INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Research Paper

Physicochemical Characterization And GC/MS Analysis of Fatty Acids in Myrianthus Arboreus and Anacardium Occidentale Oils from Côte d'Ivoire: Effect of Cooking on Their Nutritional and Functional Quality

Katou Yapo Séverin*[1], Djoupo Agnon Prisca[2], Douhoure Gnaoré Yoh Toussaint[3], Etekpo Dossou Sylvestre[4], Mamyrbekova-Békro Janat Akhnovna[5] Et Békro Yves-Alain[6]

[1, 3,] UFR Sciences et Technologies, Université Alassane OUATTARA, 01 BP V18 Bouaké 01, Côte d'Ivoire ;
[2] Laboratoire de Biochimie Médicale, Université Alassane OUATTARA, BP V1801 Bouaké, Côte d'Ivoire ;
[4, 5,6] Laboratoire de Chimie Bio-Organique et de Substances Naturelles, UFR SFA, Université Nangui ABROGOUA, 02 BP 801 Abidjan 02, Côte d'Ivoire.

ARTICLE INFO

Published: 22 Aug 2026
Keywords:
Myrianthus arboreus; Anacardium occidentale; heat treatment; fatty acid profile; GC/MS; nutritional quality
DOI:
10.5281/zenodo.22055419

ABSTRACT

Côte d'Ivoire has a significant diversity of oilseeds that are still undervalued, such as Myrianthus arboreus and Anacardium occidentale. This study made it possible to evaluate the influence of traditional cooking processes on their properties. The analyzes were carried out according to AOAC and ISO standardized methods, and the fatty acid composition was determined by GC/MS. The results revealed a high energy value, with 499.27 ± 6.13 kcal/100 g for A. occidentale and 584.60 ± 5.89 kcal/100 g for M. arboreus. The analysis of the lipid profile showed a predominance of oleic acid (55.40%) in A. occidentale and linoleic acid (92.35%) for M. arboreus. Comparison with data obtained from raw samples highlights the modification of certain nutritional and biochemical parameters attributable to the applied heat treatments. However, the oil of A. occidentale exhibited higher antioxidant activity (IC50 = 0.52 mg/mL) than that of M. arboreus (IC50 = 0.65 mg/mL). Overall, these results show that heat treatments modify certain nutritional and functional characteristics of these oilseeds without altering their nutritional quality. Further studies on biological properties, preservation, and food or industrial applications would allow for the optimization of their use.

INTRODUCTION

Oilseeds are an important source of nutrients and bioactive compounds beneficial to human health.

***Corresponding Author:** Katou Yapo Séverin
Address: *UFR Sciences et Technologies, Université Alassane OUATTARA, 01 BP V18 Bouaké 01, Côte d'Ivoire.*
Email : katouyapo83@gmail.com

Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

In addition to their energy content, they contain essential fatty acids, phytosterols, and various antioxidant compounds that may contribute to the prevention of oxidative stress and certain chronic diseases[1,2]. Therefore, utilizing these plant resources is a major challenge for food diversification and the development of high-value-added products.

In Côte d'Ivoire, several local fruit species are traditionally consumed after various forms of preparation. The kernels of *Anacardium occidentale* L. (Anacardiaceae), commonly known as the cashew tree, are generally eaten after roasting, a process that improves their organoleptic qualities and facilitates their use in food. As for the seeds of *Myrianthus arboreus* P. Beauv. (Moraceae), from a fruit widely appreciated in certain regions of the country, they are usually consumed after cooking. These heat treatments, widely practiced locally, are likely to influence the chemical composition and functional properties of the seeds and the oils extracted from them.

Previous work has characterized the raw kernels of *A. occidentale* and the raw seeds of *M. arboreus*, highlighting their nutrient richness and potential value as sources of plant lipids [3,4,5,6,7,8]. However, consumers generally use these resources after preparation, while the effect of roasting or cooking on their nutritional and functional characteristics remains poorly documented.

In this context, the present study aims to promote the traditional methods of consuming these two species. Its objective is to evaluate the influence of roasting the kernels of *A. occidentale* and cooking the seeds of *M. arboreus* on their biochemical composition, mineral content, the physicochemical properties of the extracted oils, their fatty acid profile, and their antioxidant activity. Comparing raw samples with those that have undergone heat treatment will allow us to assess the impact of these preparation processes on the nutritional and functional quality of these local oilseeds, with a view to their improved use in the food, nutraceutical, and therapeutic sectors.

MATERIALS AND METHODS

Study Materials

The seeds of *M. arboreus* (Figure 1A) were obtained from ripe fruit harvested in the city of Daloa, located in west-central Côte d'Ivoire. After extraction, the seeds were dried at room temperature. The kernels were then collected, boiled at 100°C for 30 minutes, and dried under controlled conditions before being ground into a fine powder and stored under appropriate conditions until further analysis. The kernels of *A. occidentale* (Figure 1B) were obtained from nuts harvested in the Bouaké region of central Côte d'Ivoire. After shelling, the kernels were roasted at 130°C for 30 minutes, ground, and then stored in airtight containers, protected from moisture and light, until use. Samples were collected between june and july 2025.

