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PHYTOCHEMICAL AND PROXIMATE COMPOSITIONS OF *ARTOCARPUS HETEROPHYLLUS* LEAVES

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ABSTRACT

This study was aimed at determining the phytochemical and proximate compositions of *Artocarpus heterophyllus* leaves using the methods of Association of Official Analytical Chemists. The results recorded the phytochemicals and their concentrations (mg/kg) as alkaloids (3.63±18), saponnins (0.44±0.003), flavonoids (1.27±0.06), tannins (0.18±0.00), cardiac glycosides (0.01±0.00), phenols (0.42±0.02) and steroids (0.28±0.01). The alkaloid content was higher than other parameters while cardiac glycoside was the least in the leaves. The percentage proximate compositions of *Artocarpus heterophyllus* leaves recorded the presence of carbohydrate (37.95), proteins (22.17), ash (16.40), moisture (16.80), crude fibre (6.55) and fat (0.13). The results showed that *Artocarpus heterophyllus* leaves contained very high percentage of carbohydrate but lower percentage of fat.

Keywords: Phytochemicals, Proximate constituents, *Artocarpus heterophyllus* and Leaves.

INTRODUCTION

Plants have been used by human beings for medicinal purposes and even in modern times have formed the basis of many pharmaceuticals in use. Plants produce a vast array of secondary metabolites as defense against environmental stress or other factors like pest attacks, wounds, and injuries. The complex secondary metabolites produced by plants have

found various therapeutic uses in medicine from time immoral [1]. Medicinal plants have been used for many thousands of years to treat human disorders and pains. Despite their importance, medicinal plants are seldom handled within an organized manner and most of them are exploited with little or no respect for the future [2]. Significant increase in medicinal plants usage has been recorded continuously both for traditional users and pharmaceutical industry. The investigation of efficacy of plant-based drugs has been given greater attention because of the few or no side effects, cheap and easy availability [3].

Artocapus heterophyllus is a popular fruit crop that is widely grown in Thailand and other tropical areas. The ripe fruit contains well flavored yellow sweet bulbs and seeds (embedded in the pulp). The edible pulps of the fruits are consumed fresh or processed into canned products. Seeds make-up around 10 to 15% of the total fruit weight and have high carbohydrate and protein contents [4]. Seeds are normally discarded or steamed and eaten as a snack or used in some local dishes. Traditionally among the people of the south eastern Nigeria, the ripe pulp is eaten fresh while the seeds are consumed when roasted or boiled. The pulps and seeds are not fully utilized and not easily marketed in the fresh form due to post harvest losses. Therefore, processing it into flour for the production of acceptable products like ready-to-eat snacks will help to increase its utilization among consumers. It is worthwhile to utilize the edible seeds and pulps by processing them into convenient snacks like bread and cookies. Such snacks constitute light quick meal eaten in place of main meals or eaten in between regular meals [3]. The average weight of the fruit is between 3.5 to 10 kg and sometimes a fruit may reach up to 25 kg. There are two main varieties: one is small, fibrous, soft, and mushy, and the

carpels are sweet, with a texture like that of a raw oyster and the other variety is crisp and crunchy, but not very sweet [5].

Phytochemicals are plant bioactive compounds in addition to those which are traditionally considered as nutrients, such as vitamins and minerals. Phytochemicals are also a large group of plant-derived compounds hypothesized to be responsible for much of the disease protection conferred from diets high in fruits, vegetables, beans, cereals and plant-based beverages such as tea and wine [6]. They are produced via secondary metabolism in relatively small amounts. Fruits and vegetables are important sources of a variety of beneficial agents including vitamins, minerals, fiber and phytochemicals [3]. Proximate analysis considers the basic nutritional sources as protein, carbohydrates, fats, moisture, ash and fibre, which are needed for growth and development in human and animals [7].

Many reports on some lesser known leaves and fruits indicate that they could be good sources of nutrients for both man and livestock and could be used as medicinal plants. Hence the need to investigate the quantitative phytochemical and proximate compositions of *Artocarpus heterophyllus* leaves.

Figure 1: *Artocarpus heterophyllus* Leaves [8].

MATERIALS AND METHODS

Materials

Artocarpus heterophyllus leaves were collected from Aguluzigbo, Anocha L.G.A in Anambra State in October. The chemicals and reagents used were of analytical quality.

Methods

The Phytochemical and proximate analyses were carried out by the methods of Association of Official Analytical Chemists (AOAC) (2014), [9].

