

PHYTOCHEMICAL STUDY SOME PHENOLIC COMPOUNDS FROM *ANISOPTERA MARGINATA*

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Abstract

Anisoptera is the minor genus of Dipterocarpaceae, consisting of approximately 5 species and distributed in Indonesia especially in Kalimantan and Sumatera. Isolation and structure elucidation of some compounds from stem bark of *Anisoptera marginata* had been done. The isolation of those compounds was carried out by chromatographic method and structure elucidation was performed by interpretation of spectroscopic data, including UV, IR, ^1H and ^{13}C NMR 1D and 2D, and FABMS. From acetone extract stem bark *A. marginata* we isolated five known compounds named bergenin (1), (-)- ϵ -viniferin (2), (-)-ampelopsin A (3), vaticanol B (4), (-)-hopeaphenol (5), and a glycoside compound named hopeaphenol-O- glycoside (6).

Keyword: Resveratrol; Hopeaphenol-O-glycoside; *Anisoptera marginata*

Introduction

Dipterocarpaceae is one of the largest families found in the tropical forest Indonesia. The plants are distributed from the west of Indonesia until Papua (Irian Jaya) and mostly in Kalimantan, therefore the timber of these plants are usually called “meranti” or “Kayu Kalimantan”. Dipterocarpaceae consists of about 16 genus and 600 species and until now only few species have been investigated. Some chemical constituents that can be found from this plant include arilpropanoid, benzofuran, flavanoid, polyphenol, resveratrol oligomers and terpenoid. The resveratrol oligomer from Dipterocarpaceae plants have various structure from simple structure as it monomer, dimer, trimer, until hexamer. These structures are very interesting and showed interesting biological activities, such as antibacterial, anticancer, antihepatotoxic, and anti-HIV (Sothesswaran, 1993; Dai 1998; Sri Atun, 2004; 2005; 2006). Thus Dipterocarpaceae plants are very potential for chemical research in natural product and pharmaceutical industry.

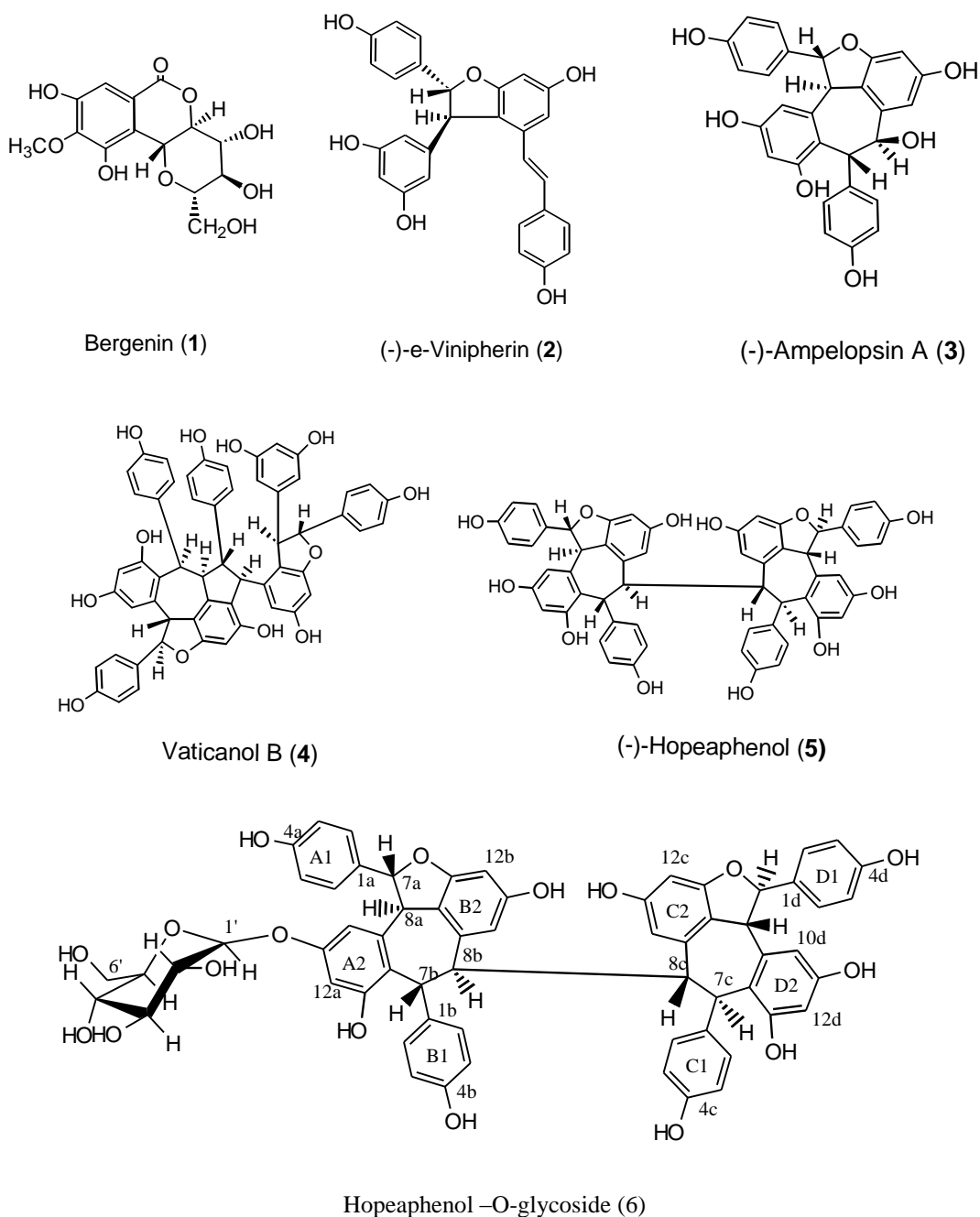
Anisoptera is the minor genus of Dipterocarpaceae, consists of approximately 5 species and distributed in Indonesia only in Kalimantan and Sumatera (Conquius, 1991; Heyne, 1987) and until now only one species have been investigated, named *Anisoptera marginata* (Sri Atun, 2009). This family of plant is known to produce a variety of resveratrol oligomer. These structures are very interesting and showed interesting biological activities, such as

