



## International Journal of Current Research and Academic Review

ISSN: 2347-3215 Volume 2 Number 12 (December-2014) pp. 101-105

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### Phytochemical and proximate analyses of dry *Gmelina arborea* leaves

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#### KEYWORDS

Phytochemicals,  
proximate,  
*Gmelina arborea*  
leaves.

#### A B S T R A C T

Chemical analyses were carried out to determine the nutritional and phytochemical constituents of *Gmelina arborea* leaves using standard methods. The phytochemical analysis revealed the concentrations (mg/100g) as  $0.06 \pm 0.00$  (Tannins),  $3.85 \pm 0.07$  (Saponins),  $1.77 \pm 0.06$  (Glycosides),  $0.06 \pm 0.01$  (Flavonoids),  $0.06 \pm 0.00$  (Alkaloids),  $0.32 \pm 0.01$  (Phenols) and  $0.09 \pm 0.00$  (Steroids). Proximate analysis (%) of the leaves showed  $12.35 \pm 0.52$ ,  $0.79 \pm 0.02$ ,  $4.55 \pm 0.49$ ,  $15.05 \pm 0.07$ ,  $20.05 \pm 0.07$ ,  $47.21 \pm 1.04$  for moisture, fat, ash, crude fibre, protein and carbohydrate respectively. The plant showed substantial levels of carbohydrate, protein, moisture, crude fibre, saponins and glycosides.

#### Introduction

The use of plants in the management and treatment of diseases started with life. In more recent years, with considerable research, it has been found that many plants indeed have medicinal values (Sofowora, 2010). Some medicinal plants used in Nigeria include *Garcinia cola*, used in the treatment of asthma; *Carica papaya*, used as a remedy for hypertension, *Ocimum basilicum*, a cure for typhoid fever, and *Cola nitida*, for treatment of pile (Nadkaru, 2008). *Gmelina arborea* is a deciduous tree, about 30m or more in height and a diameter up to 4.5m. The leaves are used as carminative, antidote to snake bite and some other poisons. Leaf-paste is applied on wounds. A paste of the leaves is applied to the head for the relief of headache (Khare, 2010).

The leaves are used in dyspepsia, cough, and wound treatment (Dinesh, 2009). The leaf has been reported to have antihelmintic activity (Ambujakshi *et al.*, 2009). Phytochemicals are bioactive compounds found in plants that work with nutrients and dietary fibre to protect against diseases. They are non-nutritive compounds (secondary metabolites) that contribute to flavour and colour (Craig, 2009). The relevance of phytochemical analysis is to enable one detect the non-nutritive chemicals found in plants that may affect health in order to modify their products by suitable biological and chemical means into patent drugs (Guinder and Daljik, 2009). The method used for the determination of the different non-nutritive chemicals found

in plants does not only vary according to the plant material being analyzed but also in details of evaluation (Gulcinet *et al.*, 2010).

Proximate analysis of food is the determination of the major components of food which include moisture, protein, fat, ash, crude fibre and total carbohydrate (Alfred and Patrick, 2005). Proximate analysis is a system of analysis of nutrients also termed “conventional analysis” in which the gross components (Protein, fat, carbohydrate, ash, etc.) of the food material rather than individual nutrients (amino acid, fatty acids, monosaccharides, mineral, etc) are determined (Prohp *et al.*, 2006).

The current study was carried out to determine the nutrient composition and bioactive constituents of *Gmelina arborea* leaves.

## **Materials and Methods**

### **Materials**

The fresh leaves of *Gmelina arborea* were gotten from Aba, Abia State, Nigeria.

### **Methods**

#### **Phytochemical Analysis**

The method of Harborne (2007) was used.

#### **Proximate Analysis**

The methods of Karoly (2011) and Onwuka (2008) were used.

## **Result and Discussion**

Phytochemical screening of the plant leaves revealed different concentrations of alkaloids, tannins, phenols, flavonoids, saponins, and glycosides. Saponins and

glycosides were found in higher concentrations but low concentrations of phenols, flavonoids, alkaloids, steroids and tannins were recorded (Fig. 1). Preliminary phytochemical screening of *Gmelina arborea* leaves by Daya *et al.* (2013) revealed high concentrations of saponins and flavonoids but low concentrations of phenols, glycosides, alkaloids, steroids and tannins. Ayoola *et al.* (2011) on the phytochemical and nutrient evaluation of *Tetracarpidium conophorum* revealed high concentration of saponins but low concentrations of phenols, alkaloids, glycosides, steroids, flavonoids and tannins. Yada and Munin (2011) 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). Plants have varying concentrations of the phytochemical components.