RESULTS

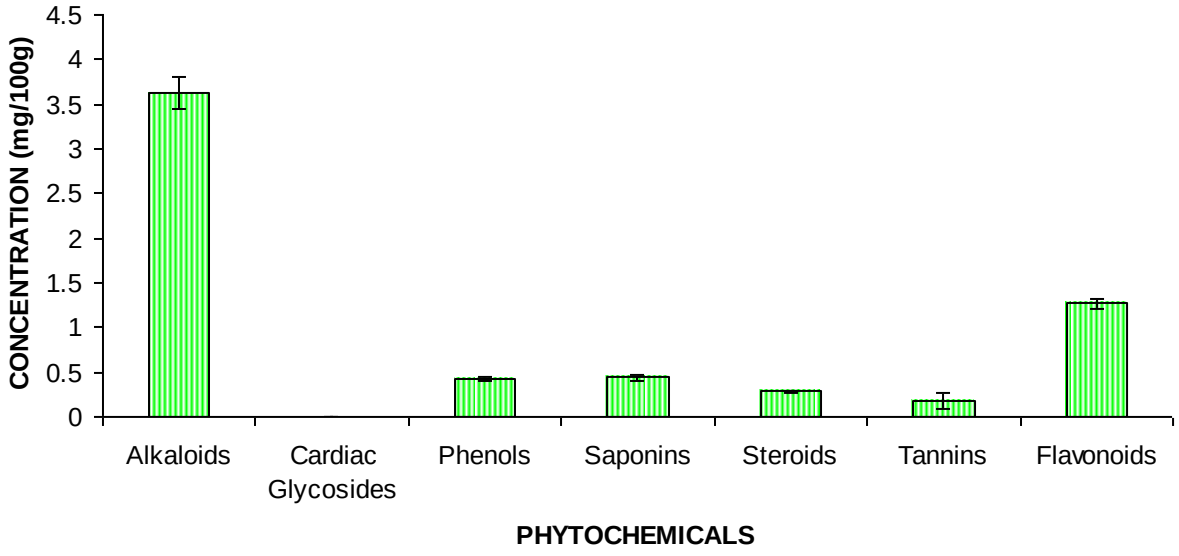

Figure 2: Phytochemical Composition of *Artocarpus heterophyllus* Leaves

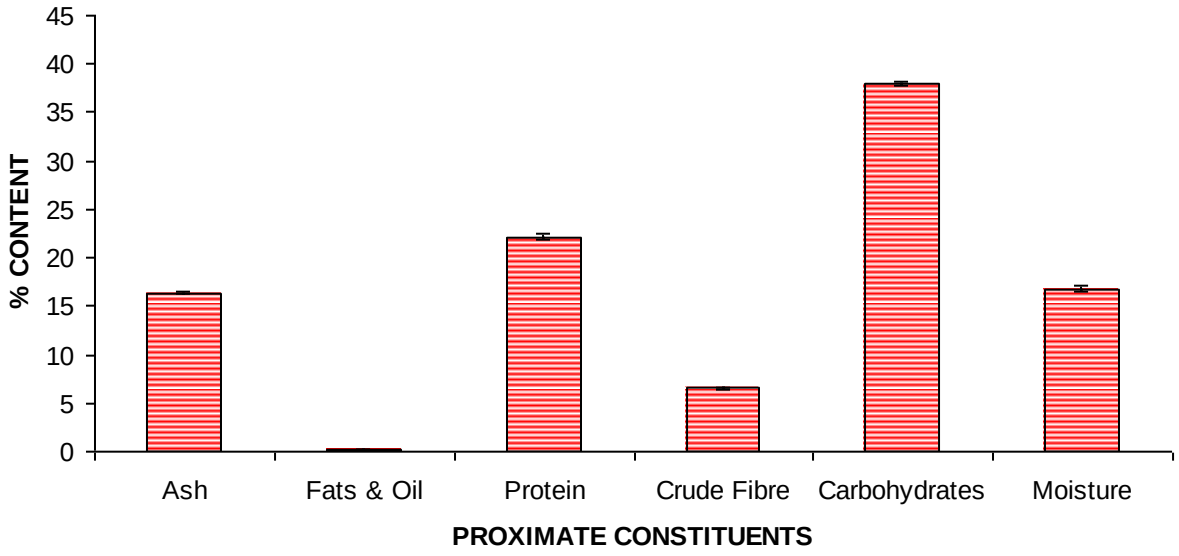

Figure 3: Proximate Composition of *Artocarpus heterophyllus* Leaves

DISCUSSION AND CONCLUSION

The phytochemical analysis of *Artocarpus heterophyllus* leaves revealed the presence of alkaloids, cardiac glycosides, tannins, steroids, saponins, flavonoids and phenols as shown in figure 2. However, the results revealed that the chemical constituents varied significantly in the plant leaves analyzed. The results recorded highest level of alkaloids in *Artocarpus heterophyllus* leaves. The cardiac glycoside was found to be lowest in *Artocarpus heterophyllus* leaves (Fig. 2), but pawpaw leaves had thigher value of cardiac glycoside [10]. The results revealed considerable amount of flavonoids in *Artocarpus heterophyllus* leaves (figure 2). Okwu (2004), [11], reported that neem leaves and bitter kola leaves also contain flavonoids. The results of the study revealed that *Artocarpus heterophyllus* leaves contained some level of tannins. *Anacardium Occidentale* leaves and *Carica papaya* leaves had tannins values as 0.56% and 1.16% respectively [12].

In addition, the percentage proximate compositions of *Artocarpus heterophyllus* leaves showed relatively high carbohydrate value (Fig. 3). Akubugwo *et al*. (2007), [13], reported that *Amarathus hybridus* leaves had the carbohydrate value as 52.18%. The protein content of *Artocarpus heterophyllus* leaves was observed to be 22.17% while cassava leaves and *Talinum triangulare* leaves had the protein values as 24.88% and 29.78% respectively. The obtained results revealed high ash content in the leaves of *Artocarpus heterophyllus* leaves (Fig. 3). Akindahunsi and Salawu (2005), [14], reported that *Talinum triangulare* leaves and *Amarathus hybridus* leaves had the ash values as 5.90% and 4.80% respectively. The *Artocarpus heterophyllus* leaves recorded very low content of fat (Fig. 3). It was observed that *Artocarpus heterophyllus* leaves had the moisture content value of 16.80%. Ekumankama (2008), [15], reported that Oha and Nturukpa leaves had the moisture content values as (83.75%) and (80.75%) respectively.

In conclusion, the results of the study revealed higher percentage of alkaloids and flavonoids in *Artocarpus heterophyllus* leaves while tannins, steroids, saponins and phenols were low. The results of proximate compositions showed higher percentage of carbohydrate, proteins, moisture and ash and lowest percentage of fat.

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