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Proximate and Phytochemical Analyses of *Terminalia catappa* Leaves

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Abstract: The proximate and phytochemical analyses of the leaves of *Terminalia catappa* were determined using the methods of Association of Official Analytical Chemists (A.O.A.C). The proximate composition (%) recorded 8.6, 1.1, 40.0, 0.2, 10.2 and 39.9 for moisture, ash, fat, protein, crude fibre and carbohydrate respectively. The phytochemical concentrations (mg/100g) revealed flavonoids (4.66±0.91), tannins (0.86±0.01), β-carotene (4.06±0.10), glycosides (4.52±0.27), alkaloids (22.40±2.60), steroids (24.30±2.35), saponins (6.80±1.09), phenols (16.70±2.65) and total carbohydrate (18.60±2.41). The results indicated that the leaves were very high in carbohydrate, fat, alkaloids, phenols and steroids but low in protein, tannins and ash contents with moderate crude fiber levels. This indicates that it could be a good source of oil, carbohydrate and some phytochemicals.

Key words: Proximate · Phytochemicals and *Terminalia catappa* leaves

INTRODUCTION

Terminalia catappa is an enormous variety of plants that contain several organic substances. The plant leaves contain vitamins like vitamin A, B, C and D and also carbohydrates, proteins, fat, fibre, ash and moisture [1-7]. The leaves are also known to contain a great variety of other phytochemicals like flavonoids (such as kaempferol or quercetin), several tannins (such as punicalin, punicalagin or tercalins), saponins, phytosterols, β-carotene, glycosides, cyanogenic glycosides, alkaloids, phenols and steroids. Some of these phytochemicals have antioxidant, antibacterial and antifungal activities. *Terminalia catappa* is one of the most widely cultivated species of the genus *Terminalia* which serves as an example of vegetable tree with a variety of potential uses [7].

Terminalia catappa is a large tropical tree in the family combretaceae that is native to the tropical regions of Asia, Africa and Australia. The leaves and barks of *Terminalia catappa* are used in different herbal medicines for various purposes; in Taiwan, fallen leaves are used as herbs to treat liver diseases (Ratinasoriya and Dharmasiri, 2000). The leaves may contain antioxidants and agents for prevention of cancers (although they have not demonstrated anticarcinogenic properties). Extract of *Temerinalia catappa* has shown activity against *Plasmodium falciparum* chloroquine (CQ)-resistant (FCB1) and CQ-sensitive strains. Keeping the leaves in an aquarium may lower the pH and heavy metal contents of the water [8-10].

It is known to be active against some parasites and bacterial pathogens when used in breeding fishes. It is also believed to help prevent fungus forming on the eggs of the fish [8].

In view of the afore-mentioned biological activities of *Terminalia catappa,* there is need to ascertain its pharmacologically active components, hence this research was aimed at investigating the proximate and phytochemical constituents of *Terminalia catappa* leaves.

MATERIALS AND METHODS

Materials: The fresh leaves of *Terminalia catappa* were gotten from Abakaliki, Ebonyi State, Nigeria.

Phytochemical and Proximate Analyses: The methods of Association of Official Analytical Chemists (A.O.A.C.) (1990) were used.

RESULTS AND DISCUSSION

Proximate analysis of *Terminalia catappa* leaves revealed the presence of moisture, fat, carbohydrate, fibre and ash at different levels. The leaves showed high levels of carbohydrate and fat, low content of protein and ash (Fig. 1). Okoh *et al.* (2011) [5] recorded high content of the nutritive composition of the leaves of *Gmelina arborea*. The work of Peter and Lucky (2013) [6] on the phytochemical screening, proximate and elemental analysis of *Citrus sinesis* peel showed substantial levels

