

(+)-USNIC ACID IN FAR EASTERN LICHENS

V. N. Sviridov and L. I. Strigina

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On investigating the chemical composition of the Far Eastern lichens *Dactylina arctica* (Hook) Nyl and *Usnea annulata* (Mull. Arg.) Tomin, we isolated from them a compound (I) which, from the results of elementary analysis and its mass spectrum, corresponded to the empirical formula $C_{18}H_{16}O_7$. The IR spectrum showed the presence in (I) of an aromatic ring, a furan ring, hydroxy groups, and an enolizable 1,3-dione grouping [1]. On chromatography on a thin layer, (I) gave a green spot with 10% H_2SO_4 [2] and the coloration with the Ehrlich reagent that is characteristic for usnic acid [3]. The NMR and mass spectra of (I) were completely identical with those described for usnic acid by Shibata et al., [4] and by Huneck et al., [5].

Thus, compound (I) is (+)-usnic acid. This confirms the hypothesis put forward by Follmann et al., on the presence of usnic acid in the lichen *Dactylina arctica* which was made on the basis of a study by TLC and microchemical reactions.

The identity of the compounds isolated from the two species of lichen mentioned above was shown by a comparison of their melting points and their $[\alpha]_D$ values, the absence of a depression of the melting point of a mixture, and the identity of their IR, NMR, and mass spectra.

We have shown that usnic acid is absent from the lichen *Thamnolia vermicularis* (Sw.) Ach. ex Schaer. The *Dactylina arctica* and *Thamnolia vermicularis* were collected in the environs of the village of Stokovyi in the Ten'ki region, Magadan oblast, in August, 1974, and the *Usnea annulata* in the basin of the R. Kamenushki (Maritime Territory) in June, 1974.

The dry comminuted lichen was extracted with boiling petroleum ether (bp 70–100°C) for 3 h, and the extract was filtered. When it cooled, (+)-usnic acid crystallized out in the form of yellow needles with mp 203–204°C; $[\alpha]_D^{20} +496^\circ$ (chloroform).

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