

Effect Of Roasting Temperature On Nutritional Quality Of Cashew Nut (*Anacardium Occidentale*)

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Abstract: The effect of Roasting Temperature on the Nutritional Quality of Cashew Nut was investigated. The proximate compositions (moisture content, crude protein, fat, ash, crude fibre and carbohydrate) and mineral constituents (potassium, phosphorous, calcium, magnesium and vitamin c) of the nuts were determined using standard methods of measurements. The analyses were carried out on the raw sample (which served as the control) and the other samples which were roasted at various temperatures of 150°C, 170°C, 190°C respectively using a furnace. The results obtained for the raw and roasted samples at 150°C, 170°C and 190°C are as follow: moisture content 12.90, 6.66, 5.43 and 4.96%; crude protein 17.79, 17.85, 18.15 and 18.70%; Fat 53.60, 46.80, 43.50 and 42.03%; Ash 2.79, 2.92, 3.00 and 3.19%; crude fibre 3.20, 3.25, 3.26 and 3.30% and Carbohydrate 22.62, 29.18, 32.09 and 33.08% respectively. The results for the mineral constituents for the raw and roasted samples at 150°C, 170°C and 190°C are as follow: potassium 719, 770, 790 and 838 mg/100g; phosphorous 9.26, 10.88, 10.90 and 15.30 mg/100g, Calcium 42.20, 43.60, 45.00 and 47.00 mg/100g, magnesium 23.90, 27.90, 28.50 and 29.00 Mg mg/100g and Vitamin C 4.80, 3.55, 3.30 and 2.95 mg/100g respectively. The results showed that roasting temperatures have a great effect on the nutritional quality of cashew nut and roasting temperature of 190°C proved to be the best for roasting cashew nut in terms of nutrient retention.

Keywords: Carbohydrate, Cashew nut, Furnace, Nutritional Quality, Proximate composition, Roasting, Temperature.

1 INTRODUCTION

Cashew belongs to the family of a tropical evergreen tree, scientifically referred to as Anacardiaceae. Its English name derives from the Portuguese name for the fruit of the cashew tree, caju, which in turn derives from the indigenous Tupi name, acajú. The name *Anacardium* actually refers to the shape of the fruit, which looks like an inverted heart (ana means "upwards" and cardium means "heart"). In the Tupian languages, acajú means "nut that produces itself" [1]. Cashew was indigenous to Brazil, it was later taken to West Africa, East Africa and India by the Portuguese in the 15th and 16th centuries. Cashew is well adapted to seasonally wet and dry tropical climates and has the capacity to grow and yield satisfactorily on well-drained, light textured soils with minimum inputs. This indicates that cashew has a very good adaptability to wide ecological differences [2]. The cashew nut has a hard double shell. Between the shells is caustic, black oil that has to be removed by a difficult roasting process. The oil is used in the plastics and varnish industries. Further roasting removes the second shell to free the nut. The sour fruits can be eaten after processing and are used in making condiments [3]. The nut is attached to the lower portion of the cashew apple which is conically shaped. The cashew nut (seed) hangs at the bottom of the apple, and is c-shaped. Cashew apples and cashew nuts are excellent sources of nutrition. The apple contains five times more vitamin C than an orange and contains more calcium, iron and vitamin B than other fruit such as citrus, avocados and bananas [4]. Cashew is a highly nutritious and concentrated form of food, providing a substantial amount of energy.

The cashew nut is a popular snack, and its rich flavour means that it is often eaten roasted on its own, lightly salted or sugared, or covered in chocolate [5]. Roasting is a cooking method that uses dry heat, whether an open flame, roaster or other heat source. Roasting can enhance [flavour](#) through [caramelization](#) on the surface of the food. Roasting uses indirect diffused heat and is suitable for slower cooking of nuts in a larger, whole piece [6]. Temperature range of 185°C to 190°C is ideal for roasting since it is sufficiently hot to exceed the decarboxylation temperature [7]. If heat applied to cashew nut cannot be fully regulated, it may completely destroy the cashew nut shell liquid (CNSL) which is a valuable raw material for industrial processes and will also affect the quality of the kernels in the shell causing the kernels to break and become brittle during shelling. However, kernels when removed wholly and without crack attract more economic value and this must be considered in cashew nut roasting temperature processing [8]. Heat is required to process cashew nut to edible form but it is also obvious that roasting temperature affects the nutritional qualities of food. This research is concerned with finding out how roasting temperatures at various temperatures affect the nutritional qualities of cashew nut.

2 MATERIALS AND METHODS

2.1 Sample Collection and Preparation

The cashew nut samples used for this experiment were collected from Shonga farm, Patigi Local Government Area of Kwara state. The samples were properly cleaned and kept in a sack. Plate 1 shows the cashew nut samples.

