

Chemical composition and radical scavenging (anti-oxidant) efficacy of the leaf of *Terminalia catappa* Linn

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Abstract

Medicinal plants have been identified and used throughout human history to treat ailments and diseases. Plants have the ability to synthesize a wide variety of chemical compounds. Many of them are efficacious and contain substances that are potential drugs that require further examinations. Chemical compounds in plants mediate their effects on the human body by binding to receptor molecules present in the body; *Terminalia catappa* Linn (Indian almond) is a Combretaceae plant (tropical almond family). Fresh leaf of *Terminalia catappa* was collected from Bolori ward Maiduguri Borno state and it was identified by Professor S. S. Sunusi Department of Biological Science Faculty of Science, University of Maiduguri. One thousand grams (1000g) of the powdered leaf of *Terminalia catappa* was extracted with methanol using cold infusion (maceration) method. Eighty three point eight two grams (83.82g) of the dark green in color gummy in texture of methanol crude extract was obtained, which was further partitioned with n-hexane, ethyl acetate, n-butanol and water to give n-hexane portion (1.638% W/W), dark green in color, oily in texture, ethyl acetate portion (0.075% W/W), black in colour, gummy in texture, n-butanol portion (0.777% W/W), brown in color, oily in texture and finally aqueous portion (2.997% W/W), dark brown in color, powdered in texture. Preliminary phytochemical screening of the methanol crude extract and partitioned portions revealed the presence of some secondary metabolites such as cardiac glycoside, flavonoids, saponins, terpenoids, tannins and alkaloid. The antioxidant activity was carried out on the methanol extract and partitioned portions. The methanol extract showed the percentage inhibitions of 98.25 at 10µg/ml 97.40 at 20µg/ml 96.94 at 30µg/ml 96.63 at 40µg/ml and 97.10 at 50µg/ml and all the partitioned portions exhibited anti-oxidant activities. The concentration levels of macro-elements (Ca, Mg, Na, K) and micro-elements (Cd, Cu, Ni, Zn, Fe, Mn) were analyzed using Atomic Absorption Spectrophotometer and the anions (Cl⁻, NO₃⁻, PO₄³⁻, and SO₄²⁻) were estimated using smart spectrophotometer. The leaf of *Terminalia catappa* indicated the presence of calcium (19.68µg/ml), cadmium (0.12µg/ml), copper (6.84µg/ml), iron (10.67µg/ml), potassium (18.90µg/ml), magnesium (10.27µg/ml), manganese (1.27µg/ml), sodium (15.30µg/ml) nickel (1.00µg/ml), zinc (4.17µg/ml), chloride (0.72µg/ml), nitrate (46.00µg/ml), phosphate (70.00µg/ml) and sulphate (227.33µg/ml). However, only phosphate and sulphate exceeded the permissible limit of world health organization (WHO) standard. Purification of compound was done by using column and thin layer chromatography method. After pooling and recombination with different solvent system of the n-butanol extract, three compounds TCA, TCB and TCC were obtained with melting points TCA (286.00-287.00), TCB (278.00-279.00) and TCC (260.00-262.33). All the melting points were sharp and uncorrected. The Gas Chromatography-Mass Spectrometry of the compound TCA revealed the presence of fatty acid derivatives such as octadecanoic acid 4-hydroxybutyl ester, tetradecanoic acid 2-hydroxyl, pentanoic acid, 2,2,4-trimethyl-3-carboxy isopropyl, isobutyl ester, octadecanoic acid (2-phenyl 1-3-dioxolan -4-yl) methyl ester cis. The methanol extract showed promising antioxidant activities at various concentrations when compared with the partitioned portions.

Biography

Prof. Fanna Inna Abdulrahman is currently a Deputy Vice Chancellor (Central Administration) and a lecturer of medicinal chemistry in the Department of Chemistry, University of Maiduguri. She had her Ph.D in medicinal chemistry in 1997. She has published more than 100 research papers in the field of organic/Medicinal chemistry and Natural Product. Her current research interest is in the area of Organic/ Medicinal Chemistry and Natural product. Prof. Fanna's is a Fellow, Chemical Society of Nigeria, and Fellow Institute of Chartered Chemist of Nigeria, Member West African Network of Natural Products Research Science and Member of Council of the Institute of chartered Chemist of Nigeria. Prof. Fanna's was formally the Head, Department of Chemistry, University of Maiduguri, Borno State, Nigeria. She is also a member of University of Maiduguri Senate, Member Board of Research Journal of Science, and currently a Dean, Faculty of Sciences, University of Maiduguri, Borno State, Nigeria. She has worked with many plants in Nigeria that have analgesic, anti-inflammatory, anticonvulsant, antidiarrheal, antipyretic, antioxidant, antimicrobial, antidiabetic and antidepressant activities.



[3rd International Conference on Organic Chemistry](#) | July 23, 2020,

Citation: F.I. Abdulrahman, Chemical composition and radical scavenging (anti-oxidant) efficacy of the leaf of *Terminalia catappa* Linn, Organic Chemistry Congress 2020, 3rd International Conference on Organic Chemistry, July 23, 2020, pp.02