



(REVIEW ARTICLE)



## Cashew production, consumption and utilization: Implication on health of end users

Mutiati Oluwaseyi Agboola-Adedjoja \*, Adejoke Adebusola Adelusi, Qudus Adebayo Ogunwolu, Chinweike Abednego Ugwu, Modinat Adewunmi Alli, Kehinde Ademola Adesanya and Ayodele Oladipo Akinpelu

*Cocoa Research Institute of Nigeria, P.M.B 5244, Ibadan, Oyo State, Nigeria.*

World Journal of Advanced Research and Reviews, 2022, 14(01), 182–186

Publication history: Received on 01 March 2022; revised on 04 April 2022; accepted on 06 April 2022

Article DOI: <https://doi.org/10.30574/wjarr.2022.14.1.0297>

### Abstract

This study examined the implication of cashew production, consumption and utilization on the health of end-users. Desk research was carried out using past published literatures. The study outlined the effects of production, consumption and utilization of cashew on human health. The benefits of cashew production, consumption and utilization outweighed the negative effects. Cashew production and use should be promoted because it is beneficial in the treatment of a variety of diseases and ailments. More study on reducing chemical components (allergens) found in unroasted cashews should be encouraged by the government and other stakeholders in the cashew value chain to reduce their sensitivity to people.

This will improve the contributions of the crop to the Gross Domestic Product (GDP) of the country.

**Keywords:** Cashew; Production; Consumption; Utilization; Health implication; Gross Domestic Product

### 1. Introduction

Brazil is home to the cashew tree (*Anacardium occidentale*). Because of its extensive root system, it was traditionally used to prevent soil erosion along coastlines. It was brought to West Africa, East Africa, and India by the Portuguese in the 15th and 16th centuries [1]. Cashews are cultivated in Africa, Latin America and South East Asia. The top-producing countries of these regions are Ghana, Nigeria, Brazil, Vietnam, India, and Indonesia [2]. The seed of the cashew tree is what is known as a cashew nut. The tree produces drupes, which are double-shelled fruits with a seed inside. The accessory fruit, sometimes known as the cashew apple, is frequently confused with these fruits. This is the drupe's huge, colorful extension. The seeds and cashew apples can both be eaten [3] Although the cashew apple can be eaten raw, it is more commonly processed into pulp or juice. The cashew nut or seed can be eaten raw, but it's also available fried, salted, or sweetened. Additionally, the seed's shell can be used to extract oil. This Cashew Nut Shell Liquid (CNSL) is a byproduct of the roasting process that can be used for industrial or medical applications [4]. Africa's raw cashew nut (RCN) production is becoming increasingly important. Nigeria, Côte d'Ivoire, Tanzania, Mozambique, and Guinea Bissau are the primary producers, although Ghana, Burkina Faso, and Benin are extending their production areas. [5]. Despite the fact that West Africa produces 45 percent of the world's cashews, the majority of those harvests are shipped for processing [6]. Meanwhile, according to data from the Food and Agricultural Organization (FAO), Nigeria is the world's second-largest producer of cashew nuts, with 675,266 tonnes. [7].

A raw cashew nut (28.35g) has 157 calories, 8.56 grams of carbohydrate, and 168 milligrams of phosphorus. 1.68 grams of sugar, 0.9 grams of fiber, 12.43 grams of total fat, 10 milligrams of calcium, 1.89 milligrams of iron, 83 milligrams of magnesium, 187 milligrams of potassium, 5.17 grams of protein, 3 milligrams of sodium, and 1.64 milligrams of zinc. Cashew includes vitamins B and C, as well as 7mg DFE of Folate (Dietary Folate Equivalent). [8]. The apple and the nut

\* Corresponding author: Mutiat Oluwaseyi Agboola-Adedjoja  
Department of Economics and Extension, Cocoa Research Institute of Nigeria, P.M.B 5244, Ibadan, Oyo State, Nigeria.

of the cashew are both edible. The cashew nut, on the other hand, is the cashew tree's principal commercial produce. In 2019, the global cashew nut market grew by 5.6 percent over the previous year, reaching \$14.9 billion. [6]. This study focused on the implications of cashew production, consumption and utilization on the health of end-users in Nigeria.

