Result  
Archers: No Result  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 326, 325, 308, 281  
Substance Class: Aliphatic acids
Biosynthetically Related Compounds:  
Notes: Occurs in *Roccellaria mollis*

**Roccellic acid**
A: 42  B: 60  B': 60  C: 48  E: x  F: x  G: x  
HPLC: x  
V: −  UV: −  
Acid Spray: No Result  LW UV: No Result  
Archers: No Result  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: 300, 282, 264, 254  
Substance Class: Aliphatic acids  
Biosynthetically Related Compounds: Angardianic acid  
Notes: Occurs in *Roccella phycopsis*

**Roccellin**
A: x  B: x  B': x  C: x  E: x  F: x  G: x  
HPLC: 8  
V: +  UV: +  
Acid Spray: x  LW UV: x  
Archers: No Result  
K: Yellow  C: No Result  KC: PD: No Result  
Mass Spectrum: 452, 410, 247, 206  
Substance Class: Chromones  
Biosynthetically Related Compounds: Galapagin, Mollin  
Notes: Pale yellow pigment. Occurs in *Roccellaria mollis*

**Rugulosin**
A: 30  B: x  B': 14  C: 14  E: 3  F: x  G: x  
HPLC: 15  
V: +  UV: +  
Acid Spray: Red-brown  LW UV: Brown  
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass Spectrum: 542, 270, 256
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Graciliformin, Skyrin
Notes: Bright yellow pigment. Occurs in *Acroscyphus sphaerophoroides*

**Russulone** [Nemetzone]
A: 60  B: x  B': 61  C: 50  E: x  F: x  G: x
HPLC: 42
V: +  UV: +
Acid Spray: P.Red  LW UV: Pink
Archers: x
K: Purple  C: No Result  KC: PD: No Result
Mass spectrum: 352, 338, 323, 309
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Endocrocin, Norrussulone
Notes: Red pigment. Occurs in *Ramboldia russula*

**Salazinic acid**
A: 10  B: 7  B': 7  C: 4  E: x  F: x  G: 26
HPLC: 5
V: −  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: D.Red  C: No Result  KC: PD: Orange
Mass Spectrum: 388, 370, 354, 179
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Connorstictic acid, Consalazinic acid, Galbinic acid, Hyposalazinic acid, Norstictic acid, Protocetraric acid
Notes: Occurs in *Xanthoparmelia tasmanica*

**Salazinolide** [6α-Deoxysalazinic acid]
A: 18  B: x  B': 12  C: 8  E: x  F: x  G: x
HPLC: 13

V: –  UV: +

Acid Spray: Yellow  LW UV: Brown
Archers: x
K: D.Red  C: No Result  KC: PD: Orange

Mass spectrum: x

Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Consalazinolide, Norstictic acid, Salazinic acid

Notes: Acid Spray: blue-grey, yellow on standing. Minor component in *Heteroderma queenslandica*

---

**Scabrosin acetate butanoate** [4-Acetyl-4'-butyrylscabrosin]

A: 57  B: x  B': 7  C: 40  E: 12  F: x  G: 56
HPLC: x

V: –  UV: –

Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 468, 408, 380, 318

Substance Class: Amino-acid derivatives
Biosynthetically Related Compounds: Scabrosin acetate hexanoate, Scabrosin diacetate, Scabrosin dibutanoate

Notes: SW UV: may detected if concentrated. Occurs in *Xanthoparmelia scabrosa*

---

**Scabrosin acetate hexanoate** [4-Acetyl-4'-hexanoylscabrosin]

A: 61  B: x  B': 13  C: 43  E: 15  F: x  G: 61
HPLC: x

V: –  UV: –

Acid Spray: Yellow  LW UV: Yellow
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 496, 436, 380, 318

Substance Class: Amino-acid derivatives
Biosynthetically Related Compounds: Scabrosin acetate butanoate, Scabrosin diacetate, Scabrosin dibutanoate

Notes: SW UV: may detected if concentrated. Occurs in *Xanthoparmelia scabrosa*

**Scabrosin diacetate** [4,4'-Diacetylscabrosin]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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<tbody>
<tr>
<td></td>
<td>50</td>
<td>x</td>
<td>3</td>
<td>33</td>
<td>x</td>
<td>x</td>
<td>48</td>
</tr>
</tbody>
</table>

HPLC: x

V: –

UV: –

Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 440, 380, 320, 318

Substance Class: Amino-acid derivatives

Biosynthetically Related Compounds: Scabrosin acetate butanoate, Scabrosin acetate hexanoate, Scabrosin dibutanoate


Notes: SW UV: may detected if concentrated. Occurs in *Xanthoparmelia scabrosa*

**Scabrosin dibutanoate** [4,4'-Dibutrylscabrosin]

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>65</td>
<td>x</td>
<td>19</td>
<td>46</td>
<td>22</td>
<td>x</td>
<td>67</td>
</tr>
</tbody>
</table>

HPLC: x

V: –

UV: –

Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 496, 408, 320, 318

Substance Class: Amino-acid derivatives

Biosynthetically Related Compounds: Scabrosin acetate butanoate, Scabrosin acetate hexanoate, Scabrosin dibutanoate


Notes: SW UV: may detected if concentrated. Occurs in *Xanthoparmelia scabrosa*

**Scensidin**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>75</td>
<td>x</td>
<td>64</td>
<td>80</td>
<td>44</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 41
Acid Spray: No Result  LW UV: D.Purple

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 372, 370, 368, 335

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Dechloro-\(O\)-methyl diploicin, 3-\(O\)-Demethylscensidin, Diploicin, Isofulgidin


Notes: Best seen under SW UV before spraying. Minor component in *Diploicia canescens*

**Schizopeltic acid**

A: 42  B: 27  B': 22  C: 46  E: 44  F: x  G: x

HPLC: 16

V: –  UV: +

Acid Spray: Purple  LW UV: Purple

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 358, 343, 327, 311

Substance Class: Dibenzofurans

Biosynthetically Related Compounds: Pannaric acid, Pannaric acid 2-methyl ester, Pannaric acid 6-methyl ester


