PROXIMATE, PHYTOCHEMICAL AND MINERAL COMPOSITION OF AFRICAN PEAR (*DACRYODES EDULIS*) LEAF MEAL

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ABSTRACT
This study investigated the proximate, phytochemical, and mineral composition of African pear (Dacryodes edulis) leaf meal, emphasizing its nutritional and medicinal potential. The leaves were harvested, processed into meal form, and analysed using standard methods. Proximate analysis revealed high crude protein (17.50%) and fibre content (30.0%), with nitrogen-free extract at 46.0%. Phytochemical assessment indicated the presence of alkaloids (1.2%), glycosides (2.0 mg/g), saponins (3.5%), flavonoids (3.8%), reducing compounds (1.1%), and polyphenols (3.2%). Mineral composition showed nitrogen (2.8%), potassium (1.96%), calcium (1.36%), magnesium (0.53%), and phosphorus (0.14%). These findings suggest that African pear leaf meal is rich in bioactive compounds and essential nutrients, positioning it as a viable candidate for animal feed and medicinal applications.
Keywords: African pear, leaf meal, proximate, phytochemical, mineral

INTRODUCTION

African pear (*Dacryodes edulis*) is an evergreen perennial fruit tree which belong to the family *Burseraceae.* It is nature to countries in Central and West Africa and produces edible fruits. It can grow to 18-40m height, with compound alternate leaves consisting of 5 – 8 pairs of leaflets and yellow flowers (Makoute and Lekange, 2021). Flowering takes place from January to April and fruiting takes place between May and October yearly (Makoute and Lekange, 2021).

Proximate composition refers to the analysis of the basic nutritional components of a feedstuff, and it is expressed as percentages. It includes the following components: Moisture, Crude Protein, Ether Extract, Crude fibre, Ash and Nitrogen-Free Extract (Christopher *et al.,* 2022). Proximate composition helps the nutritionists to ascertain the nutritional value of feeds, enabling formulation of balanced diets to meet the specific needs of animals. (Christopher *et al.,* 2022)

Leaf and seeds meals are valuable feedstuff for livestock, they are plant-derived products made by drying and grinding leaves and seeds and into fine powder. According Christopher *et al.* (2024); Ekpo *et al.* (2022), leaf meals are widely used as a feed supplement in animal nutrition. They are rich in protein, fibre, vitamins, and minerals, making them valuable addition to animal diets (Christopher *et al.,* 2019).

The primary use of *D. edulis* is its fruit which can be eaten raw, boiled or roasted. Notwithstanding, African pear is a multipurpose tree. This is because in addition to the consumption of its fruits, the leaves, bark and root are used for medicinal purposes to treat aliments like wound, skin diseases, dysentery and fever (Omonhinmin, 2012; Miguel *et al.,* 2017). The leaves are utilized as fodder for ruminants in periods of scarcity. In addition, there is paucity of information on the proximate, phytochemical and mineral composition of the leaves. The objective of this study is therefore to determine the proximate, phytochemical and mineral constituents of African pear leave meal.

MATERIALS AND METHODS

Source and preparation of African Pear Leaf Meal

Fresh African pear leaf as was harvested from the trees within Obio Akpa Community, Oruk Anam Local Government Area, Akwa Ibom State, Nigeria. The leaves were washed in clean tap water to remove dirt and drained. After this, the leaves were chopped into tiny pieces and sun-dried for 5 days. The sun-dried leaves were run through a hammer mill with a 2mm sieve to produce the African pear leaf meal which were stored in air-tight sacs for further analysis.

Proximate Analysis

Proximate analysis of African pear leaves was conducted to determine the residual moisture, crude protein, Ether extract, crude fibre, ash, and NFE contents. This was done using methods described by Association of Official Analytical Chemist (AOAC, 2010).

Phytochemical Analysis

The quantitative phytochemical analysis of the African pear leaf meal were carried out for the presence of alkaloid, glycosides, saponins, flavonoids, reducing compounds, tannins, terpenoids using the standard procedures and as described by Edeoga *et al.* (2005) and Oluduro (2012).

Mineral Analysis
This was done using atomic absorption spectrophotometer (AAS) Model 210/211 VGP Buck scientific; K was analysed using flame photometer model Jenway PFP- 7, UK.