---

## 2. Cashew Production in Nigeria

Cashew was first introduced to Nigeria about 400 years ago, but widespread cultivation did not begin until the early 1950s. From 1965 to 1990, cashew production was relatively constant at 25,000 tonnes, with an estimated land area of 50,000 ha in 1990. Cashew production has nearly tripled in the last 12 years, from 30,000 MT in 1990 to 836,500 MT in 2012, on an estimated land area of 366,000 ha [9]. With annual output reaching 340,000 MT, Nigeria is one of Africa's leading cashew producers [10][11].

The interest in cashew nut production in Nigeria began in the early 1950s, when plantations were established in the states of Kogi, Anambra, Imo, Enugu, Oyo, and Osun. However, commercial cashew harvesting was unknown until recently because cocoa was more important and garnered a lot of attention in the southwest and palm oil in the southeast [12]. Cashew nut marketing is profitable in Oyo State, Southwest Nigeria, according to [13]. Cashew nut production in Nigeria increased nearly six fold from 30,000 tonnes in 1990 to 176,000 tonnes in 2000, as expected. Furthermore, Nigeria, like the majority of developing countries, has recognized the cashew's potential economic value and has made concerted attempts to boost the crop's output. Nigeria has become Africa's biggest cashew nut producer [14][9]. Nigeria currently harvests 200,000 to 240,000 metric tons of RCN each year [6].

---

## 3. Cashew consumption

Nuts are dry fruits with only one seed in which the ovary wall hardens as the fruit matures. Cashew is one of the most popular eating tree nuts. Numerous studies on nuts have been conducted, according to [15], suggesting that a diet rich in nuts lowers blood cholesterol levels when compared to a healthy diet. Nut consumption was shown to improve lipid profile in epidemiological and short-term clinical trials [16]. Some researchers, however, have looked at the impact of cashew consumption on lipid profiles and blood pressure [17]. Cashew nut is highly energetic and rich in saturated fatty acids, fibre, amino acids and vitamins [18]. Major allergen in cashew is characterized as vicilin-like protein [19]. Cashew nuts are high in saturated fatty acids, fiber, amino acids, and vitamins [18], and they are also abundant in energy. Vicilin-like protein is a major allergen found in cashews [19]. Meanwhile, it appears that cashew allergy is becoming more common over time, and it has been linked to severe anaphylaxis, surpassing even peanut allergy in severity [20]. According to [21], cashew consumption appears to lower the risk of a variety of lifestyle-related health problems, some of which are included below.

---

## 4. Heart health

Cashews include monounsaturated and polyunsaturated fatty acids, which can aid in lowering LDL cholesterol and triglyceride levels [22]. As a result, the risk of cardiovascular disease is reduced. The cashew nut, in particular, aids in lowering blood cholesterol levels, controlling diabetes, and reducing the incidence of coronary heart disease [23][15]. Cashew nuts, on the other hand, are abundant in magnesium, which is important for bone formation and preventing high blood pressure [24].

"Eating 1.5 ounces of most nuts per day as part of a diet reduced in saturated fat and cholesterol may lessen the risk of heart disease," according to the [25]. Magnesium is abundant in cashews, and it is involved in over 300 enzymatic activities in the body, including food metabolism and the creation of fatty acids and proteins [26]. Magnesium also plays a role in muscle relaxation as well as neuromuscular transmission and activity. Magnesium insufficiency is connected to insulin resistance, metabolic syndrome, coronary heart disease, and osteoporosis in the elderly [27]. A high calcium consumption without enough magnesium has been linked to arterial calcification, cardiovascular disease, and kidney stones, according to several studies. According to [28], persons who consume the most magnesium have a 58 percent lower risk of coronary artery calcification and a 34 percent lower risk of abdominal arterial calcification, according to the Framingham Heart Study.

