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Evaluation of extraction protocols for anti-diabetic bioactive molecules from medicinal plants

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The successful isolation of bioactive constituents from therapeutic plants relies mostly on the use of appropriate extraction technology. This study examines the efficacy of three extraction techniques: Soxhlet-Extraction (SE), Cold-Maceration (CM) and Microwave-Assisted-Extraction (MAE) using 80% methanol. The study was performed on each of 50 g of *Vernonia-amygdalina* (VA) and *Occimum-gratissimum* (OG) leaves respectively. The biological activities were analyzed using rat model of diabetes with a combined dose of the two plant extract (250 mg/kg-b.w.) from the three methods. The result showed that the percentage VA extract yield from MAE was highest (20.9+1.05%), when compared to the CM (14.35+0.28%) and SE (15.75+0.71%). The percentage differences in OG extract yield between: MAE versus SE was 41.05%; MAE versus CM was 46.81% and SE versus CM was 9.77%. The chemical analysis of the two plants showed no difference in the various phytoconstituents detected, but differs in the concentrations of the individual phytochemicals, as MAE had better yield on phenolics, saponins and tannins. SE technique gave the better yield on alkaloid, while CM gave the better yield on flavonoids. The CM exhibited a better percentage hypoglycemic activity within the first 14-days of treatment (43.3+3.62%) when compared to MAE (36.5+0.08%) and SE method (33.3+1.60%). However, the percentage hypoglycemic activity, 21 days post-treatment with 250 mg/kg-b.w MAE was 72.6+1.03% and it was more comparable to 10 mg/kg b.w. glibenclamide treated group (75.0+0.73%) than the SE (69.5+0.71%) and CM (69.1+1.03%). The study reveals that MAE emerges as a better option for rapid extraction procedure of phytoconstituents due to its shorter time and less solvent utilization, however, the qualitative choice of an extraction technique should depend on a specific bioactive component of interest.

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