E2-24: Insecticidal activity of usnic acid

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Due to environmental pollution and health problems associated with synthetic pesticides, the search for less toxic and environmentally friendly insect control substances is an urgent priority. Usnic acid which is known to have cytotoxic and antimicrobial properties is found in many lichens including Usnea species found in the montane regions of Sri Lanka. So far there have been no reports of the insecticidal properties of usnic acid. In the present study we report on the mosquito larvicidal and antitermite properties of usnic acid.

An *Usnea* species was collected from Horton Plains and a herbarium specimen was maintained in the Department of Chemistry, University of Peradeniya. Dried, powdered lichen sample was sequentially extracted with CH_2Cl_2 and MeOH. Solvents were evaporated using a rotavap. The CH_2Cl_2 extract (5.1 g) was subjected to medium pressure liquid chromatography with a solvent gradient of hexane to CH_2Cl_2 to CH_2Cl_2/10% MeOH to yield 2.596 g of usnic acid. The identity of the compound was established by co-TLC with an authentic sample and by ^{1}HNMR analysis.

Usnic acid showed significant mosquito larvicidal activity; 100% mortality at 1.25 ppm against the 2nd instar larvae of *Aedes aegypti*.. At 15 mg concentration usnic acid showed 100% mortality against *Glyptotermes dilatus* while at 10 mg level it showed 80% mortality.

Usnic acid is known for its cytotoxic and antimicrobial activity. To the best of our knowledge this is the first report of the insecticidal properties of usnic acid.

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