



## Scientific Research

## Comparison of the Nutritional Composition in *Myrianthus arboreus* and *Alchornea cordifolia* Grown in Nigeria

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## ABSTRACT

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*Alchornea cordifolia* and *Myrianthus arboreus* are highly nutritious plants that have long been recognised in various cultures and traditional medicine systems. However, there is a scarcity of current scientific research that compares their nutritional compositions. This study aimed to assess and compare the proximate composition, vitamins, and mineral contents of the two species to evaluate their potential in nutritional and therapeutic applications. Fresh leaves of both plants were collected from Nigeria, oven-dried, powdered, and subjected to standard analytical procedures for proximate analysis, vitamin determination, and mineral profiling. The results revealed that *Alchornea cordifolia* is particularly rich in protein (29.75%), carbohydrates (35.86%), and vitamin A (1117 µg/100g), along with notable levels of calcium and potassium, highlighting its value as a source of essential nutrients. In contrast, *Myrianthus arboreus* showed higher fat content (21.27%), dietary fibre (0.45%), and caloric value (406.3 kcal). It also exhibited higher levels of vitamins C and E, which contribute to its antioxidant potential. These findings suggest that each species provides distinct nutritional advantages and could be used complementarily in functional foods or traditional herbal formulations to enhance dietary diversity and health benefits.

## 1-Introduction

The chemical composition of plants has long been a subject of intense scientific interest, driven by their diverse applications in medicine, nutrition, and industry. Among these, two plant species, *Alchornea cordifolia* and *Myrianthus arboreus*, have attracted attention due to their distinctive chemical profiles and medicinal benefits, despite belonging to different families of flowering plants and serving distinct purposes. *Alchornea cordifolia* (Schumacher) Müll. Arg., commonly known as *Alchornea*, is a tropical plant species belonging to the family *Euphorbiaceae*, widely distributed across sub-Saharan Africa, particularly in West and Central Africa. It is renowned for its pharmacological potential and is known locally by various names such as “Coculoudo,” “Apete,” or “Alafia,” holding significant value in the traditional medicine systems of many African communities [1,2,3]. *Alchornea cordifolia* is traditionally used for wound healing, treating diarrhoea, and addressing gastrointestinal and urinary disorders. The leaves and root bark are also applied in managing leprosy and as an antidote to snake venom [1,2,34]. Additionally, the plant has been documented for use in treating ailments such as coughs, headaches, colds, preventing spontaneous abortions, and managing or alleviating asthma attacks [5]. According to the Tropical Plants Database, the leaves or leafy branches of the plant are also considered to possess abortifacient, antispasmodic, blood-cleansing, diuretic, emetic (in high doses), emmenagogic, uterine stimulant, laxative, sedative, and tonic properties. In the form of decoctions or when chewed fresh, they are used to treat a wide range of conditions. The decoction made from the leaves and roots is commonly used as a mouthwash to treat mouth ulcers, toothaches, and dental caries; young twigs are also chewed for similar purposes [6].

*Myrianthus arboreus*, also known as the “giant yellow mulberry,” is a perennial woody plant characterised by a broad, branched canopy and typically attains a height between 10 and 20 metres. It features stilt-like roots up to 60 cm long and a short, often forked trunk with a diameter reaching 1 metre [7]. The species thrives in a variety of moist habitats, including secondary forests, forest openings, wet lowland areas, stream banks, lake shores, flooded zones, and occasionally in human settlements. It is widely distributed throughout West, Central, and East Africa, where the tender leaves are traditionally consumed as leafy vegetables and are employed in ethnomedicine for treating a range of health conditions [8]. Aqueous leaf extracts of *M. arboreus* have been used in Cameroonian ethnomedicine for managing amenorrhoea, both primary and secondary female infertility, and for enhancing lactation [9]. Over the past decade, scientific investigations have demonstrated that the plant possesses notable antioxidant properties [10], as well as antibacterial, anti-infective, and wound-healing activities [11]. Additionally, *M. arboreus* exhibits hypoglycemic, antihyperlipidemic, and antidiabetic potentials, as evidenced by various cell-based bioassays [12]. The application of petioles in the form of poultices constitutes a traditional treatment for boils and, moreover, has been employed to reduce fever and manage dysentery in young children. In traditional Nigerian folk medicine, the stem bark is frequently utilised for the purpose of expelling intestinal parasites [13]. The chemical composition of *Myrianthus arboreus* can vary slightly depending on the specific species and environmental growing conditions. This plant is a rich source of vitamins, particularly vitamins A, B, C, and E. It also contains a wide range of minerals, including iron, zinc, copper, calcium, potassium, sodium, phosphorus, manganese, and magnesium [14]. In addition, both *Myrianthus arboreus* and

dandelion contain carbohydrates, proteins, fats, and a small amount of dietary fibre.