Notes: Acid Spray: purple, blue halo; fades to grey.  LW UV: dark purple, violet halo. Occurs in *Schizopeltia californica*

**m-Scrobiculin**

A: 64  B: 55  B': 54  C: 49  E: 39  F: x  G: x

HPLC: 29

V: +  UV: +

Acid Spray: P.Brown  LW UV: Purple

Archers: Brown
K: Yellow  C: Red  KC: D.Red  PD: No Result

Mass Spectrum: 418, 226, 195, 194

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: 4'-\(O\)-Demethylsekikaic acid, p-Scrobiculin

Notes: Visible: pale dull yellow. Acid Spray: fades to pale orange. LW UV: purple, pale green halo. Occurs in *Lobaria scrobiculata*

**p-Scrobiculin**

<table>
<thead>
<tr>
<th>Comp</th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>66</td>
<td>x</td>
<td>58</td>
<td>52</td>
<td>44</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 31

V: −

Acid Spray: P.Brown

LW UV: Purple

Archers: Brown

K: Yellow

C: Red

KC: D.Red

PD: No Result

Mass Spectrum: 418, 226, 195, 194

Substance Class: Orcinol Dipsides

Biosynthetically Related Compounds: 4'-O-Demethylsekikaic acid, m-Scrobiculin


Notes: Acid Spray: fades to pale orange. LW UV: purple, pale green halo. Occurs in *Lobaria scrobiculata*

**Sekikaic acid**

<table>
<thead>
<tr>
<th>Comp</th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
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<td>57</td>
<td>57</td>
<td>51</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 28

V: −

Acid Spray: Orange

LW UV: Green

Archers: P.Red

K: No Result

C: No Result

KC: No Result

PD: No Result

Mass Spectrum: 418, 226, 210, 208

Substance Class: Orcinol Dipsides

Biosynthetically Related Compounds: Boninic acid, 4'-O-Demethylsekikaic acid, 2,4'-Di-O-methylnorsekikaic acid, Homosekikaic acid, 4'-O-Methylsekikaic acid, 2-O-Methylsekikaic acid, Ramalinolic acid


Notes: Acid Spray: pale orange, grey halo; fades to dark orange. LW UV: strong-orange, green halo. Occurs in *Canoparmelia pustulescens*

**Semivioxanthin**

<table>
<thead>
<tr>
<th>Comp</th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>62</td>
<td>x</td>
<td>42</td>
<td>52</td>
<td>20</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 20

V: +

Acid Spray: Green

LW UV: Sky Blue

Archers: x
K: Red  C: No Result  KC: PD: No Result

Mass spectrum: 547, 546, 528, 249

Substance Class: Naphthpyrones

Biosynthetically Related Compounds: Demethylvioxanthin, Pigmentosin A, Vioxanthin


Notes: Yellow-green pigment. Occurs in *Buellia vioxanthina*

**Simonyellin**

A: 65  B: x  B': 44  C: 55  E: x  F: x  G: x

HPLC: 28

V: +  UV: +

Acid Spray: Yellow  LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass spectrum: 274, 259, 256, 231

Substance Class: Naphthpyrones

Biosynthetically Related Compounds: x


Notes: Yellow pigment. Occurs in *Simonyella variegata*

**Siphulellic acid**

A: 12  B: x  B': 24  C: 8  E: x  F: x  G: 35

HPLC: 10

V: −  UV: +

Acid Spray: Brown  LW UV: Brown

Archers: x

K: No Result  C: No Result  KC: No Result  PD: Yellow

Mass Spectrum: 342, 298, 152, 151

Substance Class: β-Orcinol DIPSIDONES

Biosynthetically Related Compounds: Psoromic acid


Notes: Occurs in *Siphulella coralloidea*

**Siphulin**

A: 14  B: 27  B': 24  C: 4  E: x  F: x  G: 35

HPLC: 22

V: −  UV: +

Acid Spray: Brown  LW UV: Brown
Skyrin

A: 37 B: 32 B': 35 C: 23 E: 4 F: x G: 66

HPLC: 31

V: + UV: +

Acid Spray: Grey LW UV: Grey

Archers: x

K: Violet C: No Result KC: PD: No Result

Mass Spectrum: 410, 398, 370, 342

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Diacetylgraciliformin, Emodin, Graciliformin, Monoacetylgraciliformin, Oxyskyrin, Rugulosin, Skyrinol


Notes: Orange-yellow pigment. Acid Spray: dull green when plate still hot, cools to grey. Occurs in *Flavoparmelia haysomii*

Skyrinol

A: x B: x B': x C: x E: x F: x G: x

HPLC: x Rf 30 [chloroform/acetone, 2:1]

V: + UV: +

Acid Spray: Grey LW UV: Grey

Archers: x

K: Violet C: No Result KC: PD: No Result

Mass Spectrum: x

Substance Class: Anthraquinones

Biosynthetically Related Compounds: Emodin, Graciliformin, Oxyskyrin, Rugulosin, Skyrin


Notes: Orange pigment in *Trypetheliopsis boninensis*
**Solorinic acid**

A: 80  B: x  B’: 78  C: 85  E: 61  F: x  G: x  
HPLC: 75  
V: +  UV: +  
Acid Spray: Orange  LW UV: Pink  
Archers: x  
K: Violet  C: No Result  KC: PD: No Result  
Mass Spectrum: 384, 366, 341, 313  
Substance Class: Anthraquinones  
Biosynthetically Related Compounds: Averythrin, 6-O-Methylaverythrin, Norsolorinic acid  
Notes: Orange-red pigment. Acid Spray: orange, fades to bright pink. LW UV: bright pink. Occurs in *Solorina crocea*.

**Sordidone**

A: 59  B: x  B’: 42  C: 42  E: 22  F: x  G: x  
HPLC: 13  
V: +  UV: +  
Acid Spray: P.Yellow  LW UV: Yellow  
Archers: x  
K: No Result  C: Orange  KC: PD: No Result  
Substance Class: Chromones  
Biosynthetically Related Compounds: Eugenitin, Eugenitol  
Notes: Pale yellow pigment. Occurs in *Lecanora rupicola*.

