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REVIEW ON PHARMACOLOGICAL ACTIVITIES OF *MICHELIA ALBA*

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ABSTRACT

This review describes the morphological, phytochemical and pharmacological properties of *Michelia alba* (Magnoliaceae). The genus *Michelia* (Magnoliaceae) consists of approximately 30 species. *Michelia alba* D.C. is a tall tree native to Indonesia and has been used by the native Malays in Indonesia and Malaysia for medicinal purposes. The tree producing these flowers ranges from 10 to 15 meters in height and can grow up to 20 meters if cultivated in a high-moisture area. Cracks in the stem bark are in a reticulated pattern along the trunk. *Michelia alba* is an annual flowering plant; generally the flowers begin to bloom in the evening, with their scent becoming widespread; the scent begins to fade in the afternoon. Gardeners usually collect the flowers twice a day: at night and at dawn. This plant was used for the treatment of fever, syphilis, gonorrhoea and malaria, and was regarded traditionally as an abortive agent. The present paper enumerates an overview of phytochemical composition and pharmacological aspects that is useful to researchers for further exploration for necessary development of this potential herb.

Key Words: - *Michelia alba*, Magnoliaceae, Phytochemical, Pharmacological Properties.

INTRODUCTION

The genus *Michelia* (Magnoliaceae) consists of about 30 species. One of these species is native to Taiwan. *Michelia* species are traditionally used by indigenous people for the treatment of cancer (Wang *et al.*, 2010b). For example, *Michelia champaca* has been utilized in India for the treatment of abdominal tumours, and *Michelia hypoleuca* and *M. officinalis* for carcinomatous sores and leukaemia, respectively, in China (Wang *et al.*, 2010b). *Michelia alba* is a tall tree native to Indonesia and has been used by the native Malays in Malaysia and Indonesia for medicinal purposes. The bark is used for the treatment of fever, syphilis, gonorrhoea and malaria, and

the white fragrant flower is used traditionally as an abortive agent (Chen *et al.*, 2008; Wang *et al.*, 2010b). We have found four aporphines, two oxoaporphines, three sesquiterpene lactones, one amide, one lignan, three benzenoids, two steroids, three aliphatic compounds and two chlorophylls from the leaves of *Michelia alba* (Wang *et al.*, 2010b). Previously, this plant had been isolated 43 compounds, including nine aporphines (1-9), three oxoaporphines (10-12), one amide (13), one alkaloid (14), two lignans (15 and 16), one monoterpene (17), nine sesquiterpenes (18-26), eight benzenoids (27-34), one triterpene (35), two steroids, three aliphatic compounds, and three chlorophylls (Asaruddin, *et al.*, 2003; Chen *et al.*, 2008a; Lo *et al.*, 2010; Wang *et al.*, 2010b; Yang, 1962). As part of our continuing investigation into the phytochemical and bioactive compounds of

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Magnoliaceous plants, a new chlorophyll, michephyll A, together with 9 known compounds, (-)-*N*-formylanonaine (3), (-)-oliveroline (6), (-)-normuciferine (9), lysicamine (12), (+)-*epi*-yangambin (16), (+)-cyperone (18), ficaprenol-10 (35), pheophytin a and aristophyll C were obtained via chromatographic fractionation of the methanolic extract of the leaves of this plant (Wang *et al.*, 2010b). The objective of this article is to collect information on *Michelia alba*, which may help the investigator to realize for the efficacy and potency of this herb.