*Alchornea cordifolia* and *Myrianthus arboreus* have an extensive history in traditional medicine and culinary practices across a broad spectrum of geographical regions worldwide. However, scientific data providing a detailed comparison of the nutritional values between *A. cordifolia* and *M. arboreus* remains limited. Therefore, this study was conducted to provide a comprehensive analysis of the proximate composition, vitamins, minerals, and energy content of these two plant species, as well as to explore their potential applications, particularly in the context of nutrition in Nigeria.

## 2-METHODOLOGY

### *Plant collection and preparation*

Two medicinal plants, *Alchornea cordifolia* and *Myrianthus arboreus*, were freshly harvested from a home garden located in the Abak area of Akwa Ibom State, Nigeria. The samples were then promptly delivered to the laboratory for analysis to avoid undesirable moisture loss. In the laboratory, a part of the fresh leaf samples was used for determining wet moisture content. The extra portion undergone careful preparation for chemical analysis. This involved thorough washing with distilled water to eliminate impurities, followed by drying at room temperature for several days to ensure the removal of excess moisture. Subsequently, it was subjected to oven-drying at a temperature of 60°C for a period of 30 minutes. Once the leaves had been thoroughly desiccated and exhibited a pronounced fragility, they were subjected to a grinding process using a blender, resulting in a powdered form. The powdered samples were stored in airtight containers and labelled with letter codes. The powdered samples were utilised in the analysis of dry moisture content, protein, fat, ash (mineral content), and vitamins.

### **Proximate Compositions**

The proximate composition of the samples, comprising moisture, ash, crude protein, crude fat, crude fibre, and carbohydrate, was determined by employing the Association of Official Analytical Chemists' standard techniques as well as modified protocols [15,16].

#### **Crude fibre determination**

Crude fibre was analysed by the Weende procedure. A 5.0 g portion of sample was boiled in 200 mL of 1.25% H<sub>2</sub>SO<sub>4</sub> for 30 minutes and subsequently rinsed with hot distilled water. The insoluble residue was transferred to a boiling flask containing 200 mL of 1.25% NaOH and boiled for a further 30 minutes. After filtration and washing, the residue was dried, transferred to a pre-weighed porcelain crucible, and oven-dried at 105°C for 1 hour. The crucible was cooled in a desiccator and weighed (W<sub>2</sub>). The dried residue was then ignited in a muffle furnace, cooled in a desiccator and reweighed (W<sub>3</sub>). Crude fibre content was calculated by difference and expressed as a percentage of the original sample weight [15,16].

#### **Moisture and ash determination**

Moisture and ash contents were obtained gravimetrically [15,16]. For moisture, 10.0 g of each sample were placed in a moisture dish and oven-dried at 105°C for 3 hours, cooled in a desiccator and reweighed. Drying, cooling and weighing were repeated at hourly intervals until constant weight was achieved. Moisture content was reported as the percentage weight loss relative to initial sample mass. For ash determination, samples were incinerated in a muffle furnace at 600°C until grey ash remained; precautions were taken to prevent loss of ash. The recovered ash was retained for subsequent acid extraction and mineral analysis.

#### **Crude fat determination**

Crude fat was analysed by Soxhlet extraction [15,16]. Approximately 5.0 g of sample were wrapped in a pre-weighed filter paper and placed in the extraction thimble. The apparatus was fitted with 200

mL of solvent and operated under reflux such that solvent vapor condensed and percolated through the sample, dissolving lipid constituents. The cycle was continued for ~4 hours. After extraction, the defatted residue was dried at 100°C for 30 minutes and reweighed. Fat content was calculated from the mass loss attributable to extraction and expressed as a percentage of sample mass.

#### **Crude protein determination**

Crude protein was estimated by the Kjeldahl method and AOAC [16]. A 0.50 g aliquot of each sample was digested under a fume hood, mix 10 mL of concentrated H<sub>2</sub>SO<sub>4</sub> with a selenium catalyst until a clear digest is formed. The digest was diluted to 100 mL with distilled water. A 10 mL sample of the digest was made alkaline with an equal volume of 40% NaOH and subjected to steam distillation.; the liberated ammonia was trapped in 10 mL of 4% boric acid containing mixed indicators (methyl red and bromocresol green). Total nitrogen was quantified and crude protein calculated using a conversion factor of 6.25.