Figure 1: Cooked *Myrianthus arboreus* seeds (A) and roasted *Anacardium occidentale* kernels (B)

Methods

Physicochemical Analyses

All analyses were performed in triplicate, and results are expressed as mean ± standard deviation. The biochemical composition (moisture, ash, protein, lipid, and carbohydrate content) was determined according to the standardized methods of AFNOR [9] and BIPEA [10].

Oil extraction was carried out by continuous Soxhlet extraction with hexane for three hours (3H), according to the method described by Bamba *et al.* (2015) [11].

The main physicochemical parameters of the oils, notably the saponification index, the acid index, the iodine index (Wijs reagent method) and the peroxide index, were determined according to the protocols described by Weber, Dioum, Mamyrbekova [12,13,14].

The fatty acid composition was established after lipid methylation followed by GPC analysis, in accordance with the method of Karleskind [15].

The mineral element content was determined by atomic absorption spectrometry (AAS) after mineralization of the samples, according to the recommendations of the IIAT [16].

The antioxidant activity of the unsaponifiable fractions of the oils was evaluated according to the method described by Katou [5], by determining the 50% inhibitory concentration (IC_{50}) against free radicals.

Statistical Analysis

The data obtained were processed using appropriate software[17]. The results are presented as mean ± standard deviation of three independent determinations. The comparison of means was performed at a significance level of 5% ($p < 0.05$).

RESULTS AND DISCUSSION

The results of the various analyses carried out on the roasted kernels of A. occidentale and the cooked seeds of *M. arboreus* were compared to those previously obtained on the corresponding raw samples[3,4,5,6,7,8]. This approach allows us to assess the influence of heat treatments (roasting and cooking) on the biochemical composition and nutritional properties of these two oilseeds.

Biochemical composition of almonds of *A.occidentale* and *M. arboreus*

The results of the biochemical composition of the raw and prepared samples are presented in Table 1. Overall, both species are characterized by a high energy value, testifying to their potential interest as food resources with high nutritional density.

The analysis of the biochemical composition shows that the thermal treatments had a limited effect on the water content of the samples (Table 1). A slight increase in humidity was observed after roasting *A. occidentale* almonds, while cooking *M. arboreus* seeds practically did not modify this parameter. The low water contents recorded in both species constitute an asset for their conservation by reducing the risks of microbial proliferation and alteration.

The lipid and protein contents were also little affected by the treatments applied. Toasting *A. occidentale* almonds is accompanied by a slight reduction in the lipid fraction and a slight increase in the protein content. Conversely, *M. arboreus* seeds show a slight increase in lipids after cooking, while their protein content decreases slightly. These variations can be attributed to concentration phenomena relating to changes in dry matter induced by heat.

Table 1: Biochemical composition of *A. occidentale* and seeds of *M. arboreus* in the raw state and after thermal preparation

Parameters	*Raw almonds of A. occidentale* [6]	*Roasted almonds of A. occidentale*	*Raw seeds of M. arboreus* [8]	*Cooked seeds of M. arboreus*
Moisture %	3,53 ± 0,13	2,30 ± 0,09	9,20 ± 1,54	9,10 ± 1,54
Fat %	22,01 ± 0,85	19,51 ± 2,03	44,38 ± 3,66	45,09 ± 2,51
Protein %	9,11 ± 0,26	8,65 ± 1,10	23,37 ± 1,97	22,75 ± 1,08
Ash %	2,72 ± 0,19	3,02 ± 0,40	2,12 ± 0,44	1,5 ± 0,04
Total Carbohydrate %	62,61 ± 0,46	61,92 ± 8,57	18,67 ± 4,81	19,45 ± 4,81
Energy Value (kcal/100g)	573,15 ± 0,77	499,27 ± 6,13	575,57 ± 13,43	584,60 ± 5,89

A moderate decrease in ash content was observed in both species after heat treatment (Table 1), which could reflect minor losses of mineral compounds during preparation. Carbohydrates remained the major constituent of *A. occidentale* kernels, and their levels remained generally stable after roasting. In contrast, *M. arboreus* seeds contained significantly lower amounts of carbohydrates. This difference confirms the predominantly carbohydrate nature of *A. occidentale* kernels, while *M. arboreus* seeds are distinguished more by their high lipid and protein content.

The cooking and roasting processes also resulted in an increase in the energy value of the samples. This change could be due to a relative concentration of certain macronutrients resulting from the heat treatments.

Comparison of the prepared products reveals distinct nutritional profiles. Cooked seeds of *M. arboreus* are characterized by higher lipid and protein content, while roasted kernels of *A. occidentale* remain particularly rich in carbohydrates. These differences underscore the nutritional complementarity of the two species.

Overall, heat treatments did not lead to major changes in the biochemical composition of the samples and preserved their nutritional quality. The high energy values observed confirm the potential of these plant resources as sources of dietary energy. Furthermore, the high lipid and protein content of *M. arboreus* seeds enhances their potential for formulating highly nutritious foods, while *A. occidentale* kernels constitute a valuable source of energy-rich carbohydrates.

Mineral Content

The mineral content of the kernels of *A. occidentale* and the seeds of *M. arboreus*, both raw and after heat treatment, is presented in Table 2. The results highlight the presence of essential macronutrients, including magnesium (Mg), calcium (Ca), and potassium (K), as well as trace elements such as iron (Fe), zinc (Zn), and copper (Cu).