**Sphaerophorin**

A: 45  B: 76  B’: 74  C: 55  E: x  F: x  G: x  
HPLC: 46  
V: –  UV: +  
Acid Spray: P.Yellow  LW UV: Green  
Archers: Orange  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: -1, 252, 234, 182  
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: 4-O-Demethylsphaerophorin, Isosphaeric acid, Subsphaeric acid


Notes: Acid Spray: pale orange-yellow, grey halo. LW UV: strong-purple, green halo. Occurs in *Sphaerophorus fragilis*

**Squamarone** [2,6,8-Trihydroxy-7-ethyl-3-methylnaphtho-1,4-quinone]

A: x  B: 45  B': x  C: x  E: x  F: x  G: x  
HPLC: 16

V: +  UV: +

Acid Spray: Purple  LW UV: P.Brown

Archers: x

K: Blue-violet  C: No Result  KC:  PD: No Result

Mass spectrum: 248, 233, 220, 205

Substance Class: Naphthaquinones

Biosynthetically Related Compounds: Boryquinone


Notes: Orange-red pigment in lichenicolous fungus on *Squamarina cartilaginea*

**Squamatic acid**

A: 13  B: 25  B': 23  C: 28  E: x  F: x  G: 39  
HPLC: 22

V: −  UV: +

Acid Spray: Grey  LW UV: Green

Archers: D.Red

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: -1, 346, 226, 209

Substance Class: β-Orcinol Depsides

Biosynthetically Related Compounds: Baeomycesic acid, Barbatic acid, 4-O-Demethylbarbatic acid, Elatinic acid, 3α-Hydroxybarbatic acid, 2-O-Methylsquamatic acid


Notes: SW UV: flouresces bright blue before spraying. Occurs in *Cladonia squamosa*

**Stenosporic acid**

A: 44  B: 73  B': 72  C: 52  E: x  F: x  G: x  
HPLC: 40
Acid Spray: Orange  LW UV: Green
Archers: D.Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 224, 210, 206
Substance Class: Orcinol Dipsides
Biosynthetically Related Compounds: 4-O-Demethylstenosporic acid, Divaricatic acid, Glomelliferic acid, 2-O-Methylstenosporic acid, Oxostenosporic acid, Perlatolic acid
Notes: Acid Spray: pale yellow-orange, grey halo. LW UV: strong-purple, green halo. Occurs in Ramalina stenospora

**Stenosporonic acid**

A: 40  B: x  B’: 62  C: 46  E: x  F: x  G: x
HPLC: 35
V: −  UV: +
Acid Spray: Orange  LW UV: Pink
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 414, 396, 370, 193
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Colensoic acid, Divaronic acid, Glomelliferic acid, 2-O-Methylstenosporic acid, Oxostenosporic acid, Perlatolic acid
Notes: Acid Spray: pale orange, grey halo. LW UV: purplish pink; same as colensoic acid. Occurs in Cladonia grayi

**Stictane-3β,22-diol** [Retigeradiol]

A: 44  B: x  B’: 47  C: 43  E: 29  F: x  G: 62
HPLC: x
V: −  UV: −
Acid Spray: P.Brown  LW UV: Orange
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 444, 440, 429, 426
Substance Class: Terpenoids
Biosynthetically Related Compounds: 2α-Acetoxystictane-3β,22α-diol, 3β-Acetoxystictane-2α,22α-diol, 22α-Hydroxy-3,4-secostict-4(23)-enaldehyde, 22α-Hydroxy-3,4-secostict-4(23)-enoic acid

Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in *Pseudocyphellaria degelii*

**Stictane-2α,3β,22α-triol**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>x</td>
<td>x</td>
<td>33</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

HPLC: x  
V: –  
UV: –

Acid Spray: P.Brown  
LW UV: Orange

Archers: x  
K: No Result  
C: No Result  
KC: No Result  
PD: No Result

Mass Spectrum: x

Substance Class: Terpenoids

Biosynthetically Related Compounds: 2α-Acetoxystictane-3β,22α-diol, 3β-Acetoxystictane-2α,22α-diol, 2α,3β-Diacetoxystictane-22α-ol, 2α,3β-Diacetoxystictane-22-one, 2α,3β,22α-Triacetoxystictane


Notes: Acid Spray: fades to purple. LW UV: fades to pink. Occurs in *Pseudocyphellaria coronata*

**Stictic acid**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>32</td>
<td>9</td>
<td>9</td>
<td>18</td>
<td>x</td>
<td>x</td>
<td>34</td>
</tr>
</tbody>
</table>

HPLC: 6  
V: –  
UV: +

Acid Spray: Orange  
LW UV: Orange

Archers: No Result  
K: Yellow  
C: No Result  
KC:  
PD: Orange

Mass Spectrum: 386, 368, 193, 191

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Constictic acid, Cryptostictic acid, Hypoconstictic acid, Hypostictic acid, Menegazziaic acid, Methyl stictic acid, Norstictic acid, Peristictic acid


Notes: Occurs in *Xanthoparmelia conspersa*

**Strepsilin**

<table>
<thead>
<tr>
<th></th>
<th>A</th>
<th>B</th>
<th>B'</th>
<th>C</th>
<th>E</th>
<th>F</th>
<th>G</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>39</td>
<td>21</td>
<td>26</td>
<td>23</td>
<td>7</td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>

HPLC: 7
Acid Spray: Grey  LW UV: Purple
Archers: x
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: 270, 241, 213, 185
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Alectosarmentin, Di-O-methylstrepsilin, Norascomatic acid
Notes: Acid Spray: pale grey. LW UV: weak-pale blue; strong-purple, blue halo. Occurs in Cladonia strepsilis