Fig.1 Bar Chart Representation of Phytochemical Constituents of *Gmelina arborea* Leaves

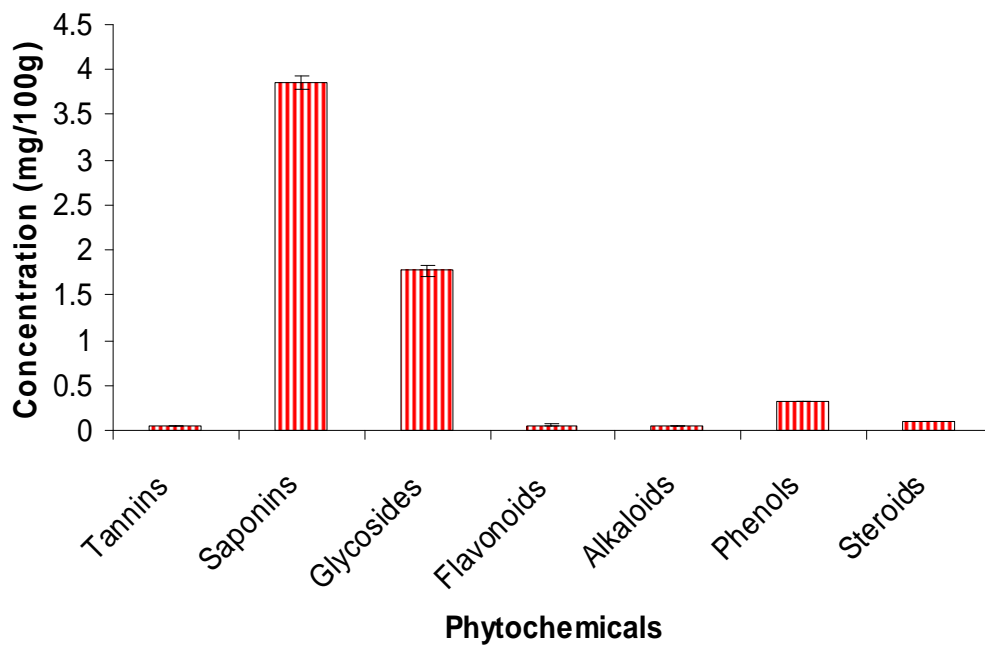
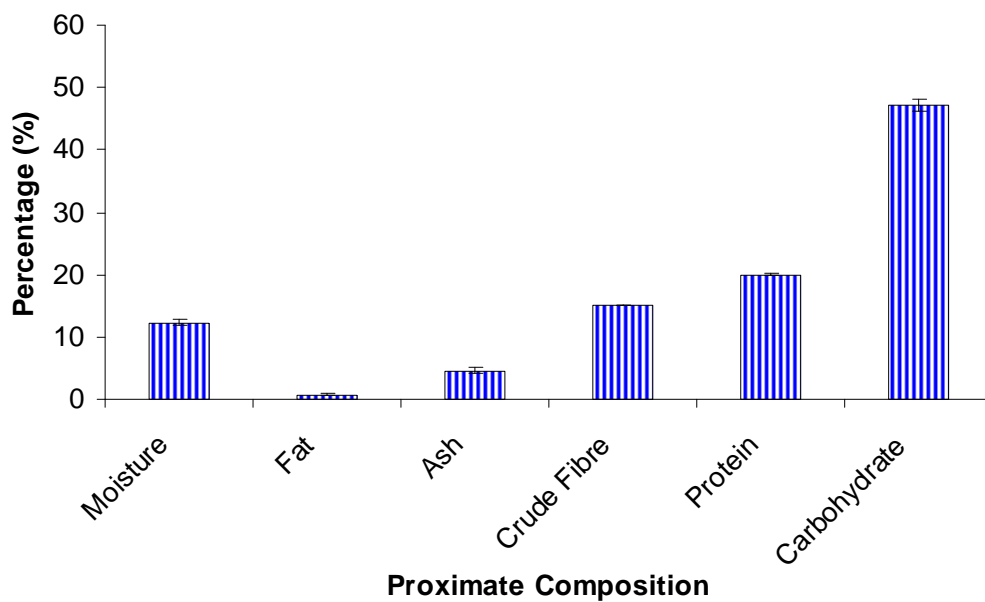


Fig.2 Bar Chart Representation of Proximate Composition of *Gmelina arborea* Leaves



**Table.1** Phytochemical analysis of *Gmelina arbora*

Phytochemical	concentration (Mg/100g)
Tannins	0.06± 0.00
Saponins	3.85± 0.000
Glycosides	1.77± 0.06
Flavonoid	0.06± 0.01
Alkaloids	0.06± 0.00
Phenols	0.32± 0.00
Steroids	0.09± 0.00

**Table 2:** Proximate composition of *Gmelina arborea*

Proximate	percentage composition (%)
Moisture	12.35± 0.52
Fat	0.79± 0.02
Ash	4.55± 0.49
Crude fibre	15.05± 0.07
Protein	20.05± 0.07
Carbohydrate	47.22± 1.04

Proximate analysis of *Gmelina arborea* leaves revealed the presence of moisture, fat, carbohydrate, protein, fibre and ash at different levels. The leaves showed high carbohydrate, protein, moisture, fibre, ash but low fat content (Fig. 2). Okoh *et al.* (2011) recorded high content of the nutritive composition of the leaves of *Gmelina arborea*. The work of Peter and Lucky (2013) on the phytochemical screening, proximate and elemental analysis of *Citrus sinensis* peel showed substantial levels of carbohydrate, fibre, fat, ash, but low protein and moisture content. Shumaila and Mahpara (2009) revealed high carbohydrate and crude fibre content but low fat, protein, ash and moisture content in cinnamon plant. Bhowmik *et al.* (2012) also revealed high nutritive values in garlic (*Allium sativum*). The differences on the proximate composition of the plant leaves could be as a result of different plant species, climatic and edaphic factors.

The leaves of *Gmelina arborea* showed substantial concentrations of carbohydrate, protein, moisture, crude fibre, saponins and glycosides. The plant leaves also contained ash, fat, flavonoids, tannins, steroids, alkaloids and phenols.

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