

BENISEEDS (*Sesamum indicum* Linn.) PREPARATION TREATMENTS THAT AFFECT PROXIMATE ANALYSIS, PHYTOCHEMICAL, AND MINERAL VALUES.

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ABSTRACT

Beniseeds, also called sesame seed can be prepared in different ways to alter its nutritive and medicinal value. Here, beniseeds were prepared by roasting, boiling, and open fermentation. The proximate analysis composition, mineral content, and phytochemical quantities varied by preparation treatment relative to the untreated fresh seeds. Open fermentation best decreased anti-nutrient and alkaloid quantities while simultaneously increasing the extractable protein content. These results provide a nutritional data base for a local seed stock and quantitatively demonstrate how preparative techniques can be applied to increase the human consumption value of beniseeds as well as its medicinal properties.

KEYWORDS: Beniseeds(*Sesamum indicum* Linn.), Proximate Analysis, Phytochemical and Mineral Values.

INTRODUCTION

Beniseeds, which serves as food in various parts of the world is known to have medicinal properties (Odugbemi, 2006). The plant belongs to the family Pedaliaceae and is an annual crop that grows in tropical areas (Dutta, 2004. And Dan et al, 2004). The seeds are tiny, flat ovals measuring about 3mm (Oshodi et al., 2010). The plant's roots and leaves are used for treating migraine, hypertension, ulcers, constipation, chicken pox and piles (Odugbemi, 2006). The fermented form of the paste reportedly has antibacterial activity from previous work. Though not documented, the Ebirá people in Kogi State of Nigeria use it for the treatment of intestinal disorder, especially in children, expecting mothers and young adults. They also use it for soup after grinding it into smooth paste with a grinding stone and they equally roast/fry it as snacks. Improving intestinal health using inexpensive and effective nutraceutical agents such as beniseed is presently being explored by medical sciences (Oyetayo, 2009). This research is therefore focused on improving the nutritional content of beniseeds due to preparative treatments by decreasing the quantity of anti-nutrients (which are) present in the seeds.

MATERIALS AND METHODS

Collection of Beniseeds

The beniseeds were purchased at Okene central market in Kogi State of Nigeria. The seed's taxonomic identity was confirmed at the department of Crop Science of the Federal University of Technology, Akure, Ondo State.

Seed treatments

a) Fermentation

500g of seeds were soaked in 1L of water for 3 days and ground into a smooth paste using a thoroughly washed electrical grinding engine. The paste was then filtered using muslin bag. The filtrate was kept at ambient temperature (29₀C) to undergo open fermentation naturally, a metabolic process performed by the local flora and fauna that naturally settle into the filtrate. The filtrate was allowed to settle for 3 h, the day 0 time point sampled. Subsequent samples were collected at 24 h increments defining days 1 to day 3.

b) Boiling of seeds

200g of the seeds were added to 500 ml of boiling distilled water and incubated for 10 m.

c) Roasting

200 g of the seeds were roasted on a tray at 110₀C for 10 m and mixed once per minute.

d) Fresh sample

The fresh sample was crushed in a crucible before subsequent analysis.

Determination of proximate Analysis, minerals and phytochemicals of different beniseed treatment

Proximate analysis is the determination of the food value of the seed in terms of its nutrient contents. The proximate analysis values of the different seed treatments were measured according to the official methods of analysis described by the Association of Official Chemist (A.O.A.C, 2000). All analyses were carried out in triplicates. These include determination of crude protein, crude fibre, ether extract, ash content, moisture content and dry matter. Minerals quantification was performed as previously described (A.O.A.C, 2000). All analyses were carried out in triplicates. The standard methods of phytochemical analysis was carried out as described by the analytical methods committee of Royal Society of Chemistry. AMC-RSC (2002) pp 222-239.

Statistical analysis of results

Results obtained will be subjected to descriptive one way analyses of variance, SPSS version 10 Microsoft windows 7 and Duncan multiple range test will be used as follow up test.