---

## 5. Weight management

Women who ate nuts infrequently gained more weight than women who ate nuts frequently, according to research. They came to the conclusion that consuming cashew nuts does not cause weight gain and may even aid weight maintenance. Routine nut consumption has been linked to a higher energy expenditure while resting, according to some

researchers [26]. It's possible that this will have an impact on weight loss. Furthermore, it was revealed that in trials comparing weight loss between eating regimens that included or excluded nuts, regimes that included nuts in moderation were connected to better weight reduction. Nuts, according to [29], can help people keep a healthy weight. They may accomplish this by making a person feel full and contributing to thermogenesis, or the body's creation of heat. This can assist in increasing the body's metabolic rate.

## 6. Gallstones and Bone health

Nut eating is linked to a lower risk of gallbladder removal surgery, according to [30]. Women who ate more than 5 ounces of nuts per week had a decreased risk of cholecystectomy than women who ate less than 1 ounce per week, according to the study. Gallstones are comprised of hardened cholesterol or a substance called bilirubin, and they can be very painful. [15]. As a result, eating cashews every day may reduce your risk of painful gallstones. Cashews are also one of the few foods high in copper. Copper is present in 622 micrograms per ounce of cashews (Cu). Copper consumption for adults aged 19 and above is 900 micrograms per day. Severe copper deficiency has been linked to reduced bone mineral density and an increased risk of osteoporosis, according to studies. Copper is also necessary for the maintenance of collagen and elastin, two key structural proteins in our bodies [31]. Meanwhile, without enough copper, the body is unable to restore damaged connective tissue or the collagen that forms the structure for bone, which can result in a variety of disorders, including joint dysfunction as bodily tissues break down [32]. Cashews' magnesium aids in the assimilation of calcium into the bone, which is vital for bone development. In combination with calcium and copper, manganese, another mineral found in cashews, has been demonstrated to prevent osteoporosis [33].

## 7. Cashew utilization

The utilization of cashew for the benefit of end-users is as shown in Table 1 below. The table revealed that cashew can be utilized to benefit human health in many forms. The products derived from the cashew tree are leaves and back of the stem. These are used to make local mixtures (medicines) for the prevention and treatment of certain diseases and ailments [34]. In addition, the stem and branches are raw materials for the construction of furniture, fishing boats and ship rollers which have shown resistance to termite infestations [35]. Moreover, apple is a product that is got from cashew trees which can be consumed in raw form. Similarly, the apple can be processed into concentrate and flesh. Apple concentrate is used for producing juice, liquor, vinegar, jam and beverages while the flesh is used for producing pickles and candies [34] [36]. Cashew nut shell liquid (CNSL) is another cashew-derived substance. It's utilized to make cashew shell resin and as a fuel source in processing units [37].

**Table 1** Cashew Utilization and Health

Parts of the tree	Products	Uses
Cashew tree	Leaves and Stem back	For manufacturing native concoction
Cashew Stem and Branches	Wood/Timber	Furniture, Fishing boats and ship rollers (highly resistant to termite attack).
Apple	Apple concentrate	To make juice, bourbon, vinegar, jam, and other beverages.
	Apple flesh	For the production of pickles and confectionery
Cashew Nut Shell Liquid (CNSL)	Cashew shell	Production of cashew shell resin and use of it as a fuel in the processing unit

Source: Author's Compilation

## 8. Conclusion

This paper examined the effect of cashew cultivation and its uses on the health of end-users. It also showed that cashew is very important as most of its parts are beneficial to human health and livelihood. Since the health benefits of production, consumption and utilization are on the increase. Hence, it is recommended that cashew should be given more attention to encourage further researches and investigations into reducing allergens to minimize the reaction when consumed. In addition, data on the impact of cashew consumption on lipid profile and blood pressure should be provided for dietary recommendations. This would improve the country's Gross Domestic Product (GDP) by stimulating stakeholders' interests in cashew production.

---

## Compliance with ethical standards

### *Acknowledgment*

I want sincerely appreciate my co-authors for their great contribution towards the success of this research.