Subconfluentic acid
A: 46  B: x  B': 31  C: 47  E: x  F: x  G: x
HPLC: 26
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Blue
Archers: P.Red
K: No Result  C: No Result  KC: PD: No Result
Mass spectrum: -1, 238, 235, 234
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Confluentic acid, 2’-O-Methylperlatolic acid, 2’-O-Methylhyperlatolic acid, 2’-O-Methylisohyperlatolic acid, 2’-O-Methylimbricaric acid
Notes: Occurs in Lecidella cf. cyanosarca

Subdidymic acid
A: 42  B: 21  B’: 65  C: 47  E: x  F: x  G: x
HPLC: 28
V: −  UV: +
Acid Spray: P.Blue  LW UV: Purple
Archers: x
K: No Result  C: Green  KC: PD: No Result
Mass Spectrum: 342, 324, 298, 295
Substance Class: Dibenzofurans
Biosynthetically Related Compounds: Condidymic acid, Didymic acid, Isodidymic acid
Notes: Acid Spray: pale blue. LW UV: dark purple, violet halo. Occurs in Cladonia strepsilis
**Subdivaricatic acid**

A: 38  B: x  B': 65  C: 49  E: x  F: x  G: x  
HPLC: 32
V: −  UV: +
Acid Spray: P.Yellow  LW UV: Green
Archers: P.Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: -1, 196, 182, 178, 164
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Divaricatic acid
Notes: Occurs in *Ramalina americana* s.lat.

**Sublobaric acid**

A: 30  B: x  B': 36  C: 33  E: x  F: x  G: x  
HPLC: 39
V: −  UV: +
Acid Spray: Grey  LW UV: B.Blue
Archers: x
K: No Result  C: No Result  KC: D.Red  PD: No Result
Mass spectrum: 428, 411, 410, 355
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: Lobaric acid, Oxolobaric acid, Norlobaridone
Notes: Occurs in *Lobaria hypoleucoides*

**Submerochlorophaeic acid**

A: 44  B: x  B': 47  C: 62  E: x  F: x  G: x  
HPLC: 19
V: −  UV: +
Acid Spray: Red-brown  LW UV: Brown
Archers: x
K: No Result  C: Red  KC: PD: No Result
Mass spectrum: -1, 224, 208, 207, 191
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Cryptochlorophaeic acid, Merochlorophaeic acid, 4-O-Methylcryptochlorophaeic acid, Paludosic acid
Notes: Occurs in Cladonia meroclorophaea

**Subnorstictic acid**

<table>
<thead>
<tr>
<th>A: 30</th>
<th>B: x</th>
<th>B': 16</th>
<th>C: 12</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC:</td>
<td>6</td>
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<tr>
<td>V: −</td>
<td>UV: +</td>
<td></td>
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</tr>
<tr>
<td>Acid Spray: Yellow</td>
<td>LW UV: Yellow</td>
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<tr>
<td>Archers: No Result</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>K: Red</td>
<td>C: No Result</td>
<td>KC:</td>
<td>PD: P.Orange</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Mass spectrum: 358, 354, 341, 340</td>
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<tr>
<td>Substance Class: Orcinol β-Orcinol Depsidones</td>
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<tr>
<td>Biosynthetically Related Compounds: Connorstictic acid, Norstictic acid</td>
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<td></td>
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<tr>
<td>Notes: Minor component in Diploschistes ocellatus</td>
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</tbody>
</table>

**Subnotatic acid**

<table>
<thead>
<tr>
<th>A: 25</th>
<th>B: x</th>
<th>B': 37</th>
<th>C: 36</th>
<th>E: x</th>
<th>F: x</th>
<th>G: 48</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC:</td>
<td>15</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>V: −</td>
<td>UV: +</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acid Spray: P.Yellow</td>
<td>LW UV: D.Blue</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archers: No Result</td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K: No Result</td>
<td>C: No Result</td>
<td>KC: No Result</td>
<td>PD: No Result</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mass Spectrum: 330, 315, 286, 150</td>
<td></td>
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</tr>
<tr>
<td>Substance Class: Orcinol β-Orcinol Depsidones</td>
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</tr>
<tr>
<td>Biosynthetically Related Compounds: 4-O-Demethylnotatic acid, Hypoprotocetraric acid, Isonotatic acid, 4-O-Demethylnotatic acid, Notatic acid</td>
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<tr>
<td>Notes: Occurs in Xanthoparmelia notata</td>
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</tbody>
</table>

**Subpaludosic acid**

<table>
<thead>
<tr>
<th>A: 29</th>
<th>B: x</th>
<th>B': 37</th>
<th>C: 29</th>
<th>E: x</th>
<th>F: x</th>
<th>G: x</th>
</tr>
</thead>
<tbody>
<tr>
<td>HPLC:</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V: −</td>
<td>UV: +</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acid Spray: Red-brown</td>
<td>LW UV: Brown</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Archers: x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>K: No Result</td>
<td>C: Red</td>
<td>KC:</td>
<td>PD: No Result</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Mass Spectrum: -1, 193, 177, 165, 149
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Cryptochlorophaeic acid, Paludosic acid
Notes: Occurs in Ramalina paludosa

Subpicrolichenic acid
A: 33   B: x   B': 36   C: 33   E: x   F: x   G: x
HPLC: 15
V: −   UV: +
Acid Spray: P.Yellow   LW UV: Purple
Archers: x
K: No Result   C: No Result   KC: Red   PD: No Result
Mass Spectrum: 414, 396, 370, 356
Substance Class: Depsones
Biosynthetically Related Compounds: Picrolichenic acid, Hyperpicrolichenic acid, Superpicrolichenic acid
Notes: Minor component in Pertusaria amara

Subpsoromic acid
A: 36   B: x   B': 38   C: 34   E: x   F: x   G: x
HPLC: 14
V: −   UV: +
Acid Spray: Brown   LW UV: Brown
Archers: No Result
K: No Result   C: No Result   KC: No Result   PD: P.Yellow
Mass spectrum: 344, 300, 299, 277
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: Psoromic acid
Notes: Occurs in Ocellularia praestans

Subsekikaic acid
A: 44   B: x   B': 53   C: 50   E: x   F: x   G: x
HPLC: 28
V: −   UV: +
Acid Spray: Orange   LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 254, 208, 182
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Homosekikaic acid, Sekikaic acid
Notes: Occurs in Ramalina americana s. lat.