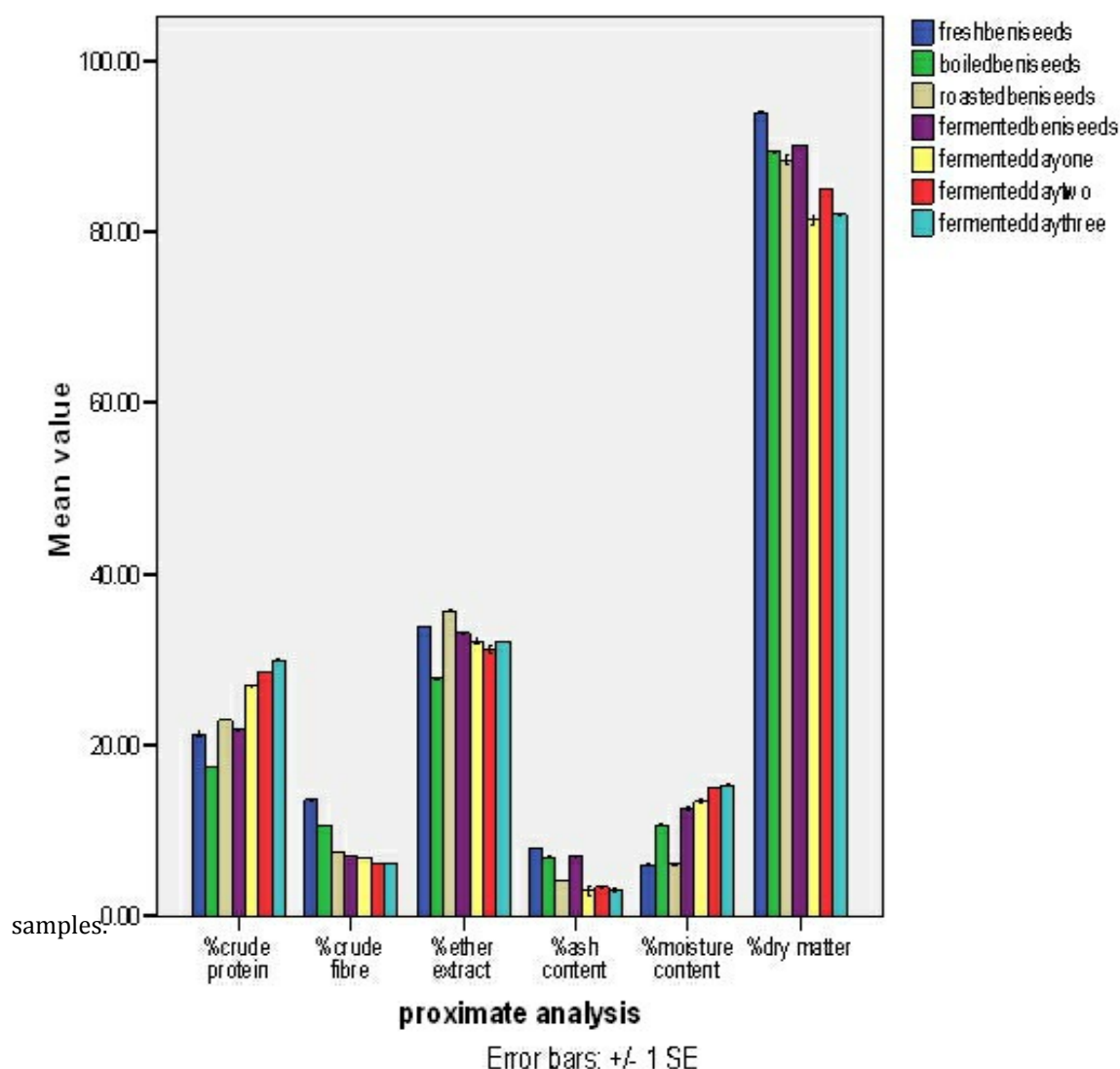
RESULTS

The results of the analyses showed that the different treatments had significant effects on the proximate analysis values, phytochemicals, and mineral quantities. Figure 1 show proximate analyses values. Fermentation increased

the protein content of the seeds by over 9%, but was decreased by about 4% when boiled. The moisture content and dry matter had their least values.