Table 2: Mineral content of the kernels of *A. occidentale* and the seeds of *M. arboreus*, both raw and after heat treatment

Minerals (mg/100g)	*Raw almonds of A. occidentale* [7]	*Roasted almonds of A. occidentale*	*Raw seeds of M. arboreus* [4]	*Cooked seeds of M. arboreus*
Mg	300,72 ± 0,57	300,09 ± 7,11	315,00 ± 26,03	311,00 ± 26,05
Ca	31,73 ± 0,32	30,97 ± 1,09	465,50 ± 48,25	441,00 ± 9,45
K	458,61 ± 7,83	460,35 ± 6,03	980 ± 58,72	1016 ± 18,70
Fe	1,94 ± 0,09	1,43 ± 0,10	2,30 ± 0,40	2,62 ± 0,35
Zn	4,85 ± 0,26	5,01 ± 0,62	0,82 ± 0,12	0,86 ± 0,02
Cu	1,83 ± 0,08	1,57 ± 0,01	-	-

Overall, the toasting and cooking processes had little effect on the mineral composition of the samples. The contents observed after treatment remain close to those of the raw materials (Table 2), demonstrating the good stability of the mineral elements with respect to heat.

Among the macroelements analyzed, potassium (K) appears to be the predominant element in both species. The seeds of *M. arboreus*, however, are distinguished by higher K and Ca contents than the almonds of *A. occidentale*. On the other hand, the Mg contents are relatively comparable between the two species. These results confirm the particular interest of *M. arboreus* as a source of essential macroelements.

The analysis of trace elements also reveals marked differences between the two species. The seeds of *M. arboreus* have higher iron (Fe) content, while the kernels of A. occidentale are characterized by their high zinc (Zn) content. Copper (Cu) was detected only in the kernels of A. occidentale, a unique characteristic of this species among the two samples studied.

Comparison of the raw and processed samples shows that the slight variations observed after cooking or roasting could be related to concentration phenomena resulting from water loss or to minor modifications induced by heat treatment. However, these changes remain limited and do not alter the mineral quality of the products.

Overall, the results highlight the nutritional value of both species as sources of essential minerals. The seeds of *M. arboreus* are particularly distinguished by their richness in Ca, K, and Fe, while the kernels of *A. occidentale* are a valuable source of Zn and Cu. This mineral complementarity reinforces the interest of these plant resources for human nutrition, as the elements in question play a fundamental role in bone metabolism, oxygen transport, the maintenance of electrolyte balance, and proper neuromuscular function[18].

Physical and physicochemical characteristics of oils

The physical and physicochemical characteristics of the oils extracted from *A. occidentale* almonds and *M. arboreus* seeds, in the raw state and after heat treatment, are presented in Table 3.

Table 3: **Physical and physicochemical parameters of *A. occidentale* and *M. arboreus***

Settings	*Raw almonds of A. occidentale[8] (Katou et al., 2024b)*	*Roasted almonds of A. occidentale*	*Raw seeds of M. arboreus[5] (Katou et al., 2021)*	*Cooked seeds of M. arboreus*
Ir (25°C)	1,464 ± 0,025	1,460 ± 0,016	1,470 ± 0,001	1,472 ± 0,001
Density	0,901 ± 0,016	0,902 ± 0,023	0,88 ± 0,01	0,885 ± 0,001
Is (mg/g)	391,29 ± 0,461	387,32 ± 0,46	169,23 ± 0,03	168,40 ± 11,14
Ia (mg/g)	9,53 ± 0,25	12,75 ± 0,11	2,80 ± 0,00	4,67 ± 0,01
Ii (g $_2$/100g)	90,69 ± 0,74	85,14 ± 0,34	171,84 ± 4,35	164,62 ± 9,52
Ip (méq/kg)	5,13 ± 0,09	10,67 ± 0,10	10,00 ± 0,00	11,57 ± 0,71
Acides gras totaux %	79,35 ± 5,21	75,47 ± 1,65	85,63 ± 3,44	82,78 ± 2,08

Heat treatments have influenced the physical properties of the oils. The observed refractive indices and densities are characteristic of vegetable oils rich in unsaturated fatty acids. Oils of *A. occidentale* have slightly higher densities than those of *M. arboreus*. According to Ollé [19], these parameters suggest a predominance of monounsaturated fatty acids in *A. occidentale* oil, while *M. arboreus* oil is richer in polyunsaturated fatty acids.

The saponification value highlights differences between the two species. A. occidentale oils have higher values than *M. arboreus* oils. A decrease in the saponification value is observed after heating, reflecting a change in triglyceride composition, without any significant alteration in oil quality.

The acid value increases after roasting the kernels of *A. occidentale* and cooking the seeds of *M. arboreus*, indicating an increase in free fatty acid content. The oil from *M. arboreus* has an acceptable value, but monitoring and pre-refining of the *A. occidentale* oil are necessary.

The peroxide values increase, indicating a high degree of lipid oxidation; the difference is still clear compared to the roasted kernels. Indeed, at 130°C, oxidation is accelerated. An increase in this value is observed after cooking; therefore, the heat treatments applied have promoted the presence of oxidation products such as hydroperoxides.

