

The Role of Polyphenolic Compounds in the Alpha Amylase and Alpha Glucosidase Inhibitory Potentials of Extracts from the Leaves of *Acalypha godseffiana* from Eastern Nigeria: An in-vitro Study

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Abstract : Background: *Acalypha godseffiana* is an important plant used both as an ornamental and herbs; its leaves are employed in management of diseases such as diabetics in Eastern Nigeria. Aim: The correlations of the polyphenolic compounds in the hypoglycemic potential of different extracts of leaves of *A. godseffiana* and their safety profile on cell lines were investigated. Materials and Methods: The phytochemical compositions and antioxidants potentials were determined using adopted methods. An in vitro approach was employed in determining the hypoglycemic potentials of the extracts on α -amylase and α -glucosidase. The Line weaver-Burke plot was used to evaluate the mechanisms of Inhibition mechanisms of the enzymes. Results and Conclusions: Antioxidants results revealed that total antioxidant capacity (TAC) of the acetone extract (IC₅₀: 0.34 mg/mL) showed better activity compared to the standards (silymarin 0.52 mg/mL; gallic acid 0.51 mg/mL). In-vitro hypoglycemic activity of the extracts confirmed that acetone extract demonstrated strong and mild inhibitory potential against α -amylase and α -glucosidase respectively. The observed activity was concentration-dependent with IC₅₀ values of 2.33 and 0.13 mg/mL. The observed hypoglycemic and anti-oxidant potentials of acetone extract *A. godseffiana* correlate to its high polyphenolic contents which include phenols (133.20 mg gallic acid g⁻¹), flavonoid (350.60 mg quercetin g⁻¹) and tannins (264.67 mg catechin g⁻¹). The mechanisms of action exhibited by acetone extract of *A. godseffiana* were mixed non-competitive and uncompetitive; which can be attributed to its inhibitory properties on α -amylase and α -glucosidase respectively. This effect would cause reduction in the rate at which starch hydrolyse, boost palliated glucose levels; hence, making acetone extract of *A. godseffiana* a potential anti-hypoglycemic alternative.

Keywords : *Acalypha godseffiana*, acetone extract, anti-hypoglycemia, antioxidant, phytochemicals

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