

**New bioactive secondary metabolites  
from selected endolichenic fungi occurring in two lichens,  
*Parmotrema* sp. and *Usnea* sp. collected from Hakgala  
Botanical Garden**



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## ABSTRACT

Although fungi are well-known producers of secondary metabolites possessing a variety of biological activities, several ecological groups of fungi remain underexplored as potential sources of new bioactive natural products. One such group is the endolichenic fungi that inhabit in the thalli of lichens. Previously reported research revealed that endolichenic fungi are excellent sources of novel bioactive secondary metabolites, yet many endolichenic fungi remain underexplored. It was documented that most of these metabolites are biologically active structurally diverse compounds. In the present study, an attempt was made to isolate bioactive secondary metabolites of three endolichenic fungi, *Penicillium citrinum* and *Daldinia eschscholzii* inhabiting in *Parmotrema* sp. and *Curvularia trifolii* inhabiting in *Usnea* sp.. The lichens used in this study were collected from Hakgala Botanical Garden in Sri Lanka. Chemical investigations of secondary metabolites of three endolichenic fungi described in this thesis led to the isolation and characterization of five novel bioactive polyketides. Many of these compounds show antioxidant, anticancer and anti-inflammatory activities.

Bioassay guided fractionation of EtOAc extract of *P. citrinum*, led to the isolation of three new polyketides, 5'-acetyl-3,5,7'-trimethoxy-3'H-spiro[cyclohexa[2,4] diene-1,1'-isobenzofuran]-3',6-dione (US/01/25/02), 4-acetyl-2'-hydroxy-3',5',6-trimethoxybiphenyl-2-carboxylic acid (US/01/18/01) and 3-(1,3-Dimethoxy-penta-1,3-dienyl)-8-methoxy-3H-1,5-dioxaphenylene-2,6-dione (US/02/31/01). The EtOAc extract of *C. trifolii*, led to the isolation of two new polyketides, 1,14-dihydroxy-6-methyl-6,7,8,9,10,10 $\alpha$ ,14,14 $\alpha$ - octahydro- H -benzo [f] [1] oxacyclododecin-4 (13H) -one (US/03/05/03) and 5-methoxy-4,8,15-trimethyl-3,7-dioxo-1,3,7,8,9,10,11,12,13,14,15,15 $\alpha$ -dodecahydrocyclododeca[de]isochromene-5-carboxylic acid, (US/03/11/01).

**Key words:** Endolichenic fungi, *Penicillium* sp., *Curvularia* sp, *Daldinia* sp., bioactivity