The iodine value reveals a marked difference between the two oils. *M. arboreus* oils exhibit high iodine values. According to the classification reported by **Dahouenon *et al.* (2012)**[20], *M. arboreus* oils would always fall into the category of drying oils, while *A. occidentale* oils would fall into the category of non-drying oils. The higher degree of unsaturation confirms the significant presence of polyunsaturated fatty acids in *M. arboreus* oil.

Total fatty acid content decreased after heat treatment in both species; this could result from lipid loss due to toasting and cooking.

These results show that heat treatments altered the physicochemical characteristics of the oils. The increase in *Ia* and I*p* could be explained by lipid hydrolysis and oxidation under the influence of heat in the presence of oxygen. The decrease in iodine value (*Iv*) confirms the sensitivity of double bonds to oxidative degradation.

Fatty acid profile determined by GC-MS

Compound identification was performed based on retention times and mass spectra obtained, and then confirmed by comparison with data reported in the literature.

Fatty *acids identified in Myrianthus arboreus seeds by GC-MS*

GC-MS analysis of the oil extracted from *Myrianthus arboreus* seeds yielded the chromatogram shown in Figure 2.

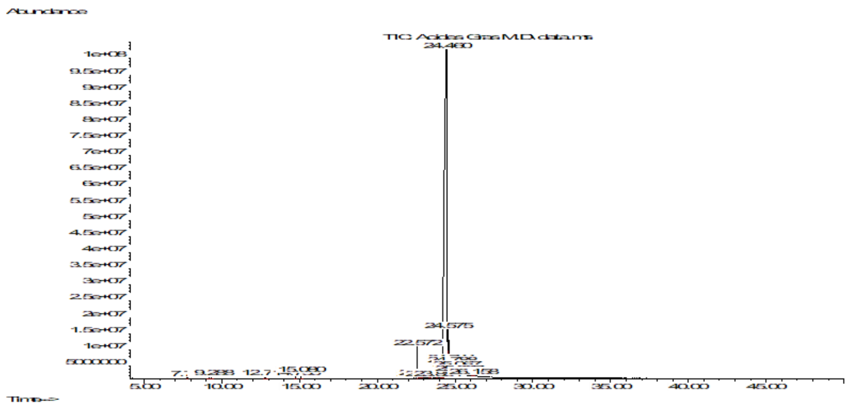

Figure 2: GC chromatogram of fatty acids in *Myrianthus arboreus* oil

Chromatographic analysis revealed two main fatty acids (Table 4): linoleic acid (octadeca-9,12-dienoic acid; C18:2) and palmitic acid (hexadecanoic acid; C16:0).

Table 4: Compounds identified by GC-MS in *Myrianthus arboreus* seeds

Peak	TR (min)	%	Molecular formula	Molar mass (g / mol)	Fragmentation, m/z (%)	Compounds identified
1	22,572	4,18	$C_{16}H_{32}O_2$	256	213 $[C_{13}H_{25}O_2]^\bullet$; 185 $[C_{11}H_{21}O_2]^\bullet$; 157 $[C_9H_{17}O_2]^\bullet$; 129 $[C_7H_{13}O_2]^\bullet$; 73 $[CO_3H_5O_2]^\bullet$; $[C_7H_{13}]^\bullet$; 56 $[C_4H_8]^{+\bullet}$	hexadecanoic acid
2	24,460	92,35	$C_{18}H_{32}O_2$	280	280 (1) [M]+, 155 (37) $[M\text{-}CH_3]^+$; 143(45) $[M\text{-}C_2H_3O$; 137 (45) $[M\text{-}C_2H_3O$; 95 (12) $[M\text{-}C_2H_3O\text{-}CH_3]^{\bullet+}$; 71(8) $[C_5H_{11}]^{\bullet+}$; 67 (8) $[C_5H_7]^{\bullet+}$; 45(4) $[CHO_2]^{\bullet+}$; 45(4) $[CHO_2]^+$.	octadeca-9,12-dienoic acid

The mass spectrum in Figure 3 shows a molecular peak m/z 280 corresponding to the formula $C_{18}H_{32}O_2$ of octadeca-9,12-dienoic acid, the molecular structure of which is shown in Figure 4.