#### ***Vitamins and Minerals***

**Vitamin A (Retinol):** A precise quantity of the sample, equivalent to one gram, was weighed and then macerated with 20 millilitres of n-hexane in a test tube. The entire procedure was allowed to run for ten minutes. Following that, 3mL of the higher hexane extract was transferred in triplicate to a dry test tube and evaporated until completely dry. Then, 0.2 mL of acetic anhydride-chloroform reagent (1:1 v/v) was added, followed by 2 mL of 50% trichloroacetic acid in chloroform (1:1 v/v). The absorbances were measured at 15 and 30 second intervals. The content of vitamin A in the sample was calculated using the standard curve [17].

**Vitamin B:** The sample was weighed and ground in a mortar. 0.2 g was transferred to a 250 mL flask, added to 3 mL of 1M NaOH

and stirred until dissolved. Then, three milliliters (3ml) of ethanoic acid were added and the volume adjusted to mark with distilled water. A 25 mL aliquot was diluted to 100 mL, then undiluted and serially diluted again. A 100-ppm vitamin B standard solution and working standards were prepared using 1% glacial ethanoic acid as the solvent. Absorbance was measured within the wavelength range of 240–550 nm, and the wavelength corresponding to the maximum absorbance was selected. The concentration of vitamin B was subsequently determined from the calibration curve, taking into account the appropriate dilution factors. The final results were expressed as mg/100 g of sample [18].

#### **Vitamin C (ascorbic acid) determination**

A 0.5 g portion of the sample was macerated with 10 mL of 0.4% oxalic acid and left to stand for 10 minutes. The mixture was then centrifuged for 5 minutes and subsequently filtered. From the filtrate, a 1 mL aliquot was transferred into a clean test tube, and this step was repeated twice. Each aliquot was treated with 9 mL of 2,6-dichlorophenolindophenol (DCPIP), and absorbance measurements were recorded at 520 nm after 15 and 30 seconds. Standardization was performed using a DCPIP solution (295 mg/L) prepared in 100 mg/L sodium bicarbonate. The vitamin C concentration was quantified and expressed as mg/100 g of dry weight [19].

#### **Vitamin E determination**

One gram (1g) of the sample was extracted with 20 mL of ethanol and the resulting mixture was filtered. An aliquot of 1 mL from the filtrate was combined with 1 mL of 0.2% ferric chloride solution in ethanol and 1 mL of 0.5%  $\alpha,\alpha$ -dipyridine solution. The reaction mixture was then diluted to a total volume of 5 mL using distilled water, after which absorbance was recorded at 520 nm. Standard solutions were prepared following the same procedure, and the concentration of vitamin E in the sample

was determined by reference to the standard calibration curve [20].

### Mineral analysis

Mineral elements were quantified using the AOAC methods. Sodium (Na) and potassium (K) were measured with a Sherwood Flame Photometer (Model 420), while phosphorus (P) was analysed using a Labtech Advance Microprocessor Single Beam UV-VIS Spectrophotometer (Model 295). The remaining trace and heavy metals were determined with a REYLEIGH Atomic Absorption Spectrophotometer (Model WFX320) following wet digestion with a mixture of 70% perchloric acid and nitric acid in a 1:3 ratio [20].

### Statistical Analysis

Data were expressed as mean  $\pm$  standard error of mean (SEM). Proximate composition results were reported in percentages, mineral contents in mg/g, and vitamin concentrations in mg/100 g of sample. Comparative differences between

the two plant species were evaluated using one-way ANOVA at a significance level of  $p = 0.05$ .

## 3-RESULTS

### Proximate composition

The proximate composition of the two plant species, *Alchornea cordifolia* and *Myrianthus arboreus*, is presented in Figure 1. There were observable differences in wet moisture, dry moisture, fat, and fibre contents between the two species, whilst no significant differences were identified in protein and ash levels (according to the Unpaired T-test with Welsh correction). These differences are indicative of the distinct nutritional characteristics of each species, thereby providing a scientific basis for their potential applications in food and traditional medicine.

