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Quantitative and Fourier Transform Infrared Analysis of Saponins from Three Kenyan Ruellia Species: Ruellia prostrata, Ruellia lineari-bracteolata and Ruellia bignoniiflora

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Abstract : Ruellia (syn. Dipteracanthus) species are wild perennial creepers belonging to the Acanthaceae family. These species are reported to possess anti-inflammatory, analgesic, antioxidant, gastroprotective, anticancer, and immuno-stimulant properties. Phytochemical screening of both aqueous and methanolic extracts of Ruellia species revealed the presence of saponins. Saponins have been reported to possess anti-inflammatory, antioxidant, immuno-stimulant, antihepatotoxic, antibacterial, anticarcinogenic, and antiulcerogenic activities. The objective of this study was to quantify and analyze the Fourier transform infrared (FTIR) spectra of saponins in crude extracts of three Kenyan Ruellia species namely Ruellia prostrata (RPM), Ruellia lineari-bracteolata (RLB) and Ruellia bignoniiflora (RBK). Sequential organic extraction of the ground whole plant material was done using petroleum ether (PE), chloroform, ethyl acetate (EtOAc), and absolute methanol by cold maceration, while aqueous extraction was by hot maceration. The plant powders and extracts were mixed with spectroscopic grade KBr and compressed into a pellet. The infrared spectra were recorded using a Shimadzu FTIR spectrophotometer of 8000 series in the range of 3500 cm⁻¹- 500 cm⁻¹. Quantitative determination of the saponins was done using standard procedures. Quantitative analysis of saponins showed that RPM had the highest quantity of crude saponins (2.05% ± 0.03), followed by RLB (1.4% ± 0.15) and RBK (1.25% ± 0.11), respectively. FTIR spectra revealed the spectral peaks characteristic for saponins in RPM, RLB, and RBK plant powders, aqueous and methanol extracts; O-H absorption (3265 - 3393 cm⁻¹), C-H absorption ranging from 2851 to 2924 cm⁻¹, C=C absorbance (1628 - 1655 cm⁻¹), oligosaccharide linkage (C-O-C) absorption due to sapogenins (1036 - 1042 cm⁻¹). The crude saponins from RPM, RLB and RBK showed similar peaks to their respective extracts. The presence of the saponins in extracts of RPM, RLB and RBK may be responsible for some of the biological activities reported in the Ruellia species.<u>1</u>

Keywords : Ruellia bignoniiflora, Ruellia linearibracteolata, Ruellia prostrata, Saponins
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