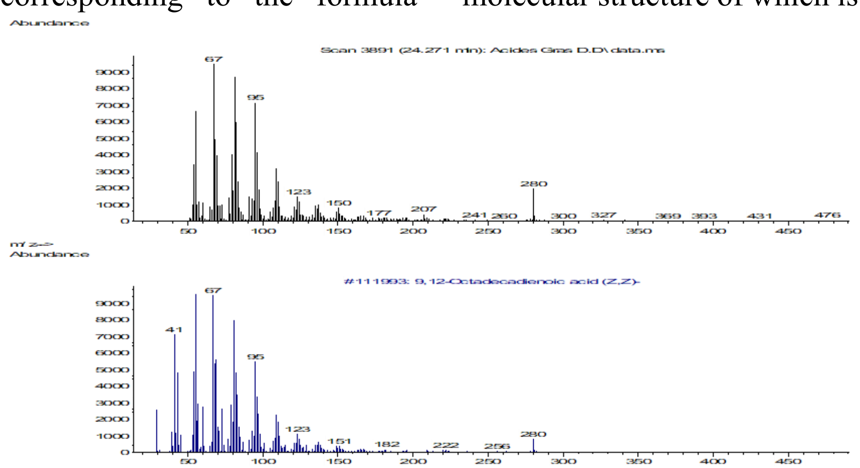

Figure 3: Mass spectrum of linoleic acid

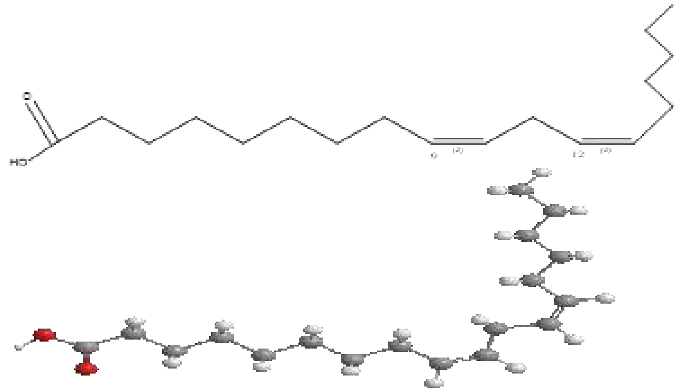

Figure 4: Structure of linoleic acid

The results obtained reveal a very strong predominance of linoleic acid, which represents 92.35% of the total fatty acid composition, while palmitic acid constitutes only 4.18%. This distribution gives *M. arboreus* oil a lipid profile characterized by a remarkable richness in polyunsaturated fatty acids. The high linoleic acid content distinguishes this oil from many conventional vegetable oils. Indeed, this essential fatty acid plays a role in several major biological functions, including growth, maintaining the structural integrity of cell membranes, and proper tissue function in humans and animals [21,3]. Consequently, *M. arboreus* seeds appear as a potentially valuable source of essential fatty acids, which could be utilized in the fields of nutrition and the food industry. This high linoleic acid content also gives this oil particular functional value, polyunsaturated fatty acids as are known for their beneficial effects on cardiovascular health and their involvement in various physiological mechanisms. Therefore, the development of *M. arboreus* seeds could contribute to the growth of new oilseed resources with high nutritional value.

Fatty acids identified by GC-MS in Anacardium occidentale kernels

Gas chromatography-GC-MS analysis of the oil extracted from *A. occidentale* kernels yielded the chromatogram shown in Figure 5 and highlighted six major fatty acids (Table 5).

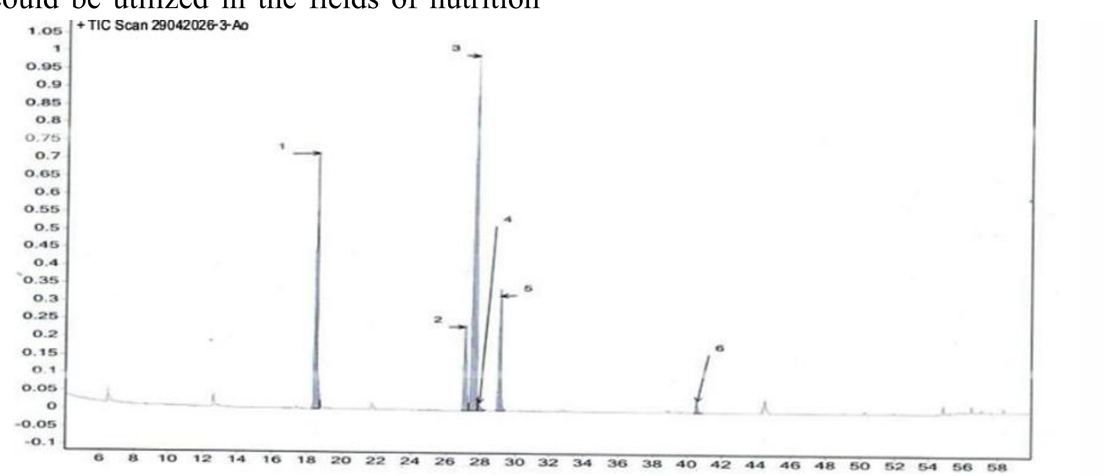

Figure 5: GC-MS chromatogram of fatty acids in *Anacardium occidentale* oil

The main fatty acids identified are oleic acid (55.40%), palmitic acid (23.53%), linoleic acid (8.23%), stearic acid (9.41%), vaccenic acid (1.19%), and arachidic acid (1.47%) (Table 5). This distribution reflects a predominance of monounsaturated fatty acids, which represent 56.59% of the total fatty acid composition, followed by saturated fatty acids with a content of 34.41%. This high monounsaturated fatty acids content is primarily due to the high proportion of oleic acid.