PHARMACOLOGICAL ACTIVITIES

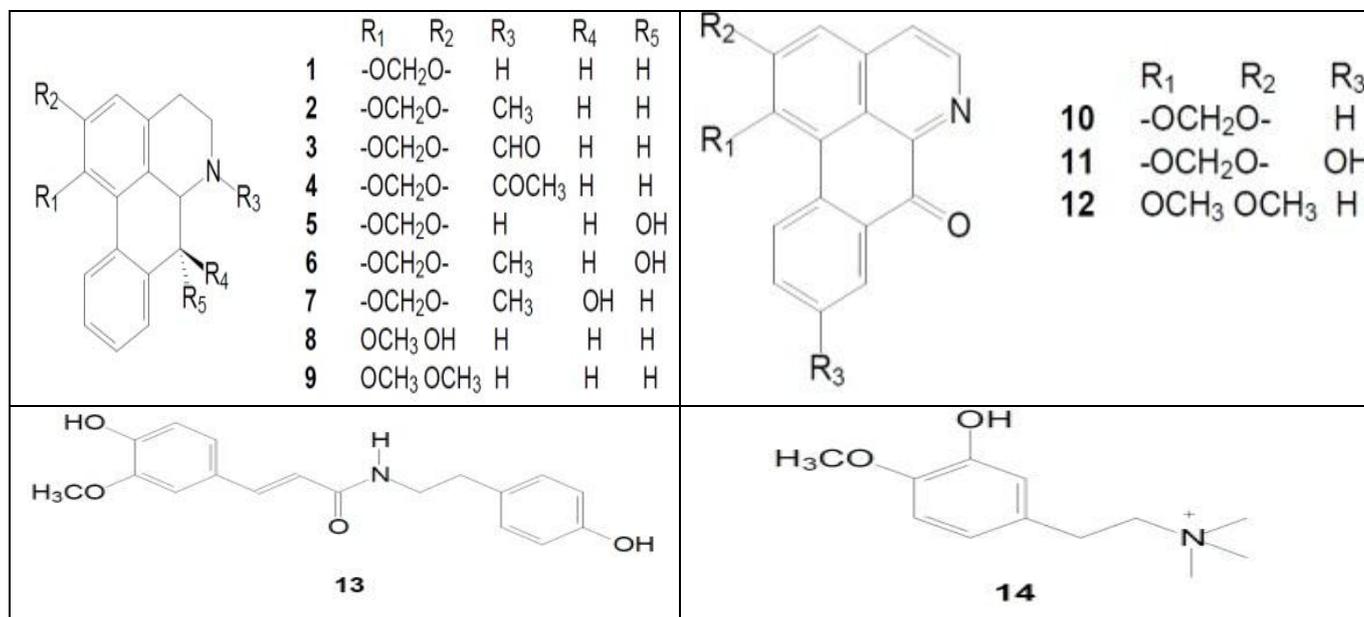
Anticancer activity

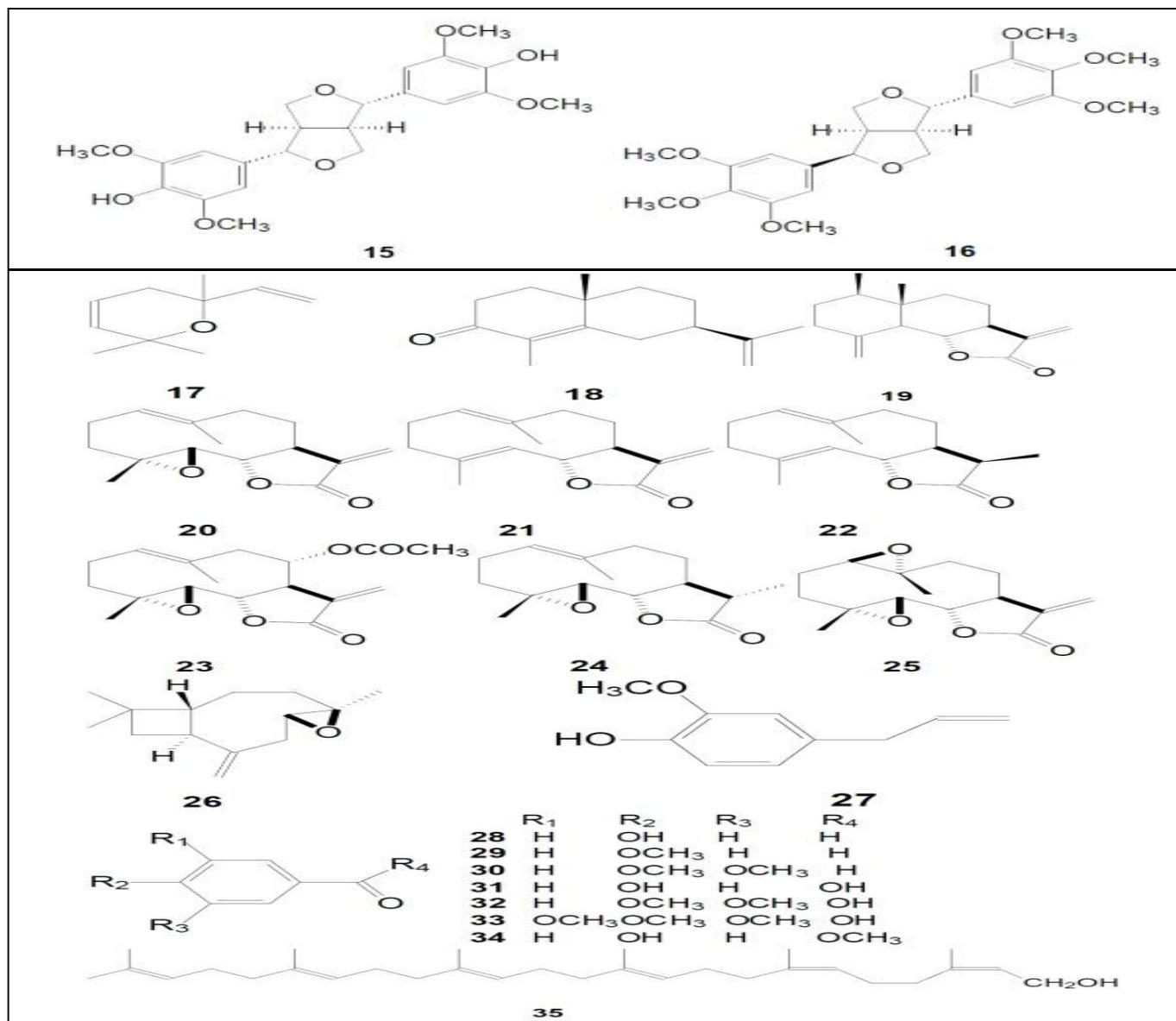
(-)-Anonaine (1), a major alkaloid compound, is isolated from the leaves of *Michelia alba*. Current studies demonstrated that (-)-anonaine (1) provided some biological and pharmacological activities, including vasorelaxant, antibacterial, antifungal, anti-oxidative, and antidepressant effects (Chulia *et al.*, 1995; Martinez *et al.*, 1992; Paulo Mde *et al.*, 1992; Protais *et al.*, 1995; Tsai *et al.*, 1989; Ubeda *et al.*, 1993; Valiente *et al.*, 2004; Villar *et al.*, 1987). Importantly, recent studies have been demonstrated that (-)-anonaine (1) has some anticancer activities. Treatment with (-)-anonaine (1) induces dose-dependent DNA damage that is correlated with increased intracellular nitric oxide, reactive oxygen species, glutathione depletion, disruptive mitochondrial transmembrane potential, activation of caspase 3, 7, 8, and 9, and poly ADP ribose polymerase cleavage, up-regulated the expression of Bax as well as p53 proteins (Chen *et al.*,

2008). In addition, (-)-anonaine (1) has been reported significant inhibition to cell growth and migration activities of lung cancer cells (Chen *et al.*, 2011). The above-mentioned mechanisms of (-)-anonaine (1) seem to be promising for cancer prevention; however, further clinical studies are warranted to assess the efficacy and safety of (-)-anonaine (1).

Skin protection