Subsphaeric acid
A: 50  B: x  B': 67  C: 50  E: x  F: x  G: x
HPLC: 50
V: –  UV: +
Acid Spray: P. Yellow  LW UV: Green
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 224, 206, 182
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Isosphaeric acid, Sphaerophorin
Notes: Acid Spray: pale yellow, grey halo. LW UV:strong-purple, green halo. Occurs in Dimelaena thysanota.

Substictic acid
A: 13  B: x  B': 4  C: 10  E: x  F: x  G: 23
HPLC: 4
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: No Result
K: Yellow  C: No Result  KC: PD: P. Orange
Mass Spectrum: 372, 354, 344, 328
Substance Class: Orcinol β-Orcinol Depsidones
Biosynthetically Related Compounds: Stictic acid
Notes: Occurs in Aspicilia mashiginensis

Subvirensic acid
A: 22  B: 57  B': 48  C: 33  E: x  F: x  G: x
HPLC: 13
Acid Spray: P.Brown  
LW UV: Brown

Archers: No Result

K: P.Brown  C: No Result  
KC: PD: P.Orange

Mass Spectrum: 344, 326, 300, 299

Substance Class: Orcinol β-Orcinol Depsidones

Biosynthetically Related Compounds: Convirensic acid, Protocetraric acid, Virensic acid


Notes: Minor component in Flavoparmelia haysomii

**Succinprotocetraric acid**

A: 4  B: 23  B': 18  C: 10  E: x  F: x  G: 26

HPLC: 10

Acid Spray: Grey  
LW UV: Purple

Archers: No Result

K: P.Brown  C: No Result  
KC: PD: D.Red

Mass Spectrum: -1, 358, 312, 258

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Fumarprotocetraric acid, Malonprotocetraric acid, Physodalic acid, Protocetraric acid, Virensic acid


Notes: Occurs in Xanthoparmelia semiviridis

**Succinsalazinic acid**

A: 12  B: 23  B': 7  C: 10  E: x  F: x  G: x

HPLC: 8

Acid Spray: Yellow  
LW UV: Purple

Archers: x

K: Red  C: No Result  
KC: PD: D.Red

Mass Spectrum: x

Substance Class: β-Orcinol Depsidones

Biosynthetically Related Compounds: Fumarprotocetraric acid, Quaesitic acid, Salazinic acid, Succinprotocetraric acid, Protocetraric acid

Reference: New Report

Notes: Minor component in Megalaria pulverea
**Superconfluentic acid**

A: 50  B: x  B': 43  C: 60  E: x  F: x  G: x  
HPLC: 41  
V: −  UV: +  
Acid Spray: P.Yellow  
LW UV: B.Blue  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass spectrum: -1, 291, 290, 266  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Confluentic acid, Glaucophaeic acid, Hyperconfluentic acid, Insignin, Superconfluentic acid  
Notes: Occurs in *Haematomma pachycarpus, Porpidia glaucophaea*

**Superlatolic acid [Prasinic acid]**

A: 53  B: x  B': 80  C: 56  E: x  F: x  G: x  
HPLC: 59  
V: −  UV: +  
Acid Spray: P.Yellow  
LW UV: Green  
Archers: x  
K: No Result  C: No Result  KC: No Result  PD: No Result  
Mass Spectrum: -1, 266, 248, 234  
Substance Class: Orcinol Depsides  
Biosynthetically Related Compounds: Hyperlatolic acid, Isohyperlatolic acid, Methoxymicareic acid, Micareic acid, Perlatolic acid  
Notes: Acid Spray: pale yellow, grey halo. LW UV spray: strong-purple, green halo. Occurs in *Micarea subviridescens*

**Superpicrolichenic acid**

A: 54  B: x  B': 57  C: 53  E: x  F: x  G: x  
HPLC: 34  
V: −  UV: +  
Acid Spray: P.Yellow  
LW UV: Purple  
Archers: x  
K: No Result  C: No Result  KC: Red  PD: No Result  
Mass Spectrum: 498, 470, 452, 440  
Substance Class: Depsones
Biosynthetically Related Compounds: Hyperpicrolichenic acid, Isohyperpicrolichenic acid, Picrolichenic acid, Subpicrolichenic acid,
Notes: Occurs in Pertusaria truncata

Superplanaic acid
A: 53  B: x  B': 47  C: 60  E: x  F: x  G: x
HPLC: 55
V: –  UV: +
Acid Spray: P.Yellow  LW UV: Purple
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: 264, 263, 91
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Planaic acid, Isohyperplanaic acid, Hyperplanaic acid
Reference: Elix, JA/ Barclay, CE/ Lumbsch, HT 1994: New depsides from the lichen Lecanora planaica. -
Australian Journal of Chemistry 47: 1199-1203.
Notes: Occurs in Lecanora planaica

SV 1
A: 48  B: 30  B': 20  C: 21  E: 4  F: x  G: x
HPLC: 37
V: +  UV: +
Acid Spray: Grey  LW UV: Grey
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass spectrum: x
Substance Class: unknown
Biosynthetically Related Compounds: x
Notes: Visible: yellow-green pigment, before spraying. Occurs in Xanthoparmelia tasmanica

Taraxerol
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x
V: –  UV: –
Acid Spray: x  LW UV: x
Archers: x
Teloschistin [Fallacinol]
A: 44  B: x  B': 31  C: 36  E: 13  F: x  G: x
HPLC: 24
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass Spectrum: 300
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Fallacinal, Parietin, Parietinic acid
Notes: Red-orange pigment. Occurs in Teloschistes flavicans

Teloschistin acetate [Monoacetylfallacinol]
A: 68  B: x  B': 43  C: 52  E: 45  F: x  G: x
HPLC: 36
V: +  UV: +
Acid Spray: Yellow  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass Spectrum: 300
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Emodin, Fallacinal, Parietin, Parietinic acid, Teloschistin
Notes: Red-orange pigment. Minor component in Xanthoria parietina