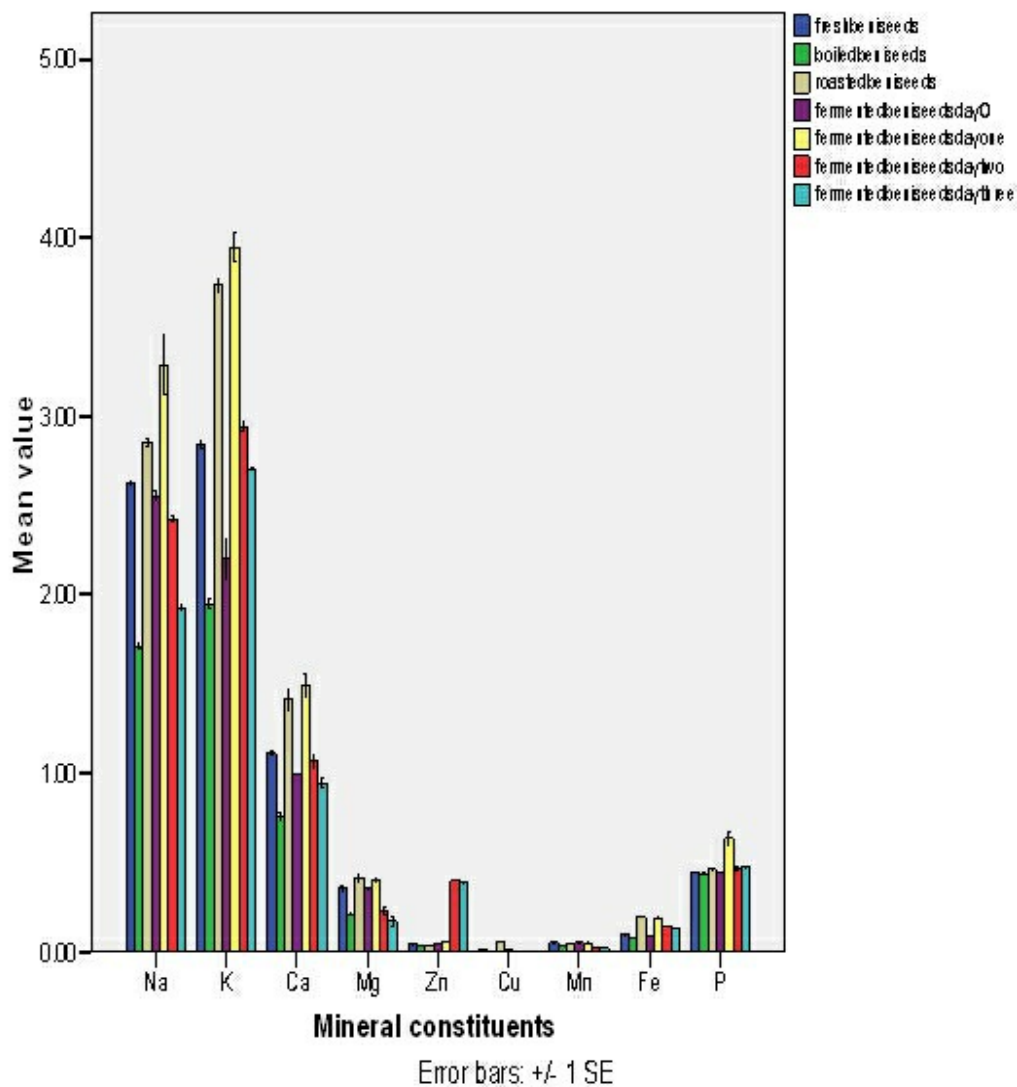
The phytochemical analyses as shown in figure 3 reveals that roasting decreased tannin, phenol, saponin, alkaloid, phytate and oxalate quantities. For instance, while the value of saponin was decreased to an insignificant level when compared the level in the fresh sample, the same trend was observed in the roasted sample. However, fermentation decreased alkaloid more than any other treatment.