### *Disclosure of conflict of interest*

The authors declare no conflict of interest.

---

## References

- [1] K. Oluyole, S. Agbeniyi and K. Ayegbonyin, "Competitiveness of Cashew Production in Nigeria", *International Journal of Research in Agriculture and Forestry*, vol. 4, no. 8, pp. 1-7, 2017.
- [2] Adeigbe OO, Olasupo FO, Adewale BD, Muyiwa AA. A review on cashew research and production in Nigeria in the last four decades. *Scientific Research and Essays*. 2015; 10(5): 196-209.
- [3] Dedehou ESCA, Dossou J, Ahohuendo B, Saidou A, Soumanou MM. Optimization of cashew (*Anacardium occidentale* L.) apple juice's clarification process by using cassava and rice starch. *J. Appl. Biosci.* 2015; 95: 8989-9002.
- [4] Azam-Ali and Judge (2004). Small-scale cashew nut processing (PDF). FAO, United Nations. Archived (PDF) from the original on 15 February 2017. Retrieved 3 June 2017.
- [5] Agweek. The Recalibration of the Global Cashew Kernels Market: Can Nigeria Participate through a European Market Entry Strategy? *The Nigeria Agribusiness Register*. 2020; 3: 4-8.
- [6] United States Department of Agriculture, Agricultural Research Service (USDA) (2018). National Nutrient Database for Standard Reference, Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>
- [7] FAOSTAT. Food and Agricultural organisation Statistics. 2013.
- [8] FAOSTAT. (2020). Food and Agricultural Organization of the United Nations Statistics Division. Available online: <http://faostat3.fao.org/download/Q/QC/E> (accessed on 10 February 2020)
- [9] Nitidae. The West African Cashew Sector in 2018: General trends and country profiles. *Nitidae report*. 2019; 1-15.
- [10] Oluyole KA, Agbeniyi S, Ayegbonyin K. Competitiveness of cashew production in Nigeria. *International Journal of Research in Agriculture and Forestry*. 2017; 4(8): 1- 7.
- [11] Oladejo JA. Profitability and structural analysis of cashew nut market in Oyo State, Nigeria. *International Journal of Agricultural Policy and Research*. 2015; 3(3): 114-221.
- [12] Aliyu OM, Adeigbe OO, Awopetu JA. Foliar Application of the Exogenous Plant Hormones at Pre-Blooming Stage Improves Flowering and Fruiting in Cashew (*Anacardium occidentale* L.). *J. Crop Sci. Biotech.* 2011; 14(2): 143-150.
- [13] Ros E. Health benefits of nut consumption. *Nutrients*. 2010; 2(7): 652-682.
- [14] Stewart RAH. Primary prevention of cardiovascular disease with a Mediterranean diet supplemented with extra-virgin olive oil or nuts. *N. Engl. J. Med.* 2018; 379: 1388.
- [15] Mohammad J, Maliheh K, Gordon AF, Seyedeh PM. The effects of cashew nut intake on lipid profile and blood pressure : A systematic review and meta-analysis of randomized controlled trails. *complementary theories in medicine*. 2020; 50: 102387.
- [16] Rico R, Bullo M, Salas-Salvado J. Nutritional composition of raw fresh cashew (*Anacardium occidentale* L.) kernel from different origin. *Food Science & Nutrition*. 2015; 4: 329-338.
- [17] Robotham JM, Wang F, Seamon V, Teuber SS, Sathe SK, Sampson HA. Ana o 3, an important cashew nut (*Anacardium occidentale* L.) allergen of the 2S albumin family. *Journal of Allergy Clinical Immunology*. 2005; 115: 1284–1290.