Table 5: Fatty acids identified by GC-MS in *Anacardium occidentale* kernels

Peak	TR (min)	%	Molecular formula	Molar mass (g / mol)	Fragmentation, m/z (%)	Compounds identified
1	18.53	23.53	$C_{16}H_{32}O_2$	256	213 $[C_{13}H_{25}O_2]^{\bullet}$; 185 $[C_{11}H_{21}O_2]^{\bullet+}$; 157 $[C_9H_{17}O_2]^{\bullet}$; 129 $[C_7H_{13}O_2]^{\bullet}$; 73 $[CO_3H_5O_2]^{\bullet}$; $[C_7H_{13}]^{\bullet}$; 56 $[C_4H_8]^{+\bullet}$	Palmitic acid
2	27.14	9.41	$C_{18}H_{36}O_2$	284	284 $[M]^{+}$; 239 $[C_{17}H_{35}]^{+\bullet}$; 199 $[C_{12}H_{23}O_2]^{+\bullet}$; 169 $[C_{12}H_{25}]^{+\bullet}$; 115 $[C_6H_{11}O_2]^{+\bullet}$; 85 $[C_6H_{13}]^{+\bullet}$; 45 $[CHO_2]^{+\bullet}$	Stearic acid
3	27.75	55.40	$C_{18}H_{34}O_2$	282	282 $[C_{18}H_{34}O_2]^{+}$; 239 $[C_{15}H_{27}O_2]^{+\bullet}$; 143 $[C_8H_{15}O_2]^{+\bullet}$; 139 $[C_{10}H_{19}]^{+\bullet}$; 96 $[C_7H_{13}]^{+2\bullet}$; 54 $[C_4H_6]^{+\bullet}$; 43 $[C_3H_7]^{+\bullet}$	Oleic acid
4	27.88	1.19	$C_{18}H_{34}O_2$	282	282 $[C_{18}H_{34}O_2]^{+}$; 239 $[C_{15}H_{27}O_2]^{+\bullet}$; 143 $[C_8H_{15}O_2]^{+\bullet}$; 139 $[C_{10}H_{19}]^{+\bullet}$; 96 $[C_7H_{13}]^{+2\bullet}$; 54 $[C_4H_6]^{+\bullet}$; 43 $[C_3H_7]^{+\bullet}$	Vaccenic acid
5	29.13	8.23	$C_{18}H_{32}O_2$	280	280 (1) [M]+, 155 (37) $[M\text{-}CH_3]$+; 143(45) [M-C_2H_3O; 137 (45) [M-C_2H_3O; 95 (12) $[M\text{-}C_2H_3O\text{-}CH_3]^{\bullet+}$; 71(8) $[C_5H_{11}]^{\bullet+}$; 67 (8) $[C_5H_7]^{\bullet+}$; 45(4) $[CHO_2]^{\bullet+}$; 45(4) $[CHO_2]$+	Linoleic acid
6	40.53	1.47	$C_{20}H_{40}O_2$	312	312 $[M]^{+}$; 227 $[C_{14}H_{27}O2]^{+\bullet}$; 197 $[C_{14}H_{29}]^{+\bullet}$; 185 $[C_{11}H_{21}O_2]^{+\bullet}$; 127 $[C_6H_{19}]^{+\bullet}$; 115 $[C_6H_{11}O_2]^{+\bullet}$; 85 $[C_6H_{13}]^{+\bullet}$; 71 $[C_5H_{11}]^{+\bullet}$; 57 $[C_4H_9]^{+\bullet}$; 43 $[C_3H_7]^{+\bullet}$	Arachidic acid

The lipid profile of A. occidentale oil is comparable to that of so-called oleic oils, particularly olive oil and rapeseed oil, whose oleic acid content is approximately 69% and 63.5%, respectively[22]. This similarity gives cashew oil particularly interesting nutritional properties.

Oils rich in monounsaturated fatty acids are known for their superior oxidative stability and their potential beneficial effects on cardiovascular health [23].

Furthermore, the presence of polyunsaturated fatty acids, especially linoleic acid, improves the nutritional quality of the oil by providing essential fatty acids that are vital for normal bodily function and are associated with a reduction in cardiometabolic risk [24]. A saturated fatty acid content of 34.41%, primarily composed of palmitic, stearic, and arachidic acids, was also observed. These compounds contribute to the oxidative stability of Anacardium occidentale oil.

The oils of *M. arboreus* and *A. occidentale* have distinct but complementary fatty acid profiles. The former is characterized by an exceptionally high linoleic acid content, while the latter is dominated by oleic acid. These results suggest that both species are potential sources of nutritionally valuable lipids and could be utilized in the food, pharmaceutical, and cosmetic industries.

Antioxidant activity of oils

The antioxidant activity of the oils of roasted *A. occidentale* almonds and cooked seeds of *M. arboreus* was evaluated based on their unsaponifiable fractions and compared to that of vitamin C used as a reference. The 50% inhibitory concentration (IC_{50}) values obtained are presented in Figure 6.

