

## Triterpene saponins from *Billia rosea*

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### ABSTRACT

Five previously undescribed triterpene saponins, billiosides A–E, and a known analogue, were isolated from the seeds of *Billia rosea* (Planch. & Linden) C. Ulloa & P. Jørg. Their structures were elucidated on the basis of extensive 1D and 2D NMR experiments (<sup>1</sup>H, <sup>13</sup>C, DEPT, COSY, TOCSY, NOESY, ROESY, HSQC, and HMBC) and mass spectrometry as (3β,21β,22α)-3-[(2-O-β-D-glucopyranosyl-O-[α-L-arabinopyranosyl-(1 → 4)]-β-D-glucopyranosyl)oxy]-21-[[[(2E,6S)-2,6-dimethyl-6-hydroxyocta-2,7-dienoyl]oxy]-22-(acetyloxy)-24-hydroxyolean-12-en-28-oic acid, (3β,21β,22α)-3-[(2-O-β-D-galactopyranosyl-β-D-glucopyranosyl)oxy]-21,22-dihydroxyolean-12-en-28-yl O-α-L-arabinopyranosyl-(1 → 4)-β-D-glucopyranoside, (3β,21β,22α)-3-[(2-O-β-D-galactopyranosyl-O-[α-L-arabinopyranosyl-(1 → 4)]-β-D-xylopyranosyl)oxy]-21,22-dihydroxyolean-12-en-28-yl O-β-D-glucopyranoside, (3β,21β,22α)-3-[(2-O-β-D-galactopyranosyl-O-[α-L-arabinopyranosyl-(1 → 4)]-β-D-glucopyranosyl)oxy]-21,22-dihydroxyolean-12-en-28-yl O-β-D-glucopyranoside, (3β,21β,22α)-3-[(2-O-β-D-galactopyranosyl-O-α-L-arabinopyranosyl-(1 → 4)]-β-D-glucopyranosyl)oxy]-21,22-dihydroxyolean-12-en-28-yl O-β-D-glucopyranosyl-(1 → 6)-β-D-glucopyranoside, and dipteroside A. Billiosides B and C exhibited moderate effects when tested as hepatic glucose-6-phosphatase inhibitors and as glucose intestinal absorption inhibitors, using *in situ* rat intestinal segments.

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## 1. Introduction

*Billia* is a genus of two species, *Billia hippocastanum* Peyr. and *Billia rosea* (Planch. & Linden) C. Ulloa & P. Jørg. (Sapindaceae) distributed in Central America and South America, respectively (Harris et al., 2016; Forest et al., 2001; Moreno, 1985). *Billia rosea* seeds have been used in infusions for their analgesic and antidiabetic properties (Giraldo et al., 2009). This plant together with the genera *Aesculus* and *Handeliendron* belongs to the clade Hippocastaneae, in the Sapindaceae family (Harris et al., 2016). The genus *Handeliendron* is represented by one species, *Handeliendron*

*bodineri*, localized in southwest China (Harris et al., 2016; Cao et al., 2008). The genus *Aesculus* is represented by 12 species distributed throughout the northern hemisphere (East Asia, North America and Europe) (Harris et al., 2016). Numerous phytochemical studies on *Aesculus* reported the isolation of oleanane-type saponins (Lanzotti et al., 2012; Yuan et al., 2012, 2013, 2015). However, there are no previous phytochemical studies on *Billia rosea* and *Handeliendron*. This paper describes the isolation and structure elucidation of five previously undescribed triterpene saponins named billiosides A–E (1–5; Fig. 1) together with a known analogue from the MeOH extract of the seeds of *B. rosea*. Hepatic glucose-6-phosphatase inhibition and *in situ* rat intestinal absorption inhibition of glucose of the compounds **2** and **3** were also evaluated.

