

PROXIMATE COMPOSITION AND PHYTOCHEMICAL PROPERTIES OF PEPPER FRUIT (*Dennettia tripetala*)

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ABSTRACT

The objective of this study was to identify the proximate composition and the phytochemical constituents of pepper fruit (*Dennettia tripetala*) fruit powder (DTFP). The fresh fruits of *D. tripetala* were harvested from a farm location in Akure. The fruits were washed with fresh water, drained and allowed to dry under the sun, milled to DTFP and analyzed for the proximate and phytochemical compositions. The carbohydrate (47.68±73%) was relatively high in proportion; while the ash (4.86±29%) has the lowest proportion. The DTFP has relatively high concentration of alkaloids, saponins and phenol (43.60±03mg/g, 42.48±01mg/g and 42.50±17mg/g respectively). The concentration of tannin and flavonoids were 38.77±05mg/g and 38.31±03mg/g respectively. The proximate composition of DTFP and its significant levels of phytochemicals present it as a substance that could be employed as a natural feed/food supplement in animal and human nutrition.

Keywords: Proximate composition, Phytochemicals, Pepper fruit, Feed, Supplement

INTRODUCTION

The demand for organic-based food has been on the increase by health-conscious individuals. This has given rise to exploring plant-based growth promoters with rich source of nutrients and phytochemicals. Plants are a good source of a wide range of phytochemicals such as terpenoids, alkaloids, carotenoids, terpenes, polyphenols and sulphur-containing groups which contain enormous nutrients and antioxidant properties (Bhanu *et al.*, 2020). Several studies have been carried out using different plants and their various parts to improve productivity and boost the immunity status of animals and enhance the quality of animal products. Such studies include *Ficus species* (Osowe *et al.*, 2021), *Acalypha wilkesiana* (Adeola *et al.*, 2025), *Ocimum gratissimum* leaf powder, *Irvingia abonensis* kernel powder (Oloruntola *et al.*, 2021); moringa leaf meal, garlic rhizome meal (Gbore *et al.*, 2021); *Syzygium maticum* leaf meal, *Myristica fragrans* seed meal (Adu *et al.*, 2020). The supplementation of these phytochemical substances of plant origin in poultry rations has contributed significantly to improving the performance of animals, enhancing carcass traits and health status, ameliorating the deleterious effects of oxidative stress and contributing positively to improved animal products (Oloruntola *et al.*, 2021; Gbore *et al.*, 2021; and Adu *et al.*, 2020). Egharevba and Idah (2015) indicated that the seeds of pepper fruit showed the presence of alkaloids, tannins, saponins, flavonoids, terpenoids, steroids and cardiac glycosides. Due to the rising price of inorganic drugs and supplements, it becomes crucial to explore the vast potentials and health benefits of pepper fruit. Therefore, this study seeks to examine the proximate and phytochemical constituents of pepper fruit in order to determine their relevance and usage as nutraceuticals.

MATERIALS AND METHODS

Collection of *Dennettia tripetala* Fruit Powder

The fresh fruits of *Dennettia tripetala* were harvested from a farm located in Akure, Ondo State, Nigeria. A Crop Scientist from the Department of Crop, Soil and Pest Management at The Federal University of Technology, Akure, Nigeria, validated the plant. After being thoroughly cleansed with fresh water, the fruits were drained and allowed to dry under the sun, protected with net screen to keep off contaminants for 21 days, ground into powder and stored in the refrigerator until analysis were carried out.

Proximate and Phytochemical Analysis of *Dennettia tripetala* Fruit Powder

The Association of Official Analytical Chemists' established techniques were used for proximate analysis (AOAC, 2010). Osowe *et al.* (2022) reported the methods for determining alkaloids, saponins (Otles and Yalcin, 2012), flavonoids (Surana *et al.* (2016), tannins (Biswas *et al.*, 2020), and phenols (Otles and Yalcin, 2012).

RESULTS AND DISCUSSION

The proximate composition and phytochemical constituents of *Dennettia tripetala* fruit powder is shown in Table 1. The Crude Protein (CP), Crude Fibre (CF), Fat, Ash, Moisture Content (MC) and the Carbohydrate (CHO)

contents were 13.25±31%, 15.49±42%, 6.95±13%, 4.86±29%, 11.41±60% and 47.68±73% respectively. Alkaloids, tannins and saponins contain 43.60±03mg/g, 38.77±05mg/g and 42.48±01 mg/g respectively while flavonoids and phenols were found to be 38.31±03 mg/g and 42.5±17mg/g respectively.

Table 1: Proximate composition and phytochemical constituents of pepper fruit (*Dennettia tripetala*)

Proximate analyses	Composition
Crude Protein (%)	13.25±31
Crude Fibre (%)	15.49±42
Crude Fat (%)	6.95±13
Ash (%)	4.86±29
Moisture content (%)	11.41±60
Carbohydrate (%)	47.68±73
Phytochemicals	Concentration
Alkaloid (mg/g)	43.60±03
Tannin (mg/g)	38.77±05
Saponin (mg/g)	42.48±01
Flavonoid (mg/g)	38.31±03
Phenol (mg/g)	42.50±17

The MC of *D. tripetala* as recorded in this study is an indication that it could be stored for future use and this will mitigate the possibility of deterioration of fresh fruits. The level of CP content of *D. tripetala* fruit powder (13.25%) is higher than the value reported by Osowe *et al.* (2021) for *Ficus thonningii* (7.63%) but lower than the value reported by Osagie and Aguebor-Ogie (2020) for *Ficus sycomorus* (17.9%). Various studies have suggested leaf and fruit meals and powders from tropical vegetables and herbs have been extensively used as protein sources in animal nutrition (Oloruntola *et al.*, 2021). This shows that *D. tripetala* could be used as a dietary protein source in animal nutrition.

In this study, the CHO value was higher than the value reported by Ganogpichayagrai and Suksaard (2020) for *Acanthopanax trifoliatum* (16.47%) which shows that the pepper fruit powder could contribute to the dietary energy required for the normal functioning of the body. The crude fiber content of *D. tripetala* is comparable to those reported by Osowe *et al.* (2021) for *F. carica* and *F. exasperata*, which is an indication that *D. tripetala* could be of great value in animal and human nutrition and could provide additional dietary minerals needed when used as a feed supplement or ingredient. The tannins and flavonoids found in *D. tripetala* support its potential as an anti-microbial, anti-inflammatory, and anti-tumour agent and a means of scavenging deleterious free radicals and reactive oxygen species (Teiten *et al.*, 2013). Saponins assist in modulating blood lipids, reducing cancer risk, improving blood glucose response and antioxidant properties (Igidi and Edene, 2014) and as such, the fruit powder of *D. tripetala* contains an appreciable amount of saponins, which could imply possessing anti-microbial potentials. The presence of alkaloids in *D. tripetala* fruit powder shows that the fruit has various pharmacological qualities, including antihypertensive, anti arrhythmic, anti-malaria, and anti-cancer activities, which is consistent with the report of Saxena *et al* (2013).

CONCLUSION

The results of this study reveal that pepper fruit (*Dennettia tripetala*) contains a significant proportion of phytochemicals with considerable biological value in its proximate composition. Consequently, the fruit powder could be employed as a natural feed supplement in animal nutrition. More research is needed to assess the efficacy of DTFP as feed supplements on animal productivity and immune status.

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