Acremonoside, a phenolic glucoside from the sea fan-derived fungus *Acremonium polychromum* PSU-F125

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ABSTRACT

A new phenolic glucoside, acremonoside (1), along with two known compounds, F-11334 A2 and 2,2-dimethyl-2H-chromen-6-ol, were isolated from the sea fan-derived fungus *Acremonium polychromum* PSU-F125. The structure of 1 was elucidated by spectroscopic techniques, acid hydrolysis and X-ray crystallographic analysis. The isolated compounds were tested for antibacterial, antimalarial, antimycobacterial and cytotoxic activities.

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1. Introduction

Marine-derived fungi are well recognized as a source of structurally unique and bioactive natural products (Hill, 2013). Bioactive secondary metabolites from marine-derived fungi of the genus *Acremonium* have been isolated such as the anti-inflammatory oxepaminide A (Belofsky et al., 2000), the cytotoxic eFrapeptin Ex (Boot et al., 2007), and the antibacterial and antioxidant acrenostricin (Juliandi et al., 2011). As part of our research program on bioactive compounds from marine-derived fungi isolated from a sea fan of the genus Annella, we describe herein the isolation of a new phenolic glucoside (1) (Fig. 1) from the mycelial extract of *Acremonium polychromum* PSU-F125 together with two known compounds, F-11334 A2 (Tanaka et al., 1999) and 2,2-dimethyl-2H-chromen-6-ol (Brown et al., 1990), from the broth extract. To the best of our knowledge, this is the first report on the chemical investigation of *A. polychromum*. The isolated compounds were evaluated for antibacterial, antimalarial, antimycobacterial and cytotoxic activities.

2. Results and discussion

Acremonoside (1) was obtained as colorless crystals and had the molecular formula C_{17}H_{26}O_{9} from HRESIMS. The UV spectrum showed absorption bands at 217 and 287 nm, indicating the presence of a benzene chromophore (Zhang et al., 1998). Its IR absorption band for a hydroxyl group was observed at 3241 cm⁻¹. The 1H NMR spectrum (Table 1) showed three aromatic protons of a 1,2,4-trisubstituted benzene [δ_{H} 7.06 (d, J = 8.7 Hz, 1H), 6.70 (d, J = 3.0 Hz, 1H) and 6.58 (dd, J = 8.7 and 3.0 Hz, 1H)], one oxymethine proton [δ_{H} 3.54, dd, J = 9.9 and 1.5 Hz, 1H], two nonequivalent methylene protons [δ_{H} 3.22 (dd, J = 13.5 and 1.5 Hz, 1H) and 2.37 (dd, J = 13.5 and 9.9 Hz, 1H)], two methyl groups [δ_{H} 1.24 and 1.22, each s, 3H] along with characteristic signals of a sugar moiety: one anomic (δ_{H} 4.71, d, J = 7.5 Hz, 1H), three resonances for four oxymethylene [δ_{H} 3.45, 3.41 and 3.37 (×2), each m] and two nonequivalent oxymethylene [δ_{H} 3.89 (br d, J = 12.0 Hz, 1H) and 3.70 (dd, J = 12.0 and 5.1 Hz, 1H)] protons. The appearance of the anomic proton as a *doublet* with an axial–axial coupling constant of 7.5 Hz indicated that the sugar unit must be a β-anomer. The 13C NMR spectrum (Table 1) consisted of four quaternary [δ_{C} 152.1, 149.2, 131.5 and 72.8], three aromatic methine (117.3, 117.0 and 113.1), six oxymethine (δ_{C} 103.0, 78.5, 58.1, 55.4, 54.4 and 53.3), 17 aromatic carbon.