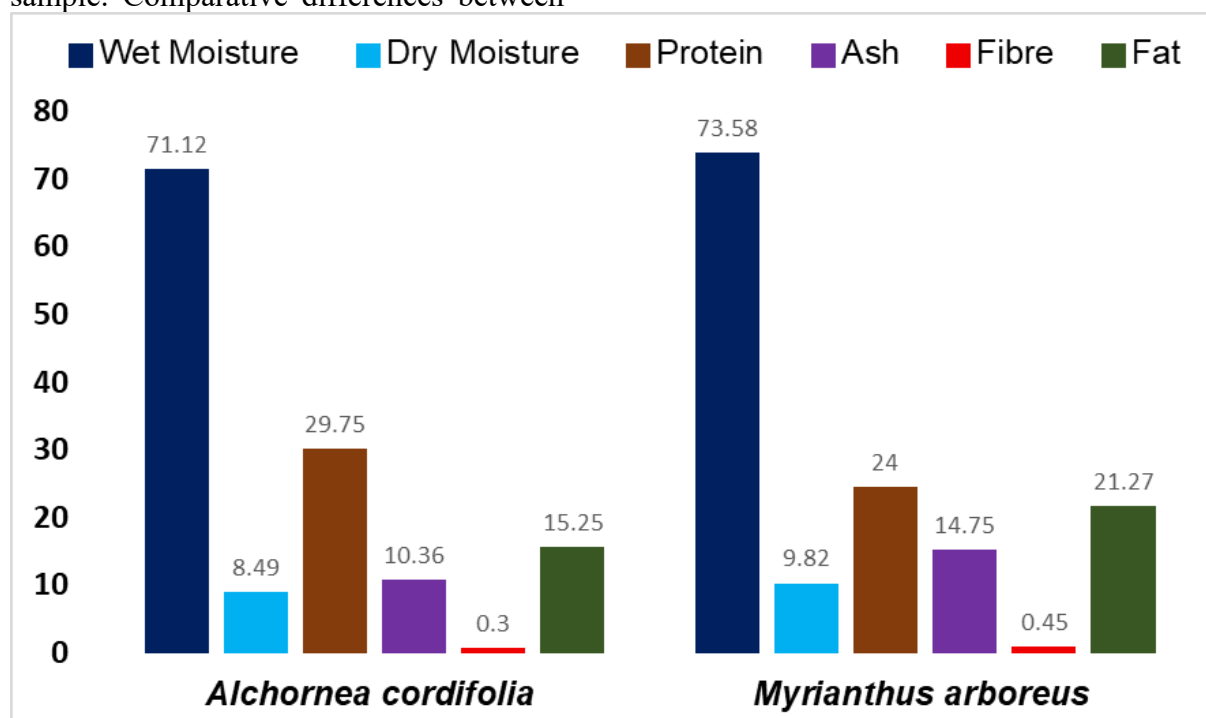


Figure 1. Comparison of proximate compositions in two plants

Results showed that the wet moisture content of *Myrianthus arboreus* ( $73.58 \pm 0.15\%$ ) was higher than that of *Alchornea cordifolia* ( $71.12 \pm 0.52\%$ ),

indicating a greater water-holding capacity of *Myrianthus arboreus* leaves in their fresh state. However, when analyzed in the dried state, the dry moisture content of *Alchornea*

cordifolia ( $8.49 \pm 0.04\%$ ) was found to be lower than that of *Myrianthus arboreus* ( $9.82 \pm 0.28\%$ ), suggesting that *Alchornea cordifolia* has a better moisture evaporation capacity. This may be attributed to differences in microstructural features or cellulose content. Ash content showed that *Myrianthus arboreus* had a higher ash content ( $14.75 \pm 0.45\%$ ) compared to *Alchornea cordifolia* ( $10.36 \pm 0.86\%$ ). This indicates that *Myrianthus arboreus* may contain a richer mineral composition, including elements such as calcium, magnesium, and potassium which are essential for bone health and various metabolic processes.

Protein content was observed, with *Alchornea cordifolia* exhibiting a substantially higher level of protein ( $29.75\% \pm 2.48\%$ ) in comparison to *Myrianthus arboreus* ( $24.00\% \pm 0.71\%$ ). This finding indicates that *Alchornea cordifolia* could be a more viable source of plant-based protein, which is especially important in regions with limited access to animal protein and has the potential to be used for nutritional supplementation.

Fat content of *Myrianthus arboreus* ( $21.27\% \pm 0.33\%$ ) was found to be higher than that of *Alchornea cordifolia* ( $15.25\% \pm 0.35\%$ ), indicating a greater energy density in the former. Despite the generally low fat levels observed in leafy species, the substantial presence of fat detected in this study may contribute to the provision of fat-soluble vitamins, including A and E. Overall, the comparative data indicate that while *Alchornea cordifolia* is superior in protein content, *Myrianthus arboreus* offers advantages in fat, ash, and moisture content. Each plant may therefore be preferred in different nutritional or medicinal applications depending on the desired bioactive component

### CHO and Energy (Kcal)

The carbohydrate content of *Alchornea cordifolia* ( $35.86\%$ ) to be similar to another report by Philip et al., [21] ( $39.53\%$ ). However, according to Akinola et al. [22], most leaves are generally not good sources of carbohydrates. In this study, the carbohydrate content of two plant species, *Alchornea cordifolia* and *Myrianthus arboreus*, was determined to evaluate their nutritional potential. The results showed that *A. cordifolia* had a significantly higher carbohydrate content ( $35.86 \pm 3.66\%$ ) compared to *M. arboreus* ( $29.72 \pm 0.45\%$ ). The high carbohydrate content of *A. cordifolia* suggests that it may serve as a valuable plant-based source of carbohydrates, particularly in regions with limited access to energy-dense foods. However, when considering caloric value, *M. arboreus* exhibited a higher energy content, with  $406.3 \pm 1.18$  kcal compared to  $398.6 \pm 1.57$  kcal in *A. cordifolia*. This difference was statistically significant ( $p < 0.05$ ), indicating that despite its lower carbohydrate content, *M. arboreus* may contain other energy-rich nutrients such as fats or proteins.

