Chemical Studies on Lichens
8.* Schizopeltic Acid, a Novel Lichen Dibenzoefuran
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The two fruticose North American lichens Schizopeltic californica Th. Fr. and
Reinkella parishii Hase (both Roccellaceae) contain a new lichen acid, for which
the name schizopeltic acid is proposed.

The acid melts at 228–230°. Analysis
leads to the empirical formula C_{12}H_{16}O_{8}. The
UV spectrum (λmax 241, 274, 290,
301, and 314 nm) suggests a dibenzoefuran-
noid structure. The IR spectrum shows two
bands in the carbonyl region, corre-
sponding to an ester and a carbonyl group.
The NMR spectrum reveals the presence
of five methyl groups, of which two are
directly bonded to an aromatic ring, and
two aromatic protons.

Upon hydrolysis with either sodium
hydroxide or concentrated sulphuric acid,
schizopeltic acid affords di-O-methylpennaric acid (III), identified by comparison
with an authentic sample. When schizo-
peltic acid is treated with diazomethane,
dimethyl di-O-methylpennarate (IV) is
obtained, identified in the same way.

From this it follows that schizopeltic
acid must be represented by either structure
I or II.

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\begin{align*}
R_1 & \quad R_2 \\
\text{I:} & \quad \text{H} \quad \text{CH}_3 \\
\text{II:} & \quad \text{CH}_3 \quad \text{H} \\
\text{III:} & \quad \text{H} \quad \text{H} \\
\text{IV:} & \quad \text{CH}_3 \quad \text{CH}_3
\end{align*}
\]

Experimental. All melting points are un-
corrected. The IR spectra were recorded with
a Perkin-Elmer 137 (KBr discs). The UV
spectrum was recorded with a Bausch & Lomb
Spectronic 605. The microanalysis was carried
out by the Analytical Department at the
Institute of Chemistry, Uppsala.

Voucher specimens are to be found in the
herbarium of Uppsala Botanical Museum
(UFS). Schizopeltic californica from California,
U.S.A., collected in 1966, quotation number
R. Sant. 17887; Reinkella parishii, California,

Dry and grounded Schizopeltic californica
(24 g) was extracted continuously with acetone
(500 ml) for 48 h. The acetone was evaporated
and the solid residue treated with ether (200
ml). The ethereal solution was discarded and
the remaining solid treated with 5% sodium
hydrogen carbonate (3 x 100 ml). Upon
acification (2 N hydrochloric acid) of the
combined extracts, a precipitate was obtained,
which was repeatedly recrystallized from
aqueous acetone to yield schizopeltic acid
(1.15 g, 4.8%). m.p. 228–230°. (Found: C
63.5; H 5.22. C_{12}H_{16}O_{8} requires: C 63.7; H
5.06.)
UV (in ethanol): λmax 241, 274, 290, 301,
and 314 nm, ε 31 000, 15 000, 13 500, 10 000,
and 10 500, respectively. IR: νmax 1725 and 1680
cm⁻¹. NMR (in CDCl₃/δ): signals at 2.61,
2.70, 3.94, 6.83, and 7.34 ppm (internal

Treated as above, Reinkella parishii (11 g)
also afforded schizopeltic acid (0.42 g, 3.8%).

Schizopeltic acid (25 mg) was dissolved in
2 N sodium hydroxide (10 ml) and kept at
60° over night. The precipitate formed upon
dissolution with dilute hydrochloric acid was
recrystallized from ethanol to give di-O-
methylpennaric acid (13 mg), m.p. 238–43°
(decomp.), identified by comparison with an
authentic specimen (IR, mixed m.p.).

Schizopeltic acid (25 mg) was dissolved in
ice-cooled concentrated sulphuric acid (3 ml).
After 5 min the solution was poured onto ice.
The precipitate was recrystallized from ethanol
to give di-O-methylpennaric acid (15 mg),
identified as above.

Schizopeltic acid (40 mg) was dissolved in
acetone (100 ml) and treated with an excess
of ethereal diazomethane. After evaporation
of the solvent, the residue was recrystallized
from methanol to give dimethyl di-O-methyl-
pennarate, (31 mg), m.p. 166–68°, identified
as above.

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