

Chemistry and Bioactivity of Physciaceae Lichens *Pyxine consocians* and *Heterodermia leucomelos*

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Abstract

Cabraleadiol monoacetate, atranorin, methyl- β -orcinol-carboxylate, zeorin, 4-*O*-methylcryptochlorophaeic acid, and lichexanthone were isolated from the lichen *Pyxine consocians* Vainio. *Heterodermia leucomelos* (L.) Poelt contained a new triterpenoid, 6 α -hydroxyhop-21 β H-22(29)-en, along with atranorin, zeorin, glyceryl trilinolate, and 3,6-dimethyl-2-hydroxy-4-methoxybenzoic acid. Cabraleadiol monoacetate, 4-*O*-methylcryptochlorophaeic acid, lichexanthone, and 3,6-dimethyl-2-hydroxy-4-methoxybenzoic acid showed mosquito larvicidal activity against the second instar larvae of *Aedes aegypti*. Lichexanthone exhibited human sperm motility enhancing activity.

Keywords: Bioactivity, *Heterodermia leucomelos*, lichen, lichen metabolites, new triterpenoid, Physciaceae, *Pyxine consocians*.

Introduction

Lichens are distributed worldwide and grow on rocks and poorly developed soils or as epiphytes on trees and shrubs. They produce large concentrations of lichen substances, which are bioactive (Huneck, 1999). In our continuing search for biologically active compounds from tropical lichens, we have investigated *Pyxine consocians* Vainio and *Heterodermia leucomelos* (L.) Poelt, which are foliose type lichens belonging to the family Physciaceae. In this paper, we report the isolation and structural elucidation of several metabolites, including a new triterpenoid 6 α -hydroxyhop-21 β H-22(29)-en (7). A number of these constituents have been evaluated for their

mosquito larvicidal and spermicidal/sperm motility enhancing activity.

Materials and Methods

General experimental procedures

Melting points (uncorrected) were determined by using a Kofler hot-stage apparatus (UK). UV absorptions were measured with a Shimadzu 1601 UV spectrophotometer (Japan). ¹H and ¹³C NMR, correlation spectroscopy (COSY), distortionless enhanced polarization transfer (DEPT), heteronuclear correlation spectroscopy (HETCOR), heteronuclear multiple quantum correlation (HMQC), and heteronuclear multiple bond correlation (HMBC) spectra were recorded on a VARIAN (¹H 300 and ¹³C 75.45 MHz) in CDCl₃ with TMS as the internal standard (USA). Low- and high-resolution electron impact mass spectra were recorded on a Kratos/AEI MS-902 spectrometer (USA). Silica gel used was Merck Kieselgel (230–400 mesh ASTM) (Germany).

Lichen collection

P. consocians was collected from the campus of the University of Peradeniya growing on the stem bark of the palm tree *Roystonea regia*, and *H. leucomelos* was collected from the mossy rocks in the Horton Plains, Central Province, Sri Lanka. Specimens were identified by Pat Wolseley of the British Natural History Museum, and voucher specimens have been deposited at the Royal Botanic Gardens, Peradeniya, Sri Lanka.

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