### Vitamins and Minerals

The vitamin composition of *Alchornea cordifolia* and *Myrianthus arboreus* reveals notable differences in Figure 2. *Alchornea cordifolia* demonstrates a significantly higher content of both water-soluble and fat-soluble vitamins. Specifically, this species contains much greater amounts of vitamins A and B compared to *Myrianthus arboreus*, indicating its stronger potential as a source of essential micronutrients. In contrast, both species exhibit low levels of vitamins C and E; however, *Alchornea cordifolia* still shows slightly higher values. These differences reflect the biochemical diversity and distinct nutritional application potential of the two plant species.

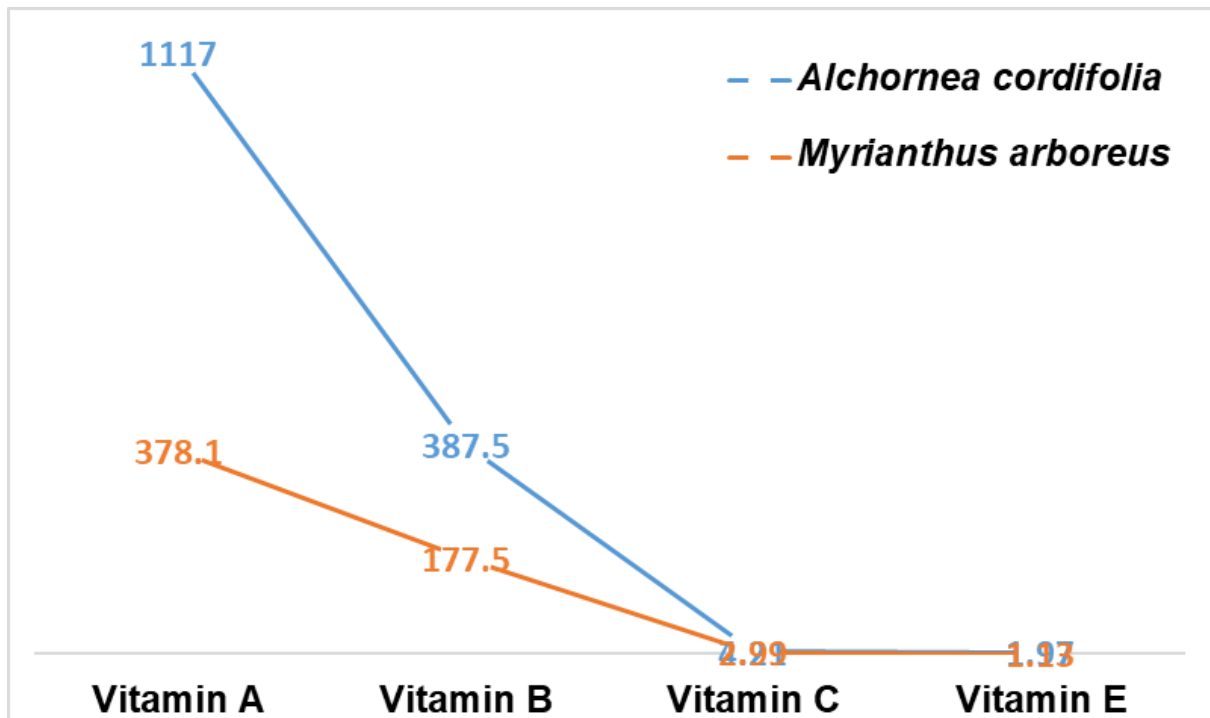
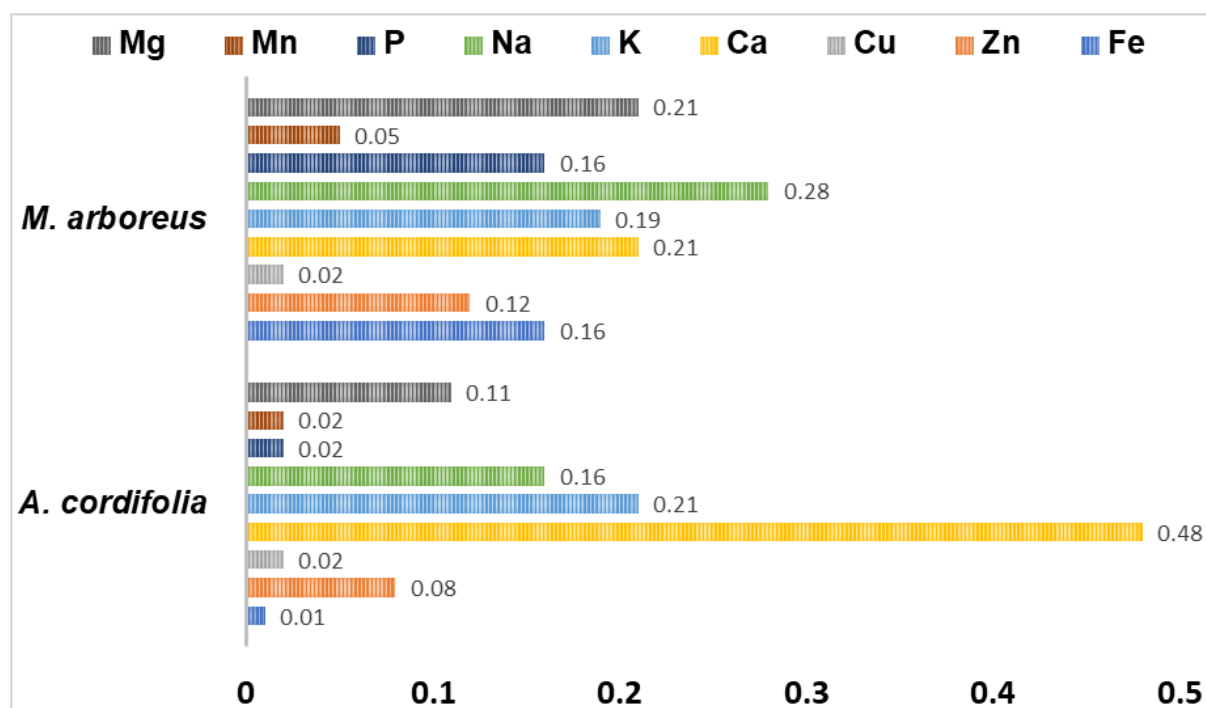