Tyrosinase is known to be the first two and rate-limiting enzyme in the synthesis of melanin pigments responsible for colouring skin, hair and eyes (Slominski *et al.*, 2005). In human skin melanocytes, the cellular tyrosinase inhibition was examined by the conversion of L-tyrosine and oxidation of L-DOPA to dopaquinone (Park *et al.*, 2009). Recent study, (-)-*N*-formylanonaine (3), one of active ingredients of *Michelia alba*, was found to inhibit mushroom tyrosinase and to have tyrosinase and melanin reducing activities in human epidermal melanocytes without apparent cytotoxicity to human cells. The results indicate that it suppresses tyrosinase activity and total melanin content without having adverse affects. Furthermore, (-)-*N*-formylanonaine (3) is superior to the known tyrosinase inhibitors, such as kojic acid and 1-phenyl-2-thiourea (PTU) (Wang *et al.*, 2010a). A recent study demonstrated that *Michelia alba* leaves extract and their hydrolysates can attenuate UVB-induced expression of matrix metalloproteinases, elastase, hyaluronic acid and type I procollagen in human dermal fibroblasts (Chiang *et al.*, 2012).





CONCLUSION

This review reveals the multiple benefits of *Michelia alba* which made it a valuable potential of nature. The anti-cancer and skin protection effects of *Michelia alba* has been investigated extensively, however

this plant has not yet been developed as preclinical trials. Future studies on determining the anticancer activity of *Michelia alba* and its active components should ideally include human intervention trials to investigate its effectiveness against human cancers and other diseases.

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