



GC-MS Analysis of n-Hexane and Chloroform Fractions of Methanol Extracts of *Phyllanthus muellerianus* Stem Bark

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Introduction

Phyllanthus muellerianus therapeutic properties happened both in science and in traditional collective knowledge similar to analysis of additional species from the genus. Traditional medicine practitioners throughout tropical regions have used this plant to treat urinogenital diseases along with intermittent fevers along dropsy diarrhea patients as well as managing jaundice while healing scabies-infected patients and treating wounds chronic dysentery, diabetes, gonorrhoea and urinary bladder deformities and urinary discomfort.

Materials and methods

The sample was air-dried, pulverized and macerated in methanol. The extract was concentrated and then reconstituted for partitioning with n-hexane and chloroform. The n-hexane and the chloroform fractions were subjected to GC-MS analysis.

Results and discussion

The n-hexane fraction extracted from *P. muellerianus* methanol extract showed ten bioactive compounds through GC-MS analysis which revealed its complete phytochemical makeup for potential pharmacological usage. The main chemical components of n-hexadecanoic acid and Vitamin E dl- α -tocopherol (+)- γ -tocopherol O-methyl and campesterol and stigmasterol together constitute 11.32% of the plant extract which demonstrates its strong antioxidant properties and lipid regulation and anti-inflammatory effects. The bioactive potential of *P. muellerianus* becomes more prominent due to its contained δ -Tocopherol (1.10%) together with structurally diverse secondary metabolites 5- α -dihydroprogesterone (0.61%) and 9-anthraldehyde, 2-furylcarbonylhydrazone (0.41%). The minor components in the extract include 4-n-Hexylthiane, S, S-dioxide at 0.04% composition and cyclohexane, (1-hexyltetradecyl) with 0.20% content which provides fascinating details about extract composition diversity. GC-MS analysis detected four main bioactive compounds namely fumaric acid, heneicosane, phthalic acid and 9-octadecenamide in the chloroform methanol extract of *P. muellerianus*. The analysis confirmed the presence of 9-Octadecenamide which had a 5.38% area percentage among all detected compounds. The analytical results show that this plant contains various chemical compounds that exhibit antioxidant effects and anti-inflammatory responses and show antimicrobial activity. The metabolic roles and antioxidant properties of the rare chemical Fumaric acid coexist with the antimicrobial attributes of Heneicosane. Phthalic acid shows biological activity which includes antioxidant behavior and anticancer effects alongside 9-Octadecenamide which demonstrates strong anti-inflammatory capability and protects against brain damage. Laboratory results establish *P. muellerianus* as a valuable plant for developing bioactive compounds which demonstrate medical usefulness. The results from this study validate the therapeutic value of *P. muellerianus* as a phytopharmaceutical candidate which justifies its traditional medicinal uses.

Conclusions

The study percent that *P. muellerianus* stem bark has shown to have various secondary metabolites which possess many pharmacological properties of which antioxidant activity is one. Further research is required for the possible development of novel drugs using some of the bioactive compounds found in *P. muellerianus*.

Keywords: *Phyllanthus muellerianus*, GC-MS analysis, Pharmacological potential, Natural products.