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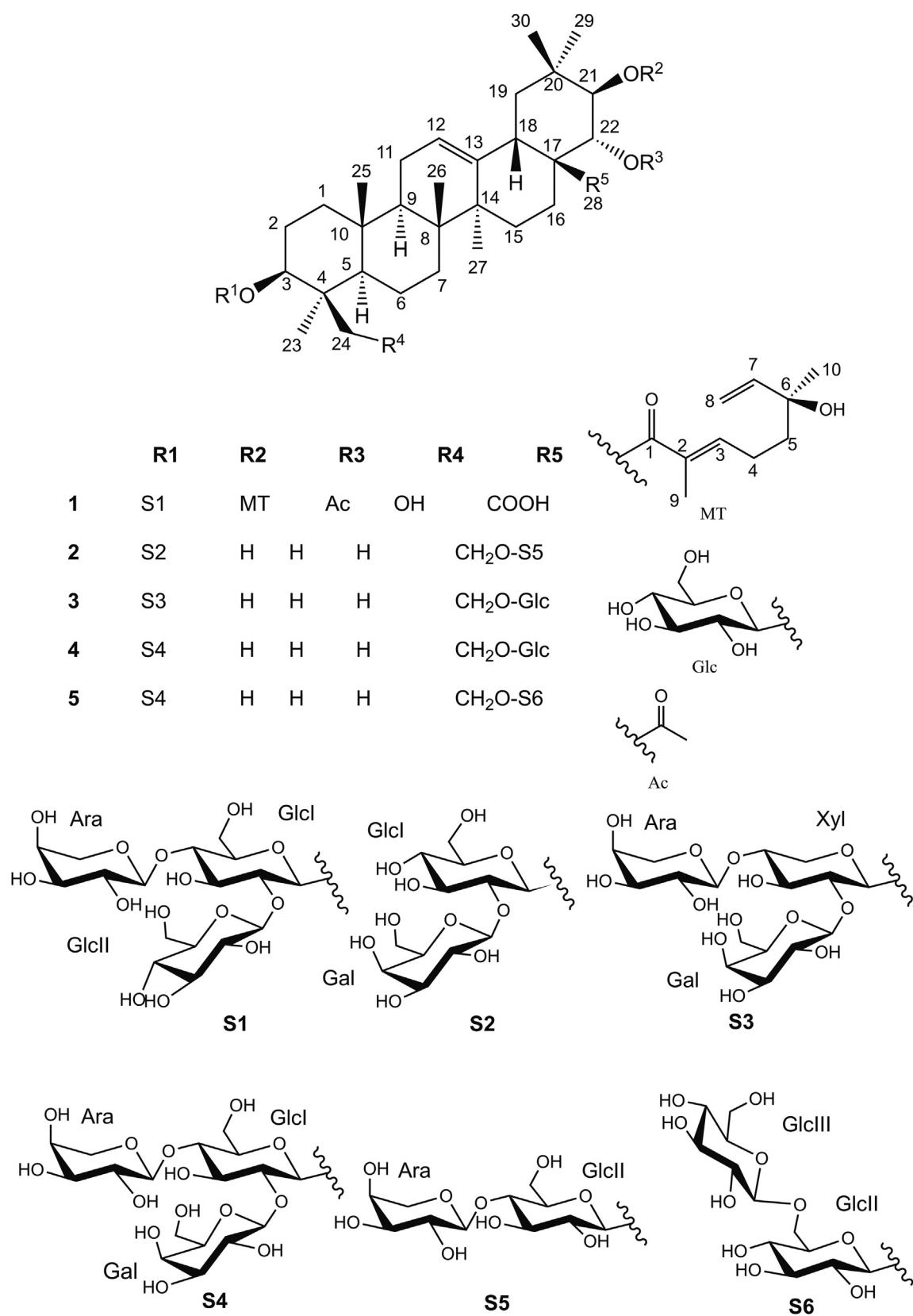


Fig. 1. Structure of compounds 1–5.

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