Figure 2: Vitamin composition of *Alchornea cordifolia* and *Myrianthus arboreus*

*Alchornea cordifolia* exhibits significantly higher levels of vitamin A ( $1117 \pm 0.21$  mg/100 g) and vitamin B ( $387.5 \pm 17.74$  mg/100 g), suggesting that this species may serve as a richer dietary source of provitamin A and essential B-complex vitamins. In contrast, *Myrianthus arboreus* has markedly lower levels of vitamins A and B, indicating a more limited contribution to the intake of these micronutrients. However, the levels of vitamins C and E are relatively comparable

between the two species, with *Alchornea cordifolia* containing  $4.21 \pm 0.32$  mg/100g of vitamin C and  $1.97 \pm 0.04$  mg/100g of vitamin E. Although both values remain relatively low, *Alchornea cordifolia* still presents slightly higher antioxidant vitamin content, which may enhance its biological value in managing oxidative stress. Overall, the results indicate that *Alchornea cordifolia* exhibits a nutritional superiority in terms of vitamin content, particularly vitamins A and B.



**Figure 3:** mineral composition of *Alchornea cordifolia* and *Myrianthus arboreus*

The mineral composition of *Alchornea cordifolia* and *Myrianthus arboreus* shows a distinct distribution pattern, reflecting their different ecological adaptations and nutritional potentials in **Figure 3**. *Myrianthus arboreus* exhibited higher concentrations of most minerals, including iron ( $0.16 \pm 0.01$  mg/g), zinc ( $0.12 \pm 0.01$  mg/g), sodium ( $0.28 \pm 0.04$  mg/g), phosphorus ( $0.16 \pm 0.01$  mg/g), manganese ( $0.05 \pm 0.01$  mg/g), and magnesium ( $0.21 \pm 0.02$  mg/g). In contrast, *Alchornea cordifolia* showed higher levels of calcium ( $0.48 \pm 0.03$  mg/g) and potassium ( $0.21 \pm 0.01$  mg/g). Although this species had lower overall mineral content, the dominance of calcium may support its traditional uses in bone-related ailments or as a calcium supplement.