antibacterial, anticancer, antihepatotoxic, and anti-HIV (Dai, 1998; Ito, 2000^{a,b}; Sri Atun, 2005; 2006^{a,b}). Therefore, the following discussion will focus on the structure diversity of phenolic compounds that have been found, and biogenetic relationship, of the compound from *Anisoptera marginata*.

Results and Discussion

1. The diversity phenolic compounds from *Anisoptera marginata* genus

Up to now, only one species plant of the *Anisoptera* genus, named *Anisoptera marginata* that have been investigated for chemical structures of this plant. Five phenolic compounds have been found from relative non polar fraction acetone extract stem bark of *A. marginata* (Sri Atun (2004) consist of bergenin (1), (-)- ϵ -viniferin (2), (-)-ampelopsin A (3), vaticanol B (4), and (-)-hopeaphenol (5). Whereas from polar fraction, has been found hopeaphenol-O-glycoside (5) (Sri Atun, 2009). The isolation of those compounds was carried out by chromatographic method, and the structure elucidation was performed by interpretation of spectroscopic data, including UV, IR, ^1H and ^{13}C NMR 1D and 2D, and FABMS. Hopeaphenol-O- glycoside (5) is a new compound. It is the first time that can be found in Dipterocarpaceae family, and the other of these plant.



2. Biogenetic relationship of oligoresveratrol structure from *Anisoptera marginata*

Many oligoresveratrol with various types of the molecular skeleton have been isolated mainly from some species of Dipterocarpaceae. The biogenetic relationship of all compounds isolated from some species of Dipterocarpaceae may be suggested to follow one primary biogenetic pathway. Generally, the structures of the resveratrol

oligomer isolated contain a heterocyclic ring named *trans*-2-aryl-2,3-dihydrobenzofuran, originated from oxidative coupling between two unit of resveratrol to produce (-)-ε-viniferin (2) as an immediate precursor. Further couplings of (-)-ε-viniferin (2) produce other resveratrol oligomers. The biogenetic relationship between these oligoresveratrol isolated in this study is shown in Figure 1.