- [18] Clark, A. T., Anagnostou, K., and Ewan, P. W. (2007). Cashew nut causes more severe reactions than peanut: Case-matched comparison in 141 children. *Allergy*, 62p.
- [19] U.S. Department of Agriculture, Agricultural Research Service. (USDA) (2013). National Nutrient Database for Standard Reference, Release 26. Nutrient Data Laboratory Home Page, <http://www.ars.usda.gov/ba/bhnrc/ndl>
- [20] Sabaté J, Oda K, Ros E. Nut consumption improves blood lipid levels in a dose-related manner, particularly among subjects with higher Nut consumption and blood lipid levels: a pooled analysis of 25 intervention trials. *Arch Intern Med.* 2010; 170(9): 821-7.
- [21] Desai D, Raorane C, Patil S, Gadgil R, Patkar D. *Anacardium Occidentale: Fountain of Phytochemicals; the Qualitative Profiling.* *World J. Pharm. Res.* 2017; 585–592.
- [22] Dendena B, Corsi S. Cashew, from seed to market: A review. *Agronom. Sustain. Dev.* 2014; 34(4): 753-772.
- [23] U.S. Food & Drug Administration. Qualified Health Claims: Letter of Enforcement Discretion - Nuts and Coronary Heart Disease (Docket No 02P-0505) 2003 . Available from: <http://wayback.archiveit.org/7993/20171114183724/https://www.fda.gov/Food/IngredientsPackagingLabeling/LabelingNutrition/ucm072926.htm>
- [24] Bes-Rastrolio M, Wedick NM, Martinez-Gonzalez MA, Li TY, Sampson L. Prospective study of nut consumption, long-term weight change, and obesity risk in women. *American Journal of Clinical Nutrition.* 2009; 89(6): 1913-1919.
- [25] Saltman, P. D., and Strause, L. G. (2018). The role of trace minerals in osteoporosis [Abstract]. *Journal of the American College of Nutrition*, 12(4), 384-9 <https://www.ncbi.nlm.nih.gov/pubmed/8409100>
- [26] Kelly JH, Sabate J. Nuts and coronary heart disease: An epidemiological perspective of Nutrition. 2006; 99(2): 447-8.
- [27] Mattes RD, Dreher ML. Nuts and healthy body weight maintenance mechanisms [Abstract]. *Asia Pacific Journal of Clinical Nutrition.* 2010; 19(1): 137-41.
- [28] Tsai CJ, Leitzmann MF, Hu FB, Willett WC, Giovannucci EL. Frequent nut consumption and decreased risk of cholecystectomy in women [Abstract]. *American Journal of Clinical Nutrition.* 2004; 80(1): 76-81.
- [29] Philips N, Samuel P, Parakandi H. Beneficial regulation of fibrillar collagens, heat shock protein- 47, elastin fiber components, transforming growth factor-beta1, vascular endothelial growth factor and oxidative stress effects by copper in dermal fibroblasts. *Connect. . Tissue Res.* 2012; 53: 373–378.
- [30] Kattimani VS, Kondaka S, Lingamaneni KP. Hydroxyapatite—Past, present, and future in bone regeneration. *Bone Tissue Regen. Insights* 2016; 7: 9.
- [31] de Souza RGM, Schincaglia RM, Pimentel GD, Mota JF. Nuts and human health outcomes: A systematic review. *Nutrients.* 2017; 9(12): 1311.
- [32] Olife IC, Jolaoso MA, Onwualu AP. Cashew (*A. occidentale* L.) Entomology in Nigeria. *Nig J.Tr Cr Res.* 2013; 2: 80-91.
- [33] Chipojola FM, Mwase WF, Kwapata MB, Bokosi JM, Njoloma JP, Maliro MF. Morphological Characterization of cashew (*Anacardium occidentale*.L) in four populations in Malawi *Afr.j.Biotechnol.* 2009; 8(20): 5173-5181.
- [34] Blomhoff R, Carslen MH, Anderson LF, Jacobs DR. Health benefits of nuts: Potential role of antioxidants. *Brit. J. Nut.* 96(S2):S52-S60.
- [35] Mc Conville DJ. Cordolite saga in a nutshell. *chemicalweek.* Mclaughlin J, Crane J, Balerdi C, Maguire I. Cashew Apple Fruit Growing in the Florida Home Landscape. *UF/IFAS Extension.* 2017; 2: 1-10.