RESULTS AND DISCUSSION

Table 1: Proximate and Mineral Composition of African Pear Leaf Meal

Parameters	Content (%)
Residual moisture	8.33
Crude protein	17.50
Ether Extract	4.0
Crude fibre	30.0
Ash	2.5
NFE	46.0
Energy (kcal/g)	350

Table 2: Phytochemical Composition of African Pear leaf meal

Parameters	Content
Alkaloid	1.2%
Glycosides	2.0mg/g
Saponins	3.5%
Flavonoids	3.8%
Reducing compound	1.1%
Polyphenol	3.2%

Table 3: Mineral Composition of African pear leaf meal

Parameters	Content (%)
Nitrogen	2.8
Phosphorus	0.14
Potassium	1.96
Calcium	1.36
Magnesium	0.53

Proximate Composition
Table 1 contains the proximate composition of African pear leaf meal which shows that it is high in crude protein (17.50%), crude fibre (30.0%), and contains appreciable amounts of ether extract, (4.0%) ash (2.5%) and Nitrogen free extract (46.0%).
This result shows that African pear leaf meal can be an excellent source of carbohydrate and protein. The fibre content (30.0%) present is an advantage to ruminants.

Phytochemical Composition
Table 2 shows the quantitative composition of different phytochemicals in sundried African pear leaf meal. The phytochemicals present in African pear leaf meal from the study include alkaloid (1.2%), glycosides (2.0mg/g), saponins (3.3%), flavonoids (3.8%), reducing compound (1.1%) and polyphenol (3.2%). Phytochemical analysis helps to ascertain the presence of bioactive chemical constituents in plants which can be used in the production of medicinal drugs (Harshal *et al.,* 2014). Alkaloids are used for medicinal purposes in the form of tinctures and as fluid extracts which also needs some further processing (Olayinka, 2023) saponins are a special class of glycosides which have soapy characteristics and have also been shown to possess active antifungal agents (Olayinka, 2023).
Flavonoids exhibit a wide range of properties, which include their ability to scavenge for free radicals thus promoting good health. In addition, flavonoids exhibit anti-inflammatory, antiallergic, antiangionic, analgesic and antioxidant properties (Olayinka, 2023).
Polyphenols are outstanding plant derived metabolites that exhibit pro-cardiovascular, antioxidant, anticancer, anti-diabetic, and anti-neurodegenerative properties (Iqbal *et al.,* 2023).

Mineral Composition
Table 3 shows the mineral composition of sundried African pear leaf meal. It contains Nitrogen (2.8%), phosphorus (0.14%), potassium (1.96%), calcium (1.36%) and magnesium (0.53%). Nitrogen is an important component of nuclei acids, proteins, hormones, and coenzymes (Soetan *et al.,* 2010). Phosphorus functions as components of

nucleic acids, phospholipids, adenosine triphosphate (ATP), several coenzymes and also plays a key role in bone and teeth health.

CONCLUSION

The study highlights the nutritional and phytochemical richness of African pear (*Dacryodes edulis*) leaf meal. It demonstrates significant crude protein and fibre content, making it an excellent feed component for ruminants and pseudo ruminants. The phytochemicals identified, including flavonoids, saponins, and polyphenols, offer diverse medicinal benefits such as antioxidant, anti-inflammatory, and antifungal properties. The leaf meal also contains essential minerals like nitrogen, potassium, and calcium, which contribute to its potential as a dietary supplement for improving health and productivity in livestock. Given its high fibre and protein content, African pear leaf meal should be further investigated for incorporation into ruminant and pseudo ruminant diets, especially during feed scarcity period. The bioactive compounds identified suggest potential for pharmaceutical use. Future research should focus on isolating and evaluating these compounds for therapeutic applications. Comprehensive feeding trials are recommended to evaluate the impact of African pear leaf meal on livestock growth, health, and productivity. Efforts should be made to explore the use of the leaf meal in creating value-added products, such as dietary supplements or herbal remedies, leveraging its phytochemical and mineral composition. Further studies on the sustainable cultivation and processing of African pear leaves can promote their use as a renewable resource, reducing agricultural waste. Overall, African pear leaf meal shows promise for sustainable applications in animal feed and as a source of bioactive compounds for pharmaceutical development.

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