STRUCTURAL ELUCIDATION, ANTIBACTERIAL, ANTIOXIDANT, AND TOXICITY OF COMPOUNDS FROM SELECTED UGANDAN MEDICINAL PLANTS USED IN TREATING BACTERIAL SKIN INFECTIONS

ABSTRACT

Many Ugandans rely heavily on medicinal plants for the treatment of bacterial skin infections. However, the efficacy of these medicinal plants for their pharmacological and phytochemical action are not known. The study aimed at evaluating the antibacterial, antioxidant, toxicity, and phytochemical composition of the extracts of Spermacoce princeae (K. Schum), Dolichopentas decora (S. Moore) and Rytigynia kigeziensis (De wild). Plant samples collected from Western region were extracted by maceration sequentially using hexane, ethyl acetate, methanol, and distilled water. Antibacterial and antifungal activity of each extract and compound was carried out using an agar well diffusion and potato dextrose assay respectively against Pseudomonas aeruginosa, Staphylococcus aureus, Escherichia coli and, Klebsiella pneumonie. Toxicity of the extracts was assessed using healthy albino rats according to OCED guidelines 402 and 410. Antioxidant activity of extracts and pure compounds was carried out using 2,2-diphenyl-1picryl-hydrazyl radical scavenging assay. Compounds were isolated using a combination of chromatographic techniques and their structures were elucidated using a combination of spectroscopic techniques. Phytochemical analysis of S. princeae extracts led to the isolation and identification of 11 compounds which included; quercetin (1), kaempferol-3-O-rutinoside (2), rutin (3), myo-Inositol (4), asperulosidic acid (5), hexadecanoic acid (6), β -sitosterol (7), stigmasterol (8), campesterol (9), ursolic acid (10), β -sitosterol glucoside (11). Two novel compounds (a benzophenone 18 and cyano-compound 20) were isolated and identified from extracts from D. decora in addition to squalene (13) and protocatechuic acid (19). Phytochemical analysis of R. kigeziensis extracts led to the isolation and identification 12 known compound that included; pomolic acid (23), 23-hydroxyursolic acid (24), rotundic acid (25), heptyl coumarate (31), vomifoliol (34) and five novel triterpenoids (27, 28, 29, 30 and 33). Compounds 10 and 2 showed antibacterial and antifungal activity against S. aureus, P. aeruginosa, C. albicans, and A. flavu with zone of inhibition $\geq 10.0 \pm 0.1$ mm. Kaempferol-3-*O*-rutinoside (2) showed good antioxidant activity ($IC_{50} = 64.81 \mu g/ml$) and good sun protection factor (SPF = 26.83). The aqueous extract of S. princeae was not toxic at 8000 and 10,000 mg/Kg. The selected medicinal plants possessed good antibacterial, antioxidant, and sun protection agents. The aqueous extract of S. princeae was generally nontoxic. The novel

compounds may present a vital template in pursuit of alternative antibacterial, antioxidant and sun protection agents.

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