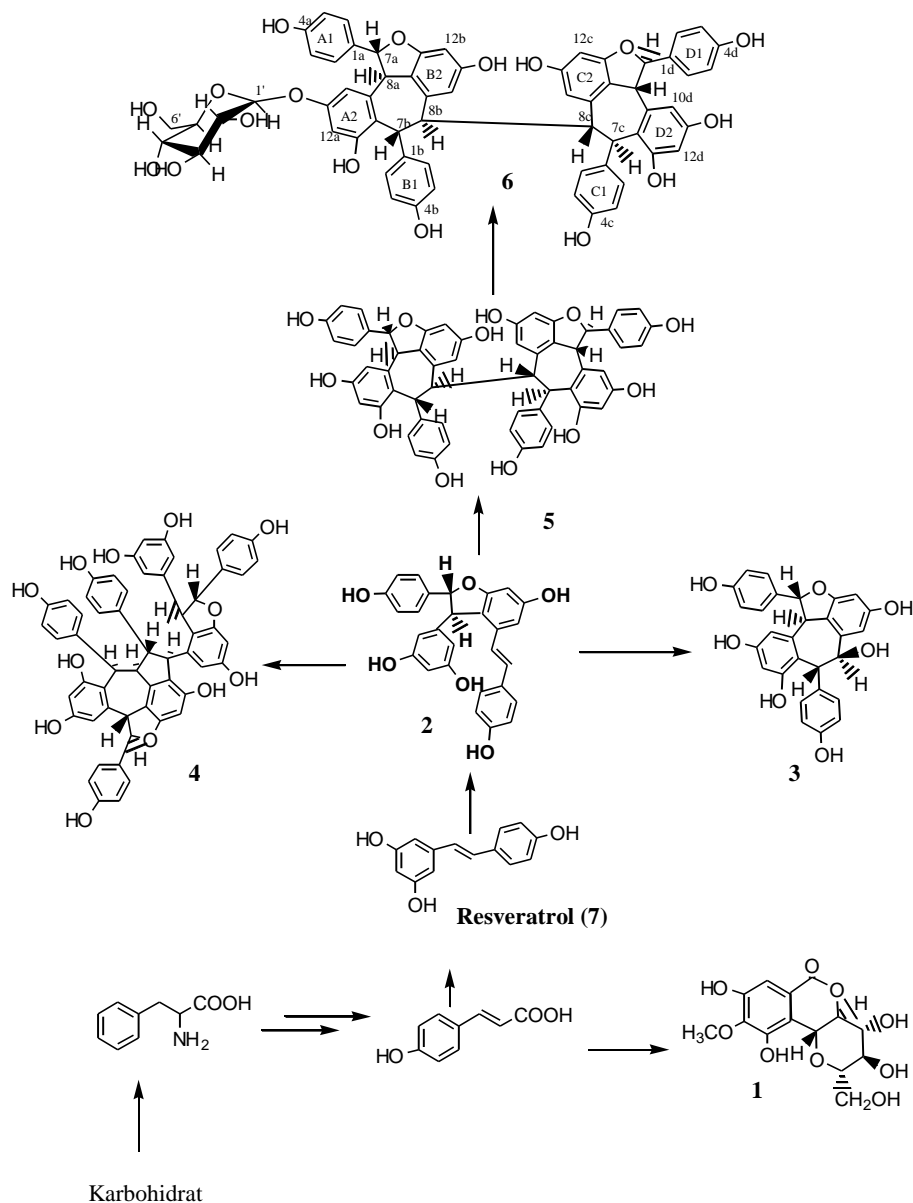


Fig. 1. Biogenetic relationship of phenolic compounds from *A. marginata*

3. Biological activity of oligoresveratrol compounds from Dipterocarpaceae family

Oligoresveratrol is a compound found in the Dipterocarpaceae family, which has some useful bioactivities. Resveratrol (1) is the first compound that was found. For the first time, it was

isolated as phytoalexins, an antimicrobial compound produced by a plants in response to infection or certain other types of physiological stimuli from *Vitis vinifera* leaves in the year 1977 (Langcake, 1977). Researchers have shown that resveratrol (1) has a chemopreventive activity against cancer cells (Jang, 1997). Various

biological activities of oligoresveratrol compounds have been also reported, for example, ϵ -viniferin (2), showed activity against antimicrobial some type of microorganism (Sothesswaran, 1993). A number of other oligoresveratrol showed activity against sitotoxic as cancer cell lines, such as (-)-ampelopsin A (3), hopeaphenol (5), are cytotoxic against KB cells carcinoma epidermoid (Tanaka, 2000; Ito, 2001a; Ito, 2001b; Seo, 1999), (Dai, 1998). Vaticaanol B (4) is cytotoxic against as Hela S3 and Raji cell lines (Sri Atun, 2008)

Conclusion

Molecular structure phenolic compounds which have been found in the *A. marginata* included gallat acid derivative, and oligomer resveratrol included dimer, trimer and tetramer with resveratrol. The structures of the oligoresveratrol isolated contain a heterocyclic ring named *trans*-2-aryl-2,3-dihydrobezofuran, originated from oxidative coupling between two unit of resveratrol to produce (-)- ϵ -viniferin (2) and other compounds. These structures are very interesting and many compounds showed interesting biological activities, such as antibacterial, anticancer, antihepatotoxic, and anti-HIV

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