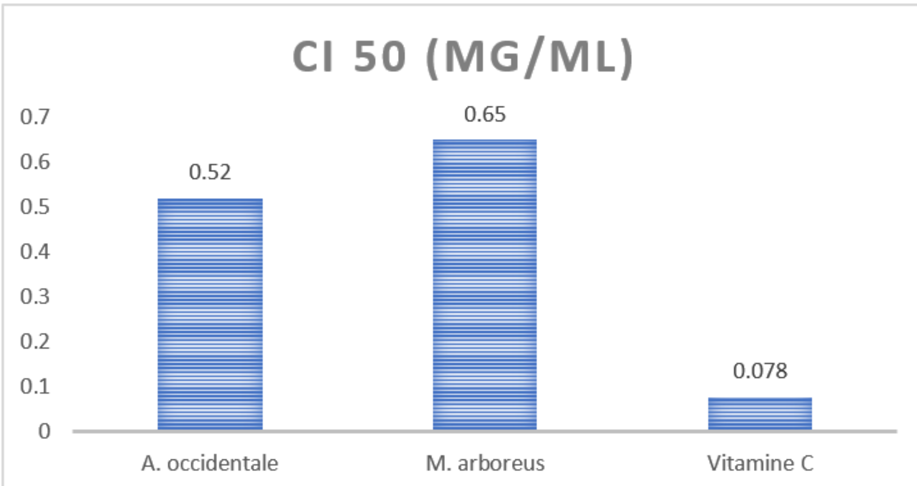

Figure 6: IC_{50} Values

The results show that the unsaponifiable fractions of both oils possess measurable antioxidant activity. However, this activity remains lower than that of vitamin C, which has the lowest IC_{50} value (0.078 mg/mL) and, consequently, the highest antioxidant capacity. Between the two species studied, *A. occidentale* oil exhibits better antioxidant activity than *M. arboreus* oil, with an IC_{50} of 0.52 mg/mL versus 0.65 mg/mL.

Overall, although their antioxidant activity is lower than that of vitamin C, *A. occidentale* and *M. arboreus* oils show interesting potential due to the presence of compounds capable of limiting oxidation. *A. occidentale* oil, however, appears to be the more promising of the two species in terms of antioxidant activity.

CONCLUSION

This comparative study highlighted the nutritional value of the kernels of *Anacardium occidentale* and the seeds of *Myrianthus arboreus* from Côte d'Ivoire. *M. arboreus* seeds are distinguished by their richness in lipids, proteins, calcium, and potassium, while A. occidentale kernels are characterized by higher levels of carbohydrates, zinc, and copper. The comparison between raw and processed samples shows that heat treatment modifies certain physicochemical parameters without significantly altering the nutritional properties of the two oilseeds.

The oil of *A. occidentale* is primarily rich in oleic acid (ω-9) and exhibits higher antioxidant activity, while that of *M. arboreus* is an excellent source of linoleic acid (ω-6).

Overall, these results confirm the potential of *M. arboreus* and *A. occidentale* to enhance the intake of unsaturated fatty acids. Their nutritional and functional properties also offer promising prospects for applications in the food, nutraceutical, and cosmetic sectors.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

CONTRIBUTES OF AUTHORS

KYS and EDS contributed to the preparation of the manuscript, maintaining regular contact with all the other authors. DAP performed the antioxidant activity test using the DPPH assay and determined the IC_{50} inhibitory concentrations. DGYT also carried out the GC/MS analysis of fatty acids from the various oils in France. Finally, MBJA and BYA provided us with suitable protocols and then revised the final version of the manuscript before its submission.

ACKNOWLEDGMENTS

Our deepest gratitude goes first to the Department of Physics and Chemistry at Alassane OUATTARA University; then to the Laboratory of Bioorganic Chemistry and Natural Substances (LCBOOSN) at Nangui Abrogoua University; and finally to all those who contributed to the completion of this work.

REFERENCES

1. Epand RM, Hughes DW, Sayer BG, Borochov N, Bach D, Wachtel E. Novel properties of cholesterol-dioleoylphosphatidylcholine mixtures. Biochim Biophys Acta. 2003; 13(2): 196-208. DOI: https://doi.org/10.1016/j.bbamem.2003.08.006
   Adlouni A. L'huile d'argan, de la nutrition à la santé. Phytothérapie, 2010 ; 8(2) : 89-97. DOI : https://doi.org/10.1007/s10298-010-0538-9
2. Katou YS, Mamyrbekova-Bekro JA, Bamba S, Konan KM, Akaffou DA, Bekro Y-A. Physicochemical Analysis and Characterization of the Lipid Fraction from Côte d'Ivoire Myrianthus Arboreus (Cecropiaceae) Seeds. Asian Journal of Plant Science and Research, 2017; 7(1): 16-22. DOI : https://scispace.com › journals ›
3. Katou YS, Konan KM, N'Da KP, Mamyrbekova-Bekro JA, Bekro Y-A. Variabilité chimique et nutritive des graines de Myrianthus arboreus P. Beauv. (Cecropiaceae) de quatre régions de Côte d'Ivoire. J. Soc. Ouest-Afr. Chim., 2018 ; 045 : 25- 30. DOI : http://www.soachim.org
4. Katou YS, Koffi NE, Gué LA, N'Da PK, Mamyrbekova-Bekro JA, Békro Y-A. Characterization and Antioxidant Activity of Myrianthus arboreus Seed Oil Harvested from Côte d'Ivoire. Chemical Sciences International Journal, 2021; 30 (6): 1-9. DOI: https://journalcsij.com/
5. Katou YS, Yapo YCV, Konan GKN'D, N'Da KP, Koffi N'D E. Biochemical analyses of almonds from Anacardium occidentale nuts (Anacardiaceae) from Côte d'Ivoire. International Journal of Advanced Research, 2023; 11(11): 942 – 947. DOI : 10.21474/IJAR01/17897
6. Katoua YS, N'Guessan PA, Diby AL, Mouho GDR, Bamba S, Koffi NE. Determination of the Content of Polyphenol, Flavonoids, Tannins, Mineral Elements and Antioxidant Activity of Almonds Obtained from Cashew Nuts Anacardium occidentale, Anacardiaceae) from Center Côte d'Ivoire. Asian Journal of Chemical Sciences, 2024 ; 14(6) : 1-9. DOI : https://doi.oeg/10.9734/ajocs/2024/v14i6329.
7. Katoub YS, Yapo YCV, Mouho GDR, Kabran G-RM, Mamyrbekova-Bekro JA, Bekro Y-A.
8. Analysis of the Physical and Physico-Chemical Properties of Oil Extracted from Cashew Kernels (Anacardium occidentale)

from Bouake, in Center oh Côte d'Ivoire. World Journal of Pharmaceutical Research, 2024; 13(22): 75-87. DOI: 10.20959/wjpr202422-34642.