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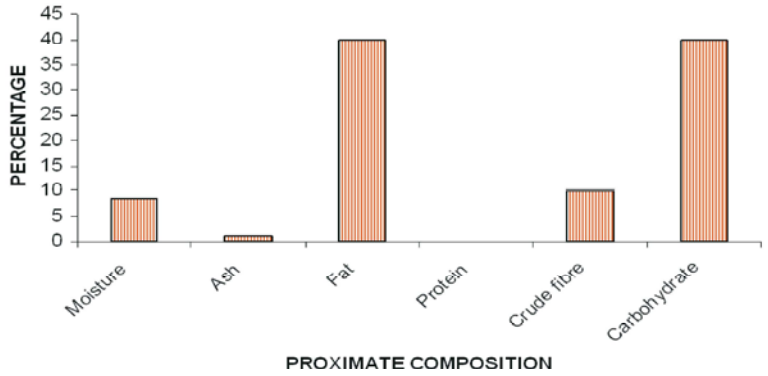

Fig. 1: Proximate Composition of *Terminalia catappa* leaves

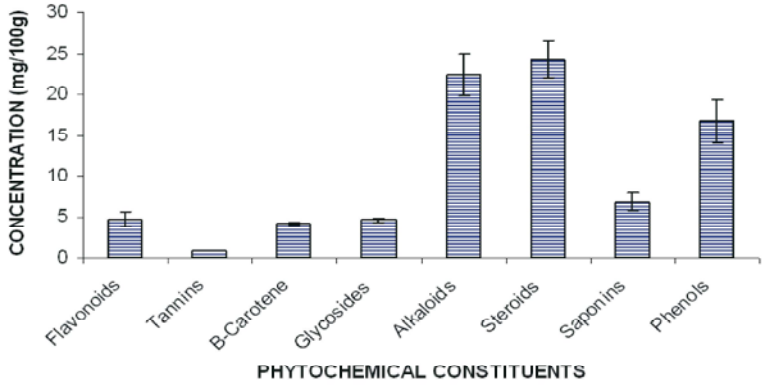

Fig. 2: Phytochemical composition of *Terminalia catappa* leaves.

of carbohydrate, fibre, fat, ash, but low protein and moisture content. Shumaila and Mahpara (2009) [9] revealed high carbohydrate and crude fibre contents but low fat, protein, ash and moisture content in cinnamon plant. Bhowmik *et al.,* (2012) also revealed high nutritive values in *Allium sativum.*

Phytochemical screening of the plant leaves revealed different concentrations of flavonoids, tannins, β-carotene, glycosides, alkaloids, steroids, saponins and phenols. Alkaloids, steroids and phenols were found in higher concentrations but low concentrations of flavonoids, β-carotene and glycosides were recorded. Tannin was insignificantly present (Fig. 2). Preliminary phytochemical screening of *Gmelina arborea* leaves by Daya *et al.,* (2013) [4] revealed high concentrations of saponins and flavonoids but low concentrations of phenols, glycosides, alkaloids, steroids and tannins. Ayoola *et al.,* (2011) [2] on the phytochemical and nutrient evaluation of *Tetracarpidium conophonum* revealed high concentration of saponins but low concentrations of phenols, alkaloids, glycosides, steroids, flavonoids and tannins. Yada and Munin (2011) [10] in their work on the phytochemical analyses of seven medicinal plants such as *Bryophyllum pinnatum, Ipomea aquatica, Oldenlandia carymbosa, Ricinus communis, Terminalia bellerica, Tinospora cordifolia and Xanthium strumarium* revealed the presence of alkaloids, saponins, glycosides, flavonoids, phenols, steroids and tannins. *Bryophyllum pinnatum* leaves showed high concentrations of phenols, glycosides, saponins, alkaloids, flavonoids, tannins and steroids. *Ipomea aquatica* leaves showed high concentrations of phenols, glycosides, saponins, alkaloids, flavonoids, tannins and steroids. *Oldenlandia corymbosa* leaves contained high concentrations of phenols, glycosides, saponins, alkaloids, flavonoids, tannins and steroids. *Ricinus communis* leaves showed absence of alkaloids but presence of phenols, steroids, glycosides, flavonoids, tannins and saponins. Absence of glycosides and alkaloids were seen in *Tinospora cordifolia* leaves with high concentrations of phenols, steroids, flavonoids, alkaloids and tannins (Yada and Munin, 2011) [10].

Various plants have varying concentrations of the phytochemical components. The leaves of *Terminalia catappa* contained varying concentrations of

moisture, fat, carbohydrate, fibre, ash, flavonoids, tannins, β-carotene, glycosides, alkaloids, steroids, saponins and phenols.

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