Tenuiorin
A: 76  B: 58  B': 55  C: 76  E: 25  F: x  G: x
HPLC: 39
V: −  UV: +
Acid Spray: Yellow  LW UV: Green
Archers: D.Red
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 332, 182, 165
Substance Class: Orcinol Trisedepsides
Biosynthetically Related Compounds: 2',2"-Di-O-methylteniuorin, Gyrophoric acid, Methyl gyrophorate, Methyl lecanorate, 2"-O-Methylteniuorin, 2"-O-Methylteniuorin
Notes: Occurs in Pseudocyphellaria crocata

Testacein  [Testacea unknown]
A: 42  B: x  B': 25  C: 22  E: x  F: x  G: x
HPLC: 32
V: −  UV: +
Acid Spray: Pink  LW UV: Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: x
Substance Class: unknown
Biosynthetically Related Compounds: x
Notes: Occurs in Parmelia testacea, P. subtestacea

2,2',7,7'-Tetrachlorohypericin
A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x  TLC: Rf = 0.2 [chloroform/methanol, 9/1]
V: +  UV: +
Acid Spray: Indigo  LW UV: Blue
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: 645, 643, 641, 639
Substance Class: Phenanthraperylenequinones
Biosynthetically Related Compounds: 7,7'-Dichlorohypericin
Notes: Blue-black pigment. Occurs in Nephroma laevigatum
1,5,6,8-Tetrahydroxy-3-methylantraquinone

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: x  TLC: Rf 0.08 [pyridine/acetone, 4/1]
V: +  UV: +
Acid Spray: Orange  LW UV: Orange
Archers: x
K: Violet  C: No Result  KC: PD: No Result
Mass Spectrum: 286, 270, 258, 257
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Xanthorin, Valsarin
Notes: Red-orange pigment. Occurs in Asahinea chrysantha, Laurerea purpurina.

Thamnolic acid

A: 3  B: x  B': 25  C: 13  E: x  F: x  G: x
HPLC: 18
V: –  UV: +
Acid Spray: Brown  LW UV: Brown
Archers: P.Red
K: Yellow  C: No Result  KC: PD: Orange
Mass Spectrum: -1, 376, 226, 209
Substance Class: β-Orcinol Depsides
Biosynthetically Related Compounds: Barbatic acid, Cryptothamnolic acid, Decarboxythamnolic acid, Haemathamnolic acid, Hypothamnolic acid, Lactothamnolic acid, Squamatic acid
Notes: Occurs in Cladonia macilenta.

Thelophoric acid

A: 0  B: x  B': 0  C: 0  E: x  F: x  G: x
HPLC: 11
V: +  UV: +
Acid Spray: Purple  LW UV: Grey
Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result
Mass Spectrum: -1, 187, 165, 155, 128
Substance Class: Terphenylquinones
Biosynthetically Related Compounds: Polyporic acid


Notes: Violet pigment. Acid Spray: fades to grey. Occurs in Lobaria retigera

**Thiomelin**

A: 80  B: x  B': 82  C: 88  E: 73  F: x  G: x

HPLC: 53

V: +  UV: +

Acid Spray: Orange  LW UV: Orange

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 342, 340, 327, 325

Substance Class: Xanthones

Biosynthetically Related Compounds: 2-Dechloro-8-O-methylthiomelin, 4-Dechloro-8-O-methylthiomelin, 2-Dechlorothiomelin, 4-Dechlorothiomelin, 8-O-Methylthiomelin


Notes: Yellow pigment. Occurs in Rinodina thiomela

**Thiophaninic acid** [2,4,5,7-Tetrachloronorlichexanthone]

A: 55  B: 56  B': 52  C: 49  E: 2  F: x  G: x

HPLC: 44

V: +  UV: +

Acid Spray: P.Brown  LW UV: P.Brown

Archers: x

K: No Result  C: Orange  KC: PD: No Result

Mass Spectrum: 400, 398, 396, 394

Substance Class: Xanthones

Biosynthetically Related Compounds: Arthothelin, Asemone, Di-O-Methylthiophanic acid, Isoarthothelin, 3-O-Methylthiophanic acid, 6-O-Methylthiophanic acid, Thuringione, 2,4,7-Trichloronorlichexanthone


Notes: Yellow pigment. Acid Spray: very pale dirty yellowish brown. Occurs in Lecanora rupicola

**Thiophanic acid**

A: 63  B: 68  B': 63  C: 60  E: 2  F: 9  G: x

HPLC: 41
V: + UV: +
Acid Spray: P. Yellow LW UV: Green
Archers: Brown
K: No Result C: Orange KC: PD: No Result
Mass Spectrum: 344, 342, 340, 311
Substance Class: Xanthones
Biosynthetically Related Compounds: 2-Chlorolichexanthone, 2-Chloro-6-O-methylnorlichexanthone, 4-Chloro-6-O-methylnorlichexanthone, 2,4-Dichlorolichexanthone, Lichexanthone
Notes: Yellow pigment. LW UV: fades to deep pink. Occurs in *Pertusaria xanthoplaca*

**Thuringione**
A: 53  B: x  B': 58  C: 48  E: 15  F: 35  G: x
HPLC: 45
V: + UV: +
Acid Spray: P. Yellow LW UV: Green
Archers: Brown
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 378, 376, 374
Substance Class: Xanthones
Biosynthetically Related Compounds: Arthothelin, Thiophanic acid, 2,4,5-Trichlorolichexanthone
Notes: Yellow pigment. Occurs in *Lecidella carpathica*

**Toensbergianic acid**
A: 40  B: x  B': 48  C: 45  E: x  F: x  G: x
HPLC: x
V: – UV: –
Acid Spray: No Result LW UV: No Result
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: x
Substance Class: Aliphatic acids
Biosynthetically Related Compounds: Norjackinic acid, Jackinic acid
Notes: Occurs in *Lepraria tensbergiana*

### 2α,3β,22α-Triacetoxystictane

<table>
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<th></th>
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<th>B: x</th>
<th>B': x</th>
<th>C: 78</th>
<th>E: x</th>
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</table>

