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OA4

COMPARATIVE CHEMICAL AND ANTIMICROBIAL STUDY OF ESSENTIAL OILS FROM TWO *SYZYGIUM* SPESIES

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The essential oils of the leaves of two *Syzygium* species (*Syzygium aromaticum and S. polyanthum)* were analyzed by gas chromatography/mass spectrometry (GC/MS) and evaluated for their antimicrobial activity against some food borne microorganisms. *The major constituents of S. aromaticum essential oil* were p-eugenol (75.190%) and β-caryophyllene (18.364%). The major constituents of *S. polyanthum* essential oils were *cis*-4-decenal (43.489%), 1-decyl aldehyde (19.752%) and capryl aldehyde (14.092%). β-Caryophyllene (18.364% and 1.734%), α-humulene (2.729% and 0.388 %), α-farnesene (0.230% and 0.857%) and caryophyllene oxide (1.130% and 0.997%) were detected in both *S. aromaticum and S. polyanthum* essential oils. Both essential oils inhibited *Bacillus subtilis* growth. The essential oil from *S. aromaticum* showed stronger inhibitory activity against *Staphylococcus aureus*, *Salmonella typhymurium* and *Vibrio cholera* than *S. polyanthum*. *Escherichia coli* was not inhibited by both essential oils.

OA5

FLAVONOIDS FROM *ARTOCARPUS SCORTECHINII* KING

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Artocarpus scortechinii King locally known as 'terap hitam' is classified under the family of Moraceae. Phytochemical study on this species had been carried out using cold extraction method with increasing polarity of solvent i.e. *n*-hexane, dichloromethane, ethyl acetate and methanol. The plant sample was collected from Bukit Fraser, Pahang. Two parts of the plant which were stem barks and leaves had been investigated. Total of six known compounds were isolated from stem barks part and identified as 4',5-dihydroxy-6,7-(2,2-dimethylpyrano)-2'-methoxy-8-γ,γ-dimethylallyflavone (**1**), artocarpin (**2**), artonin E (**3**), oxyresveratrol (**4**), cudraflavone A (**5**), cycloartobiloxanthone (**6**). Another compound identified as flemmichapparin A (**7**) obtained from leaves of *A. scortechinii*. The structures were elucidated spectroscopically using 1D NMR (^{1}H, ^{13}C, DEPT), 2D (COSY, HMQC, HMBC), UV, MS and FTIR. All crude extracts and seven isolated compounds were tested for their total phenolic content (TPC) and antioxidant activities using ferric reducing antioxidant potential (FRAP) and 2,2'-azinobis(3-ethyl-benzothiazoline-6-sulfonic acid) (ABTS) assays. Among all crude extract tested, the methanol extract of the stem barks showed the highest phenolic content with the TPC value of 136.84 mg GAE/g dw and followed by ethyl acetate

and dichloromethane extracts of the stem barks with TPC value of 105.56 and 73.93 mg GAE/g dw respectively. Ethyl acetate extract of the stem barks showed the most significant reducing potential ranges between 0.27-2.47 mM FRAP equivalent. Cycloartobiloxanthone (**6**) showed the most potent ferric ion reducer among all isolated compounds with reducing potential ranging from 0.60 to 2.79 mM FRAP equivalent. For the ABTS assay, the scavenging activity for the ethyl acetate extract of the stem barks was the highest with scavenging percentage of 90.9% which is slightly higher than methanol extract of the stem barks (90.6%) at the concentration of 1.0 mM. As for the isolated compounds, oxyresveratrol (**4**) acted as the most potent scavenger with scavenging percentage of 91.2%. Butylated hydroxyanisole (BHA), butylated hydroxytoluene (BHT) and 6-hydroxy-2,5,7,8-tetramethylchroman-2-carboxylic acid (Trolox) were used as the standard control.

OA6

ATTENUATING THE METHICILLIN-RESISTANT *Staphylococcus aureus* BY PLANTS STILBENOIDS

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Infectious diseases have become one of the leading causes of death in the world due to high prevalence of multidrug resistance bacteria. The emergence of methicillin-resistance *Staphylococcus aureus* (MRSA) is causing the major problems in the medical field as it has begun to resist other antibiotics. This study is aimed to determine the anti-infective effects of plant stilbenoids against MRSA. A total of nine oligostilbenoids comprising of dimers (ε-viniferin, ampelopsin A, balanocarpol, laevifonol, and diptoindonesin G) and trimers (α-viniferin, johorenol A, ampelopsin E, and vaticanol G) were isolated from two *Shorea* species. Initially, the antimicrobial activity of oligostilbenoids towards Gram-positive and Gram-negative bacteria was studied, which revealed bacterial susceptibility to some of these metabolites especially the resistant strain. Consequently, the anti-infective activity of these stilbenoids was focused against Gram-positive bacteria which was MRSA (ATCC 33591 and HUKM clinical isolate) and compared to an established antibiotic, vancomycin. Three stilbenoids, namely ε-viniferin, α-viniferin and johorenol A were bacteriostatic towards the growth of MRSA strain based on their MIC and MBC values. Further analysis was carried out to evaluate the bacteriostatic mode of action of the chosen oligostilbenoids (ε-viniferin, α-viniferin and johorenol A) by determining the FIC index values with checkerboard assay technique. Results showed that the combination of the compounds with vancomycin displayed additive effects except for johorenol A, which was found to act in synergism with vancomycin against MRSA ATCC 33591. An extensive analysis was then narrowed to determine the combined effect of ε-viniferin and johorenol A with standard antibiotics, vancomycin and linezolid against MRSA ATCC 33591 and HUKM clinical isolate. Based on the microdilution checkerboard assay (MDC), only the combination between ε-viniferin and vancomycin showed synergistic effect against ATCC 33591 and HUKM strain with FICI values of 0.25 and 0.19 respectively. Whereas, combination of ε -viniferin and linezolid and