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Plate 1: cashew nut samples

2.2 Methods

Samples of cashew nuts were cleaned to remove impurities; they were then soaked in water to avoid scorching during the roasting operation. This was done by placing the nuts in a plastic container filled with water, the nuts were then left to stand for about ten minutes and the water drained off. The nuts were left for about four hours in order to allow the water left on the surface of the nuts to be absorbed. This process was repeated until a moisture content of 9% was reached according to the method described by [9]. 500g each of the cashew nuts sample were subjected to heat treatments in a furnace set at 150°C, 170°C and 190°C for a uniform period of 20minutes. These were done in replicates. The roasted samples were then allowed to cool and the nutritional properties determined. Nutritional properties of the raw cashew nut samples were also determined prior to roasting. This was carried out using the [10] methods of analysis.

3.0 RESULTS AND DISCUSSION

The result of the nutritional parameters of raw cashew nuts and roasted cashew nuts at different temperatures are presented in Table 1.

Table 1: Nutritional Parameters of Raw and Roasted Cashew Nuts

| Nutrient | Raw | 150°C | 170°C | 190°C |
|-----------------------|-------|-------|-------|-------|
| Moisture Content (%) | 12.90 | 6.66 | 5.43 | 4.96 |
| Protein (%) | 17.79 | 17.85 | 18.15 | 18.70 |
| Fat (%) | 53.60 | 46.80 | 43.50 | 42.03 |
| Ash (%) | 2.79 | 2.92 | 3.00 | 3.19 |
| Crude Fibre (%) | 3.20 | 3.25 | 3.26 | 3.30 |
| Carbohydrate (%) | 22.62 | 29.18 | 32.09 | 33.08 |
| Phosphorous (mg/100g) | 9.26 | 10.88 | 10.90 | 15.30 |
| Potassium (mg/100g) | 719 | 770 | 790 | 838 |
| Calcium (mg/100g) | 42.20 | 43.60 | 45.00 | 47.00 |
| Magnesium (mg/100g) | 23.90 | 27.90 | 28.50 | 29.00 |
| Vitamin C (mg/100g) | 4.80 | 3.55 | 3.30 | 2.95 |

Based on the analyses conducted on the three roasting variations of cashew nuts, it was discovered that moisture content plays a significant role in the extraction of oil (fat), as moisture content of 12.90% yielded the highest result of oil (fat) extracted. The roasting temperature of 150°C, 170°C and 190°C gave reduction of moisture content in descending order thereby affecting the oil yield. From Table 1 it can be observed that the raw nuts gave the highest fat content of 53.60% followed by 150°C having 46.80%, 170°C having 43.50% and 190°C having 42.03%. That of 170°C gave a corresponding value with that of [11] which gave a value of 43.85%. The crude protein level analyzed shows that the protein is not degraded with increase in temperature as the crude protein level shows a corresponding increase from 17.79%-18.70%. The roasting effect shows a significant rise in the mineral composition of the cashew nut, as the mineral value (ash) increased with increase in temperature from 2.79%-3.19%. Crude fibre for the raw cashew nut gave a value of 3.20%. This value showed a significant increase with increase in roasting temperature from 3.2%-3.3%. Carbohydrate value increased tremendously with heat increase. It was lower in the raw form which was 22.62% and started increasing with the application of heat between 150°C-190°C. Phosphorous also had a significant increase with roasting temperature, giving a value of 9.26mg/100g in raw form. There was a slight increase between 0.9-1mg/100g at 150°C and 170°C, while that of 190°C gave a significantly higher value of 15.30mg/100g. Roasting temperature also gave a significant increase in potassium, potassium content increased with increase in temperature. Heat favours the calcium content in cashew nut; this is so because the calcium value in the raw form was lower but with the increase in heat, there was increase in calcium value. Calcium which proves to be a very important mineral in food increased with increasing temperature in cashew nut. Magnesium followed the same increment trend along the roasting temperature with a range of 23.90mg/100g-29.00mg/100g; this implies that roasting at high temperature favours magnesium. Vitamin C was higher in raw cashew nut but on application of heat; there was a decline in this mineral. The higher the heat, the lower the value of vitamin C. It also shows that increase in heat denatures the content of vitamin C in cashew nut.

4.0 CONCLUSION

This study showed that roasting temperatures have effect on the nutritional quality of cashew nut. Some of the proximate composition and mineral constituents analysed increased as the roasting temperature increased with potassium having the highest content, while Moisture content, fat and vitamin C reduced as the roasting temperature increased.

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