Substance Class: Terpenoids


Notes: Occurs in *Pseudocyphellaria coronata*

### 2,4,5-Trichlorolichexanthone

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<th>A: 75</th>
<th>B: x</th>
<th>B': 65</th>
<th>C: 84</th>
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<tr>
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<tr>
<td>Mass Spectrum:</td>
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</table>

Substance Class: Xanthones

Biosynthetically Related Compounds: Arthothelin, 2-Chlorolichexanthone, 2,4-Dichlorolichexanthone, 2,5-Dichlorolichexanthone, 6-O-Methylarthothelin, Thuringione


Notes: Yellow pigment. Occurs in *Pertusaria aleianta*

### 2,5,7-Trichlorolichexanthone

<table>
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<tr>
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<th>A: 87</th>
<th>B: x</th>
<th>B': 74</th>
<th>C: 85</th>
<th>E: 58</th>
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<td>+</td>
<td>UV:</td>
<td>+</td>
<td></td>
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<tr>
<td>Acid Spray:</td>
<td>Orange</td>
<td>LW UV:</td>
<td>Yellow</td>
<td></td>
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<tr>
<td>Archers:</td>
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</table>

Substance Class: Xanthones
Biosynthetically Related Compounds: 5,7-Dichlorolichexanthone, 5,7-Dichloro-3-\(O\)-methylnorlichexanthone, Isoarthothelin, 3-\(O\)-Methylthiophanic acid, 2,5,7-Trichloro-3-\(O\)-methylnorlichexanthone


Notes: Yellow pigment. Occurs in Lecanora epibryon ssp. broccha

2,5,7-Trichloro-3-\(O\)-methylnorlichexanthone
A: 64    B: x    B’: 56    C: 56    E: 6    F: 18    G: x
HPLC: 47
V: +    UV: +
Acid Spray: Orange    LW UV: Yellow
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass Spectrum: 378, 376, 374, 361
Substance Class: Xanthones
 Biosynthetically Related Compounds: 5,7-Dichlorolichexanthone, 5,7-Dichloro-3-\(O\)-methylnorlichexanthone, Isoarthothelin, 3-\(O\)-Methylthiophanic acid, 2,5,7-Trichlorolichexanthone
Notes: Pale yellow pigment. Occurs in Lecanora epibryon ssp. broccha, L. capistrata

2,4,7-Trichloronorlichexanthone
A: 51    B: x    B’: 50    C: 34    E: 4    F: 16    G: x
HPLC: 37
V: +    UV: +
Acid Spray: Orange    LW UV: Yellow
Archers: x
K: No Result    C: Orange    KC:    PD: No Result
Mass Spectrum: 364, 362, 360, 326
Substance Class: Xanthones
 Biosynthetically Related Compounds: Arthothelin, Asemone, 2,4-Dichlorolichexanthone, 2,7-Dichlorolichexanthone, 4,7-Dichloronorlichexanthone, Isoarthothelin, Thiophanic acid
Notes: Pale yellow pigment. Occurs in Lecanora sulphurata, L. flavopallescens

1,3,6-Tri-\(O\)-methylarthothelin
A: 72    B: x    B’: 55    C: 66    E: 53    F: 75    G: x
HPLC: 56
Acid Spray: Yellow

LW UV: Yellow

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 408, 406, 404, 402

Substance Class: Xanthones

Biosynthetically Related Compounds: Arthothelin, 6-O-Methylarthothelin, Thiophanic acid, 2,4,5-Trichlorolichexanthone


Notes: Pale yellow pigment. Occurs in *Dimelaena elevata*

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**2,4,5-Tri-O-methylhiascic acid**

A: 40  B: 35  B': 31  C: 38  E: x  F: x  G: x

HPLC: 28

V: −  UV: +

Acid Spray: P.Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: P.Red  PD: No Result

Mass Spectrum: -1, 376, 226, 211

Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: 2,4-Di-O-methylgyrophoric acid, 4,5-Di-O-methylhiascic acid, Gyrophoric acid, Hiascic acid, Gyrophoric acid, 4-O-Methylhiascic acid, 5-O-Methylhiascic acid


Notes: Acid Spray: strong yellow, grey halo. Occurs in *Hypotrachyna neodamaziana*

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**Umbilicaric acid**

A: 25  B: x  B': 29  C: 18  E: x  F: x  G: x

HPLC: 25

V: −  UV: −

Acid Spray: P.Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: P.Red  PD: No Result

Mass Spectrum: -1, 182, 168, 164

Substance Class: Orcinol Tridepsides

Biosynthetically Related Compounds: 2,4-Di-O-methylgyrophoric acid, Gyrophoric acid, 3-Hydroxylumbilicaric acid, Lecanoric acid, 3-Methoxy-2,4-di-O-methylgyrophoric acid, 5-O-Methylhiascic acid, 3-Methoxyumbilicaric acid, 2,4,5-Tri-O-methylhiascic acid

Notes: Acid Spray: pale yellow, grey halo; weak-pale grey. LW UV: strong-purple, green halo. Occurs in *Umbilicaria polyphylla*

**Ursolic acid**

A: 52  B: 50  B': 54  C: 49  E: 25  F: x  G: x  
HPLC: x
V: –      UV: –

Acid Spray: Purple  LW UV: Lilac

Archers: x
K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 456, 438, 249, 248

Substance Class: Terpenoids

Biosynthetically Related Compounds: x


Notes: Common accessory compound in many lichens

**Usnic acid**

A: 70  B: 70  B': 66  C: 70  E: 23  F: 40  G: 88  
HPLC: 36
V: +      UV: +

Acid Spray: Green  LW UV: Green

Archers: x
K: No Result  C: No Result  KC: Yellow  PD: No Result

Mass Spectrum: 344, 260, 233, 217

Substance Class: Usnic acid derivatives

Biosynthetically Related Compounds: Contortin, Isousnic acid, Placodiolic acid, Pseudoplacodiolic acid


Notes: Yellow pigment. Occurs in *Usnea* sp.