#### 4-DISCUSSION

The comparative analysis of the nutritional composition between *Alchornea cordifolia* and *Myrianthus arboreus* reveals distinct variations in proximate nutrients, mineral content, and vitamin levels, reflecting both biological and environmental influences on nutrient accumulation. The present study shows that the proximate composition of *A.*

*cordifolia* aligns well with previously published data, thereby confirming its nutritional and therapeutic potential. For instance, Oyediji et al. [23] reported moisture, crude protein, fat, fibre, and carbohydrate contents of 65.34%, 10.64%, 5.28%, 6.33%, and 0.11% in the leaves; 69.05%, 9.53%, 5.49%, 8.39%, and 1.57% in the bark; and 72.28%, 4.22%, 3.03%, 7.31%, and 1.03% in the stem, respectively. These findings aligned with the present results, where *A. cordifolia* demonstrated high moisture and moderate crude protein content. Similarly, Ngaha et al. [24] and AOAC [15] reported comparable ranges for moisture and fibre content, confirming that the proximate composition of *A. cordifolia* varies significantly across plant parts, yet consistently shows good nutritional balance.

In this study, the dry moisture content of *A. cordifolia* leaves ( $8.491 \pm 0.04\%$ ) corresponds with previous findings [21,24], while *M. arboreus* exhibited slightly higher dry moisture ( $9.82 \pm 0.28\%$ ). In terms of wet moisture, *M. arboreus* recorded  $73.58 \pm 0.15\%$ , consistent with the general range of 58–93.4% typical of leafy vegetables

[15]. These variations suggest that *M. arboreus* contains less water and higher solid matter, implying better storage potential and nutrient density per dry unit weight, whereas *A. cordifolia*'s higher moisture may enhance freshness and ease of processing.

Protein content varied considerably between both species, underscoring their nutritional significance. *A. cordifolia* contained  $29.75 \pm 2.48\%$  protein, notably higher than earlier reports of  $13.19 \pm 0.31\%$  [24] and  $17.94 \pm 0.40\%$  [21], but comparable to its leaf composition as reported by Oyediji et al. [23], which demonstrated the leaves having the highest crude protein value (10.64%) relative to the bark (9.53%) and stem (4.22%). *M. arboreus* also exhibited a high protein level ( $24.00 \pm 0.71\%$ ), suggesting that both species provide valuable dietary proteins within or above the recommended 10–35% RDA range. Variations in protein content can be attributed to environmental factors, harvesting time, and sample preparation methods, yet they consistently demonstrate that *A. cordifolia* and *M. arboreus* are protein-rich and suitable for inclusion in plant-based diets.

In terms of fat and fibre composition, *A. cordifolia*'s fat content (5.28–5.49%) was comparable to *M. arboreus* and within the range reported by Oyediji et al. [23]. The bark and leaves contained similar fat levels, with the stem showing lower values, as also observed by Nouredini and Byun [25]. The fibre content of *A. cordifolia* was highest in the bark (8.39%), followed by the stem (7.31%) and leaves (6.33%), consistent with the present low-fibre trend in both *A. cordifolia* (0.30%) and *M. arboreus* ( $0.45 \pm 0.03\%$ ). These fibre values remain below the recommended dietary allowance, implying limited contribution to daily fibre intake. Nonetheless, the high moisture and balanced proximate profile support their utility in fresh or semi-processed nutritional applications.

The ash content of *A. cordifolia* in this study (10.36%) closely matches earlier reports [21] but was lower than that of *M. arboreus* ( $14.75 \pm 0.45\%$ ). The high ash percentage in *M. arboreus* indicates greater mineral residue after combustion, suggesting higher mineral abundance. *A. cordifolia*'s carbohydrate content (35.86%) is comparable with the 39.53% reported by Philip et al. [21] and much higher than the minor carbohydrate values (0.11–1.57%) in the various plant parts reported by Oyediji et al. [23]. This difference may arise from sample drying and analytical basis (fresh vs dry weight). In contrast, *M. arboreus* displayed significantly higher kcal levels ( $406.3 \pm 1.18\%$ ) and energy value (406.3 kcal), making it a potent energy source compared to *A. cordifolia* (398.6 kcal). This agrees with the proximate distribution where *M. arboreus* accumulated more carbohydrates and energy reserves.

The vitamin analysis revealed that both species are nutritionally valuable sources of vitamins A, B, C, and E. *A. cordifolia* recorded high vitamin A (1117 mg) and B (387 mg) concentrations, consistent with its rich biochemical profile and higher pigment accumulation, while *M. arboreus* showed  $378.1 \pm 2.67$  mg of vitamin A and  $177.5 \pm 3.54$  mg of vitamin B. The presence of vitamin C (4.21–5.15 mg) and vitamin E (1.13–1.97 g) across both species reflects substantial antioxidant potential, which enhances immune function and cellular protection. These vitamin profiles reinforce the ethnomedicinal relevance of *A. cordifolia*, which has been widely recognized for its phytochemical and antioxidant constituents [23].

