



Oligostilbenoids from *Hopea Mengarawan* (Dipterocarpaceae)

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H. mengarawan; Dipterocarpaceae; Oligostilbenoids; Chemotaxonomy

1. Introduction

In the course of our continuing phytochemical study of the Dipterocarpaceae family occurring in Indonesia (Sri Atun et al., 2002; Syah et al., 2003), we have examined the phenolic constituents of *Hopea mengarawan*, a relatively large genus belonging to the family Dipterocarpaceae and is distributed mainly in Southeast Asia (Sri Atun, 1974). This family has proven to be a rich source of oligostilbene compounds derived from the stilbenoid skeleton (4, 3', 5'-trihydroxystilbene) (Sotheeswaran and Pasupathy, 1993; Hakim, 2002; Ito et al., 2000). The present study was conducted in December 2003 from the Experimental Garden of Carita, Banten, Indonesia. The study was supported by the Staff at the Herbarium Bogoriense, Bogor, Indonesia and a voucher specimen was deposited in the Bogoriense Herbarium.

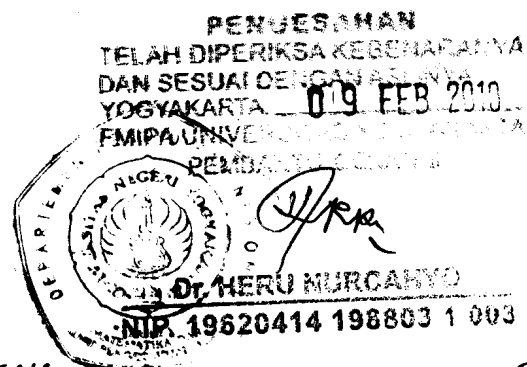
2. Materials and Methods

The phytochemical study on *H. mengarawan* has been carried out previously by Bate-Smith and Whitmore (1959) in an analysis of the phenolic constituents from fresh leaves of dipterocarps.

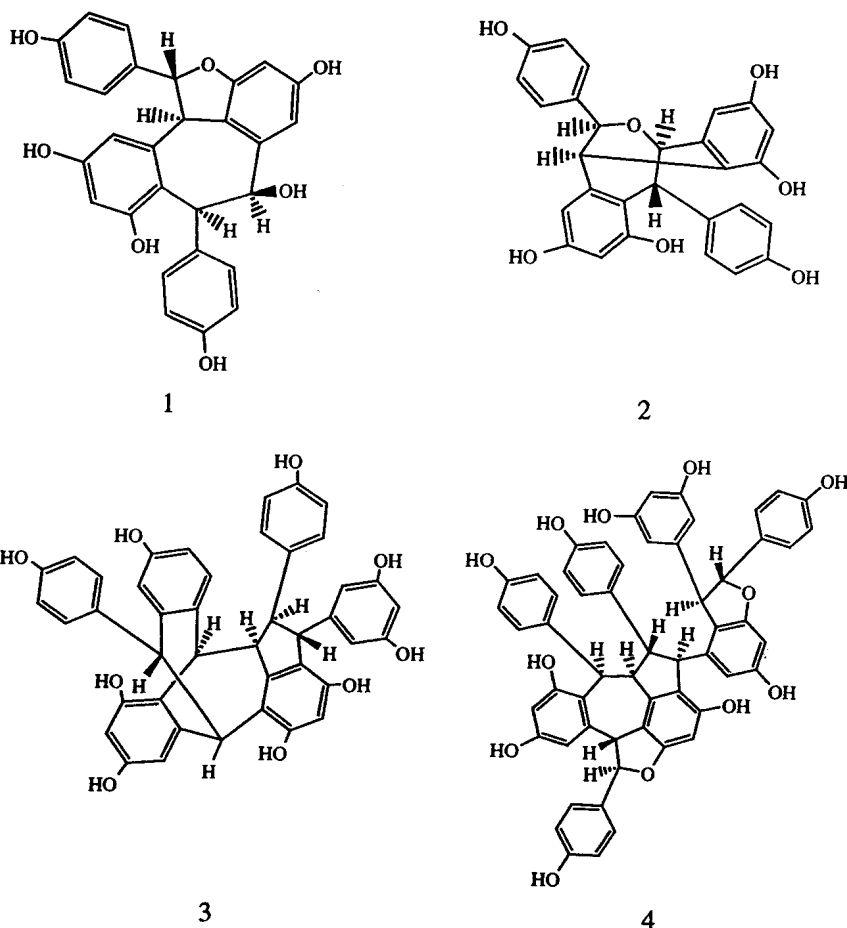
The stem bark of *H. mengarawan* (5 kg) was extracted exhaustively with acetone. The acetone extract was concentrated under reduced pressure to give a brown residue (400 g). A portion (40 g) of the total acetone extract was separated by vacuum liquid chromatography (VLC) and purified by repeated column chromatography using various solvent systems. From this method we obtained four oligostilbenes, namely:

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balanocarpol (1) (300 mg), heimiol A (2) (200 mg), vaticanol G (3) (70 mg), and vaticanol B (4) (200 mg). The structures of these compounds (1–4) were established on the basis of their spectral data, including UV, IR, and NMR spectra in comparison with the previously reported data and by direct comparison with the authentic samples.



4. Chemotaxonomic significance

Four oligostilbenes (1–4) were isolated from the stem bark of *H. mengarawan*. Balanocarpol (1) is commonly found in some species of Dipterocarpaceae from genera *Hopea*, *Shorea*, *Balanocarpus*, and *Neobalanocarpus*, such as *Hopea malibato* (Dai et al., 1998), *Hopea jucunda*, *Balanocarpus zeylanicus* (Diyasena et al., 1985), *Neobalanocarpus heimii* (Weber et al., 2001), and *Shorea balangeran* (Tukiran et al., 2005), but has not yet been found in genus *Vatica*. This is the first report of the presence of heimiol A (2) and vaticanol G (3) in species of *Hopea*. Compound 2, a dimer with a fused benzopyran–benzooxepane structure, has been reported previously in *Neobalanocarpus heimeii* (Weber et al., 2001). Vaticanol G (3) is a trimeric stilbene characterized by the presence of a bridged tricyclic skeleton, a rare structure which can be found in natural products, has been reported previously in *Vatica rassak* (Ito et al., 2001). Vaticanol B (4) has been previously reported in several species from genus *Hopea* and *Vatica*, but has not yet been found in genus *Shorea*, such as *V. rassak* (Tanaka et al., 2000a,b,c), *Vatica umbonata* (Sri Atun et al., 2004). The compounds (1–4) in *H. mengarawan* have a significant role in the chemotaxonomy of plants in the Dipterocarpaceae. Some previous researches (Sotheeswaran and Pasupathy, 1993; Tanaka et al., 2000a,b,c; Ito et al., 2000, 2001, 2003; Hakim, 2002; Zgoda-Pols et al., 2002; Hirano et al., 2003; Sri Atun et al., 2004; Tukiran et al., 2005) reported several oligostilbenoids in many species of *Hopea*, *Shorea*, and *Vatica*. The greatest variety of oligostilbenoids is found in *Shorea*, on the other hand the most complex oligostilbenoids in terms of the number of resveratrol units are found in *Vatica*.

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Appendix A. Supplementary data

Supplementary data associated with this article can be found, in the online version, at doi:10.1016/j.bse.2006.02.008.

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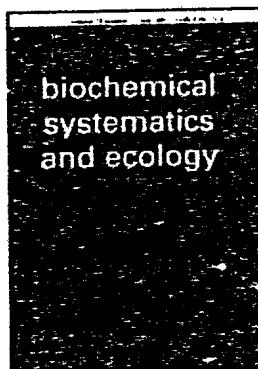
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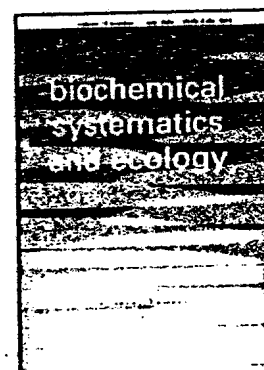
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
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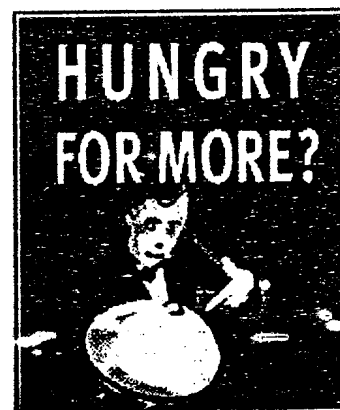
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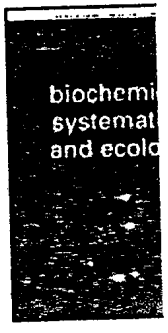
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