**Valsarin [Papulosin]**

A: x  B: x  B': x  C: x  E: x  F: x  G: x
HPLC: 44  TLC: Rf 9 [chloroform/acetone, 4/3]; Rf 40 [chloroform/methanol, 9/1]
V: +      UV: +
Acid Spray: Orange
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass Spectrum: 320
Substance Class: Anthraquinones
Biosynthetically Related Compounds: 1,5,6,8-Tetrahydroxyanthraquinone, Xanthorin
Notes: Red pigment. Occurs in Lasallia papulosa

**Variolaric acid**

A: 18 B: 13 B': 12 C: 14 E: x F: x G: x
HPLC: 3
V: – UV: +

Acid Spray: Grey
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 314, 286, 270, 269
Substance Class: Orcinol Depsidones
Biosynthetically Related Compounds: x
Notes: Occurs in Ochrolechia parella

**Verrucigeric acid**

A: 38 B: x B': 5 C: 22 E: x F: x G: 45
HPLC: 14
V: – UV: +

Acid Spray: Orange
Archers: No Result
K: No Result C: No Result KC: No Result PD: No Result
Mass spectrum: 430, 386, 385, 384
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Constictic acid, Cryptostictic acid, Lusitanic acid, Norstictic acid, Stictic acid, Methyl stictic acid
Notes: Minor component in Xanthoparmelia verrucigera
Vicanicin

A: 67    B: 75    B': 77    C: 64    E: 52    F: 85    G: x
HPLC: 37
V: −    UV: +
Acid Spray: Grey    LW UV: Purple
Archers: x
K: No Result    C: No Result    KC: No Result    PD: No Result
Mass Spectrum: 384, 382, 349, 347
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Argopsin, 7-Dechlorovicanicin, Isovicanicin, 4-O-Methylvicanicin, Norvicanicin, Pannarin
Notes: Occurs in *Teloschistes flavicans*

Vioxanthin [Pigmentosin B]

A: 42    B: x    B': 14    C: 43    E: x    F: x    G: x
HPLC: 28
V: +    UV: +
Acid Spray: Green-brown    LW UV: Yellow
Archers: x
K: Red    C: No Result    KC: PD: No Result
Mass spectrum: 547, 546, 528, 249
Substance Class: Naphthpyrone
Biosynthetically Related Compounds: Desmethylvioxanthin, Pigmentosin A
Notes: Yellow-green pigment. Minor component in *Hypotrachyna osseoalba*

Virensic acid

A: 26    B: 57    B': 56    C: 40    E: x    F: x    G: 56
HPLC: 26
V: −    UV: +
Acid Spray: Brown    LW UV: Brown
Archers: x
K: P.Brown    C: No Result    KC: PD: D.Red
Mass Spectrum: 358, 340, 312, 179
Substance Class: β-Orcinol Depsidones
Biosynthetically Related Compounds: Convirenic acid, Fumarprotocetraric acid, 2-Hydroxyvirensic acid, Hypoprotocetraric acid, Protocetraric acid, Subvirensic acid


Notes: Occurs in *Lecanora caesiorubella*

**Vittatolic acid**

A: 8  B: x  B’: 21  C: 5  E: x  F: x  G: 32

HPLC: 19

V: –  UV: +

Acid Spray: Orange  LW UV: P.Yellow

Archers: x

K: No Result  C: No Result  KC: Red  PD: No Result

Mass Spectrum: 486, 442

Substance Class: Orcinol Depsidones

Biosynthetically Related Compounds: Alectoronic acid, 2’-O-Methylphysodic acid, Oxyphysodic acid, Physodic acid


Notes: Acid Spray: pale orange, grey halo. LW UV: pale green-yellow, fades to mauve. Occurs in *Hypogymnia vittata*

**Vulpinic acid**

A: 71  B: 66  B’: 54  C: 75  E: 18  F: x  G: x

HPLC: 25

V: +  UV: +

Acid Spray: Yellow  LW UV: Green

Archers: x

K: No Result  C: No Result  KC: No Result  PD: No Result

Mass Spectrum: 322, 290, 261, 234

Substance Class: Pulvinic acid derivatives

Biosynthetically Related Compounds: Pulvinamide, Pulvinic acid, Pulvinic dilactone


Notes: Intense yellow pigment. LW UV: strong-orange, large pale green halo. Occurs in *Letharia vulpina*

**Wrightiin**

A: 70  B: x  B’: 55  C: 74  E: 42  F: x  G: x
HPLC: 29
V: – UV: +
Acid Spray: P.Green LW UV: Pink
Archers: x
K: No Result C: No Result KC: No Result PD: No Result
Mass Spectrum: 398, 396, 382, 380
Substance Class: Orcinol Depsides
Biosynthetically Related Compounds: Methyl 3,5-dichlorolecanorate, Methyl evernate, Methyl lecanorate
Notes: Occurs in Erioderma wrightii

Xantholepinone A
A: 38 B: x B': 7 C: 28 E: 2 F: x G: x
HPLC: 15
V: + UV: +
Acid Spray: Yellow-brown LW UV: Sky Blue
Archers: x
K: Orange-red C: Orange KC: No Result PD: No Result
Mass spectrum: x
Substance Class: not known
Biosynthetically Related Compounds:
Notes: Yellow pigment. Occurs in Chrysothrix sulphurella

Xanthorin [1,5,8-trihydroxy-6-methoxy-3-methylantraquinone]
A: x B: x B': x C: 60 E: 20 F: x G: x
HPLC: 60 TLC: Rf 54 [benzene/ethyl formate/formic acid, 80/20/1]; Rf 35 [benzene/acetic acid, 40/3]
V: + UV: +
Acid Spray: Red LW UV: Red
Archers: x
K: Violet C: No Result KC: PD: No Result
Mass Spectrum: 300, 282, 272, 260
Substance Class: Anthraquinones
Biosynthetically Related Compounds: Erythroglaucin, Parietin, 1,5,6,8-Tetrahydroxyantraquinone
Notes: Red pigment. Occurs in Xanthoria elegans