

RESEARCH ARTICLE

Two new bioactive polyketides from *Curvularia trifolii*, an endolichenic fungus isolated from *Usnea* sp., in Sri Lanka

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Abstract: Two new polyketides (compounds 1 and 2) were isolated from the EtOAc extract of an endolichenic fungus, *Curvularia trifolii* obtained from *Usnea* sp. in Sri Lanka. The structures of these compounds were elucidated on the basis of spectroscopic methods (UV, IR, MS, 1D NMR and 2D NMR). The bioactivity of the compounds 1 and 2 were studied using DPPH antioxidant assays and they showed radical scavenging activity with IC₅₀ values of 4.0 ± 2.6 and 1.3 ± 0.2 mg/mL, respectively. The radical scavenging activity of compound 2 was higher than that of compound 1 and it was comparable to BHT. Moreover, the new compounds 1 and 2 were evaluated for their anti-inflammatory activity, and only compound 2 exhibited a significant activity comparable to the standard anti-inflammatory drug, aspirin. Compound 1 was evaluated for the inhibition of cell proliferation in a panel of five cancer cell lines NCI-H460, MCF-7, SF-268, PC-3M and MIA Pa Ca-2, and exhibited > 90 % inhibitory activity at 5 µg/mL with all of the above cell lines.

Keywords: Anticancer activity, anti-inflammatory activity, antioxidant activity, *Curvularia* sp., endolichenic fungus.

INTRODUCTION

Endolichenic fungi are considered as a new source of bioactive fungal metabolites (Paranagama *et al.*, 2007). Only a few investigations have been reported on the isolation and characterisation of secondary metabolites of endolichenic fungi, but they have shown great potential to be a new source for structurally diverse and biologically active natural products (Paranagama *et al.*, 2007; Ding *et al.*, 2009; Zhang *et al.*, 2009; Wang *et al.*, 2010). The endolichenic fungi available in Sri Lanka are still an untapped source of bioactive natural products since their

identity and the chemistry of their secondary metabolites have not been explored thoroughly. The first report on isolation and identification of endolichenic fungi from the lichens in Sri Lanka was published by a research team from the University of Kelaniya (Kannangara *et al.*, 2009). New bioactive compounds from endolichenic fungi from Sri Lanka have been isolated and identified (Kannangara *et al.*, 2009; Kulasekera *et al.*, 2013; Pary *et al.*, 2013; Samanthi *et al.*, 2013a; 2013b; 2014; 2015). In the ongoing study on isolation of bioactive secondary metabolites from endolichenic fungi, the fungal strain US/US/06 was found inhabiting the lichen, *Usnea* sp. collected from the Hakgala Botanical Garden, Central province, Sri Lanka in December 2010. This study was aimed at determining the bioactive compounds present in the ethyl acetate (EtOAc) extract of US/US/06 cultured on potato dextrose agar (PDA) and their potential for the production of bioactive secondary metabolites. This led to the isolation of two new polyketides (compounds 1 and 2). The details of isolation, structure elucidation, and bioactivity screening of compounds 1 and 2 are described here.

METHODS AND MATERIALS

Isolation of the fungal strain

Usnea sp. was collected from the Hakgala Botanical Garden in Sri Lanka. Sterilised polythene bags were used to store the lichen samples for transport to the laboratory of the Department of Chemistry, University of Kelaniya. Surface sterilisation method was used to isolate the fungi from the lichen (Kannangara *et al.*,

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