9. AFNOR (Association française de normalisation). Recueil des normes françaisesCorps gras, graines oléagineuses, produits dérivés. NF 03-720, NF V03 903, NF T60-204, NT T 60-223, NF T 60-205 et NF T60-203. Paris, la Défense. 1981- 1982 ; 327 p.
10. BIPEA. 1976. Bureau interprofessionnel d'études analytiques, Recueil de méthodes d'analyses des communautés européennes.
11. Bamba S, Mamyrbekova-Bekro JA, Virieux D, Kabran GRM, Pirat JL, Békro Y-A. Analysis of a Rutaceae fat matter from Côte d'Ivoire. Der chemical Sinica, 2015; 6(4): 47-50. DOI: https://hal.science/hal-01203788v1
12. Weber N, Birnbaum P, Forget P-M, Gueye M, Kenfack D. L'huile de carapa spp., (Méliacées) en Afrique de l'ouest : utilisation et implication dans la conservation des peuplements naturels. Fruits, 2010 ; 65(6) : 343-354. DOI : https://doi.org/10.1051/fruits/2010029
13. ioum DM, Seck M, Sy GY, Faye JM, Sarr A. Activité anti-inflammatoire de la graine de Carapa procera (Meliaceae). Revue Cames struct. Mat., 2013 ; 1: 17-28. DOI : https://publication.lecames.org/index.php/mat/article/viewFile/170/107
14. Mamyrbekova-bekro JA, Bamba S, Akaffou S, Bekro Y-A. Caractéristique de la matière grasse extraite des amandes de Afzelia Africana (Fabaceae-caesalpinioideae) de Côte d'Ivoire.
Rev. Ivoir.sci. Technol, 2009 ; 13: 191-198. DOI : https://revist.net
15. Karleskind A, Wolff JP et Guthmann F. Manuel des corps gras. 1992; pp : 83-92.
16. IIAT. Analyse des prélèvements pédologiques et végétaux. Oyo-Road. Nigéria. 1981 ; 66 p.
17. Dagnelie P. 2007. Statistique théorique et appliquée, tome 1 : Statistique descriptive et base de
l'inférence statistique, Paris et Bruxelles, De Boeck et Larcier.
18. Razzaque MS, Wimalawansa SJ. Minerals and human health: From deficiency to toxicity. Nutrients, 2025; 17(3): 454. DOI : https://doi.org/10.3390/nu17030454
19. Ollé M. Analyse des corps gras. Technique de l'ingénieur. Analyse et caractérisation. 2002 ; p 3325.
20. Dahouenon A.E., Djenontin T.S., Codjia D.R.M., Alitonou A.G., Dangou J., Avlessi F., Sohounhloue D.C.K. Morphologie des fruits et quelques caractéristiques physique et chimique de l'huile et des tourteaux de Irvingia gabconensis (Irvingiaceae). International Journal of Biological and Chemical Sciences, 2012 ; 6(5): 2263-2271.
21. Ernandes EI, Margolina AA, Petroukhina AO. Barrière lipidique et produits cosmétiques, Moscou: Ed. KLABEL. 2003; 340p.
22. Benjelloun N. Huile d'argan : propriétés pharmacologiques et mise en place d'un processus de contrôle. Thèse pour le diplôme d'état de docteur en pharmacie. Université de limoges, 2014 ; p 182.
23. Schwingshackl L, Hoffmann G. Monounsaturated fatty acids, olive oil and health status: a systematic review and meta-analysis of cohort studies. Lipids in Health and Disease, 2014; 13, 154. DOI : https://doi.org/10.1186/1476-511x-13-154
24. Marangoni F, Agostoni C, Borghi C, Catapano AL, Cena H, Ghiselli A, La-Vecchia C, Lercker G, Manzato E, Pirillo A, Riccardi G, Risé P, Visioli F, Poli A. Dietary linoleic acid and human health: Focus on

cardiovascular and cardiometabolic effects. Atherosclerosis, 2020; 292, 90–98. DOI : https://doi.org/10.1016/j.atherosclerosis.2019.11.018

HOW TO CITE: Katou Yapo Séverin, Djoupo Agnon Prisca, Douhoure Gnaoré Yoh Toussaint, Etekpo Dossou Sylvestre, Mamyrbekova-Békro Janat Akhnovna Et Békro Yves-Alain, Physicochemical characterization and GC/MS analysis of fatty acids in Myrianthus arboreus and Anacardium occidentale oils from Côte d'Ivoire : effect of cooking on their nutritional and functional quality, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 8, 32-32, https://doi.org/10.5281/zenodo.22055419