Mineral analysis further differentiates the nutritional attributes of both species. In the present study, *A. cordifolia* exhibited moderate mineral concentrations compared to *M. arboreus*. According to Essien et al. (2015), potassium is the most abundant mineral in *A. cordifolia*, reaching 4757.13 mg/l in the stem, 4298.53 mg/l in the bark, and 3338.75 mg/l in the leaves, followed by

sodium (1379.05–2029.91 mg/l), calcium (808.50–1288.81 mg/l), magnesium (583.95–775.22 mg/l), and zinc (12.76–26.07 mg/l). However, the current findings, *A. cordifolia* demonstrated moderate macronutrient levels. The differences in mineral concentration among plant parts suggest distinct physiological roles and mineral partitioning. In comparison, *M. arboreus* exhibited relatively higher iron ( $0.16 \pm 0.01$  mg/g) and sodium (0.28 mg/g) levels but lower calcium (0.21 mg/g) and zinc (0.08 mg/g), consistent with the natural variation between species and environmental influences on mineral uptake.

Overall, these compositional differences underscore the complementary nutritional value of *A. cordifolia* and *M. arboreus*. While *A. cordifolia* demonstrates a balanced nutrient distribution and superior vitamin content, *M. arboreus* offers greater carbohydrate and energy yields. The alignment of current findings with established literature [15,23,24,25,26] strengthens the reliability of the results and supports the potential use of both plants as sustainable nutritional and therapeutic resources. As Oko et al. [27] further emphasized in comparative studies involving Brazilian plume flower and dandelion, species-specific nutritional diversity enhances the scope for food and pharmaceutical applications. Hence, the current comparative evaluation contributes valuable insight into the nutrient potential and public health relevance of *A. cordifolia* and *M. arboreus*, reinforcing their importance as underutilized yet nutrient-dense plant species suitable for food, health, and industrial development.

In addition to the similarities that have been observed in previous studies, the differences in nutritional composition between *A. cordifolia* and *M. arboreus* are of significant value for public health. *A. cordifolia* was found to have a high vitamin A content, suggesting potential in preventing vitamin A deficiency and

enhancing the immune system. [28]. Conversely, *M. arboreus* is characterised by a substantial carbohydrate and energy content, making it a suitable option for individuals with elevated caloric requirements. [29]. Differences in minerals also demonstrate complementarity between the two species: *M. arboreus* is characterized by a high calcium-magnesium-potassium content, which has the ability to support bone health and regulate metabolism [31]. Meanwhile, *A. cordifolia* stands out for its abundance of micronutrients and antioxidants [30].

It is important to note that these differences are not solely attributable to environmental factors, but rather, they are primarily indicative of intrinsic biological characteristics. These characteristics include leaf tissue structure, enzyme activity, metabolic pathways, and nutrient accumulation capacity, which vary among the different species [32]. These factors provide a more compelling explanation for the observed differences in protein, minerals, and vitamins between the two species.

## CONCLUSION

The comparative evaluation of *Alchornea cordifolia* and *Myrianthus arboreus* revealed that both plants possess remarkable nutritional profiles with complementary strengths. *A. cordifolia* is notable for its high protein, carbohydrate and vitamin content, showing potential as a safe and sustainable source of plant protein. This is of particular relevance for the diets of malnourished populations or those in need of low-cost alternative protein sources. In addition, the presence of a wide range of micronutrients and bioactive compounds suggests that *A. cordifolia* has the potential to be exploited for the production of nutritionally enhanced foods, immune-supporting products and traditional medicinal products. It is evident that these applications have a long history

in the treatment of inflammation, wound healing and gastrointestinal disorders.

Conversely, *M. arboreus* exhibited higher energy potential, making it an important candidate for food fortification and nutraceutical development. The plant's favourable growth characteristics and ease of cultivation suggest that it has considerable potential for use in food fortification programmes in areas where food is scarce, as well as in the development of products for children, heavy labourers or athletes. Furthermore, the mineral and vitamin content of the species under discussion suggests its potential for exploitation in formulations designed to support bone health, energy metabolism and body recovery. The diversity in nutrient and micronutrient distribution between the two species highlights their potential synergistic application in functional foods, dietary supplements, and traditional medicine. Overall, these findings reinforce the nutritional significance of indigenous leafy plants as sustainable alternatives for improving food security, enhancing health outcomes, and promoting the use of local biodiversity in nutrition-based interventions and public health strategies.

**Conflict of Interest Disclosure** The authors declare no conflict of interest.

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