

Antiplasmodial Compounds from Indonesian Marine Sponge, *Xestospongia* sp, against *Plasmodium falciparum* 3D7

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ABSTRACT

A part of our continuing search for antiplasmodial compounds from Indonesian marine sponge, two steroidal alkaloids, epoxysarcovagenine-D (1) and epoxyepapakistamine-A (2), have been isolated from the ethyl acetate extract of the Indonesian marine sponge, Xestospongia sp. Their structures were identified on the basis of spectroscopic data analysis and by comparison with published spectroscopic and physicochemical properties data. Compounds 1 and 2 were isolated first time from marine sponge, Xestospongia sp., and showed strongest plasmodial activity against Plasmodium falciparum 3D7 strain with IC₅₀ values of 0.013 and 0.158 μM, respectively.

Keywords: Steroidal alkaloid, *Xestospongia* sp, Petrosiidae, Antiplasmodial activity

INTRODUCTION

The genus *Xestospongia* is the marine sponge belong to Petrosiidae family, comprises approximately 40 species that are mainly distributed in north-western Australia, Papua New Guinea, Solomon Island, Thailand and Indo-Malaysia Peninsula (Fromont, 1991; Calcul, 2003; Laurent et al., 2006; Aguinaga et al., 2010). *Xestospongia* is known to settle and grow on a variety of substrates, such as sand, rock beds, dead coral rubble and coral heads (Kerr and Borges, 1994; Williams et al., 1998; Krisanapuntu et al., 2001; Bell and Smith, 2004; Armstrong et al., 2006). Chemical investigations on the species of this genus have led to the isolation of a large array of structurally diverse secondary metabolites with significant biological activities including antimalarial alkaloids (Girard et al., 2004; Darumas et al., 2007; Ashok et al., 2014), antifungal alkaloids (Moon et al., 2012), cytotoxic and inhibition of the aspartic protease of the quinones and hydroquinones (Aguinaga et al., 2010; Dai et al., 2010), antimalarial quinones (Laurent et al., 2006), antiplasmodial benzaldehyde (Murtihapsari et al., 2019) and antiplasmodial sterol (Renga et al., 2012).

During the course of our continuing search for antiplasmodial compounds from Indonesian marine sponge, the methanolic extract of *Xestospongia* sp exhibited a significant antiplasmodial activity against *Plasmodium falciparum* 3D7 strain. *Xestospongia* sp is distributed in the eastern part of Indonesia, and previous investigation have led to the isolation of several steroid with antiplasmodial activity (Muptihapsari et al., 2019). Owing to our interest in antiplasmodial compounds from this species, we investigated the ethyl acetate extract of the *Xestospongia* sp and obtained two antiplasmodial steroidal alkaloid. Here, we describe the structural identification of the isolates and their antiplasmodial activity.

MATERIALS AND METHODS

General

Melting points were obtained on an electrothermal melting point apparatus. Optical rotations were measured on an ATAGO AP-300 automatic polarimeter. IR spectra were obtained with a Perkin Elmer spectrum-100 spectrophotometer using KBr pellets. Mass spectra were recorded on Water Qtof HR-MS XEVtm mass spectrometers. 1D and 2D-NMR spectra were run on a JEOL ECZ A-600 spectrometer with tetramethyl silane as an internal standard. Chemical shifts (δ) were expressed in ppm with reference to the solvent signals. Column chromatography was performed on silica gel (70-230 and 200-400 mesh, Merck,