

## **Vernonia cinerea leaves as the source of phenolic compounds, antioxidants, and anti-diabetic activity using microwave-assisted extraction technique**

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### **ABSTRACT**

Diabetes mellitus is a metabolic disorder disease emanating from the inability of body's response to high glucose levels in the blood. However, the side-effects from consuming synthetic drugs have reduced the effectiveness, thus, the potential of purple fleabane (*Vernonia cinerea*) leaf was investigated using microwave-assisted extraction (MAE) in this study. The influences of extraction factors such as irradiation time, microwave power level, feed/solvent, and ethanol concentration on the recovery yields of polyphenol and flavonoids were as well studied. Thirty experimental runs using a face-centered central composite design (FCCCD) with six centre points were employed and optimal yields were obtained by generating quadratic models based on response surface methodology. The obtained optimal MAE conditions were as follows: irradiation time, 2 min; microwave power level, 444 W; feed/solvent, 1:14 g/mL; and ethanol concentration, 47% v/v. There was an insignificant difference between the predicted and experimental data ( $p > 0.05$ ), showing good predictive models for the extraction of phenolic compounds from *V. cinerea* leaves using MAE. Also, the results confirmed that MAE can recover higher phenolic compounds, antioxidant, and anti-diabetic activities from *V. cinerea* leaves in shorter extraction time. In addition, the phenolic compounds in *V. cinerea* leaf extract were identified using liquid chromatography-mass spectrometry quadrupole time of flight (LC-MS-Q-TOF) and Fourier transform infrared spectroscopy (FTIR). The extracts showed higher anti-diabetic activity using alpha-amylase and alpha-glycosidase assays which suggested its exploration in pharmaceutical and functional food industries.

**KEYWORDS:** *Vernonia cinerea* leaf; Phenolic compounds; Antioxidant; Response surface methodology; Microwave-assisted extraction; Anti-diabetic activity