UNIVERSITI TEKNOLOGI MARA

PHYTOCHEMICALS FROM THE STEM BARK OF *Calophyllum ferrugineum* Ridl. AND *Calophyllum andersonii* P. F. Stevens AND THEIR BIOASSAYS

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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the results of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any degree or qualification.

I, hereby, acknowledge that I have been supplied with the Academic Rules and Regulations for Post Graduate, Universiti Teknologi MARA, regulating the conduct of my study and research.

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ABSTRACT

Plant from the genus *Calophyllum* were known for its medicinal properties and used to treat swollen gums, arthritis, diarrhoea, chronic abscess, skin infections and lesion. The species, *Calophyllum ferrugineum* and *Calophyllum andersonii* from Sarawak has least studied about their phytochemical constituents and biological activities. The aims of this study are to isolate and identify the phytochemical constituents from both species and to determine the antibacterial and antioxidant activity. The plant stem barks were collected from Semenggoh Nature Reserve in Sarawak and underwent maceration process to extract the samples. The extracts were subjected to chromatographic methods for the isolation and purification processes. Structural elucidation was achieved by using IR, MS, 1D and 2D NMR. The further isolation process from both species by using column and centrifugal chromatography has afforded different classes of compounds such as triterpene, xanthone, coumarin and fatty acid. *Calophyllum ferrugineum* afforded four compounds from *n*-hexane, chloroform and methanol extracts namely friedelin **(5)**, lupeol **(100)**, 1-hydroxy-7-methoxyxanthone **(77)**, isocalanone **(11)**. Meanwhile, *Calophyllum andersonii* afforded seven compounds namely linoleic acid **(91)**, oleic acid **(90)**, thwaitesixanthone **(84)**, euxanthone **(64)**, pyranojacareubin **(54)** and mammea A/BB cyclo F **(101)** from *n*-hexane, chloroform and methanol extracts. There were 10 compounds in total from both species. Friedelin **(5)** was recorded presence in both species. Isocalanone and methanol extract of *C. ferrugineum* showed appreciable antioxidant activity with the IC_{50} values of 27 ± 5.23, 38 ± 7.04 and 34 ± 3.70 µg/mL compared to the positive control; quercetin (15.5 ± 1.38 µg/mL) and ascorbic acid (14.2 ± 1.21 µg/mL), respectively. The chloroform and methanol extracts from both species showed significant inhibitions against *S. aureus*, *B. subtilis*, *P. aeruginosa* and *E. coli* with MIC and MBC values ranging from 225 and 112.5 µg/mL compared to the positive control. The results obtained from this study highlighted the potential of both species as antibacterial and antioxidant agent.

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TABLE OF CONTENTS