Fig 1: Proximate analysis of the different treatments of beniseeds

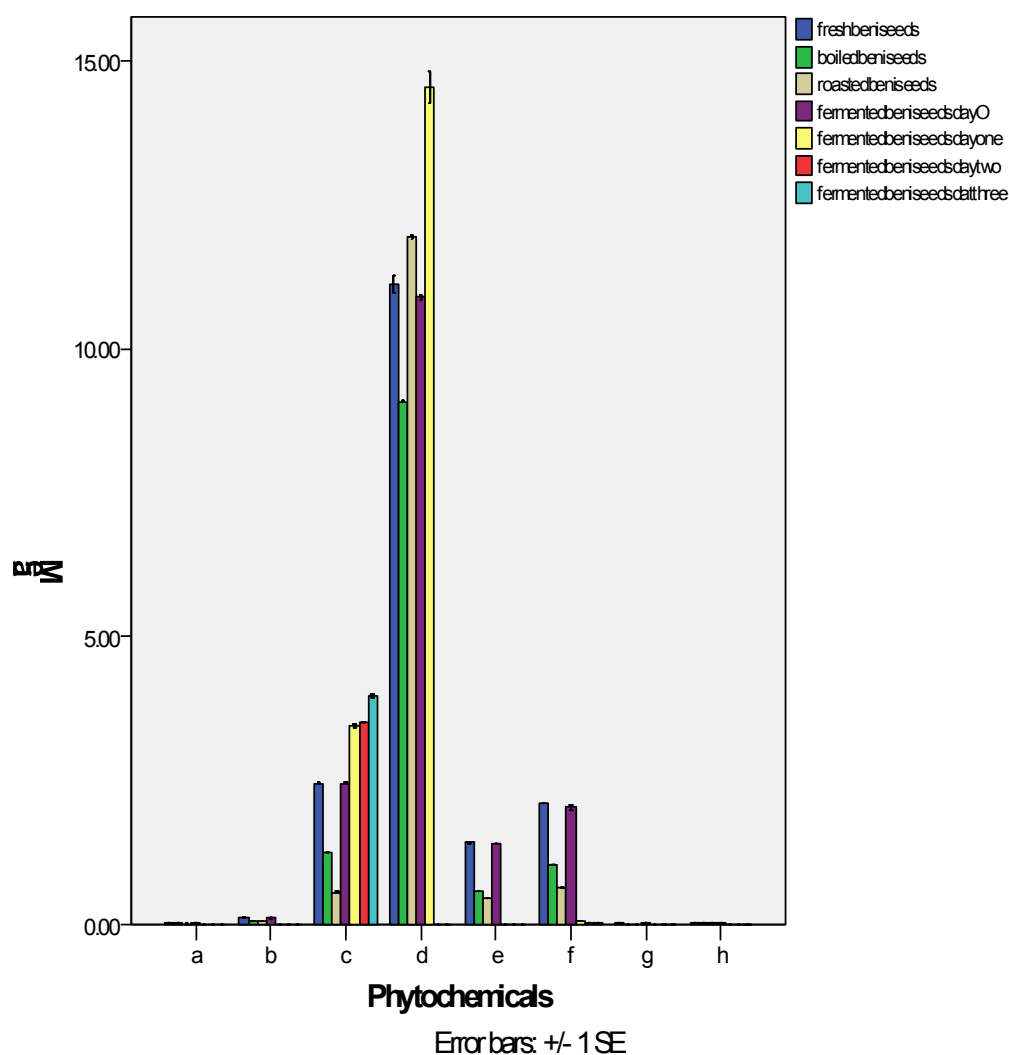


The mineral contents of the beniseeds subjected to different treatments are shown in figure 2. The treatment effects were significant. The sodium content of the seeds was increased slightly when roasted by 8.80% when compared with the fresh sample, but fermentation by day one increased it by 25.60%. In all the mineral contents increased significantly in their values due to the different treatments. This

especially was seen in the fermented after day one. Also, roasting had significant effect and boiling showed significant reducing effect on the minerals. The results of the mineral analyses also showed that, following treatments, the seeds generally had a high content of sodium, potassium calcium, magnesium and phosphorus but were mostly lacking in zinc, copper, manganese and iron.

Fig 2: Mineral constituent of the different treatments of beniseeds

Key: Na- Sodium (g/100ml), K- Potassium (g/100ml), Ca- Calcium (g/100ml), Mg- Magnesium (g/100ml), Zn- Zinc (g/100ml), Cu- Copper (g/100ml), Mn- Manganese (g/100ml), Fe- Iron (g/100ml), P- Phosphorus (g/100ml).

Fig 3: Phytochemical analysis of the different treatment of beniseeds

Key: a- Tannin (g/100ml), b- Phenol (g/100ml), c- Saponin (g/100ml), d- Alkaloid (g/100ml), e- Phytate (g/100ml), f- Oxalate (g/100ml), g- Trypsin inhibitor (g/100ml), h- Glycoside (g/100ml).

DISCUSSION

The preparative beniseed treatments reported here significantly changed the proximate analysis composition, minerals, and phytochemical contents thereby removing the anti-nutrients. Protein content increased significantly when the seeds were fermented. Adebolu, (2007) and Olorunfemi et al., (2006) reported that fermentation increased the level of protein content in fermenting ogi liquor. Since protein is an essential food nutrient, fermented beniseeds can provide adequate form of it. Also, the level of saponin was greatly reduced by roasting and fermentation. Saponin is said to have foaming properties in water and capable of lysing cells (as in haemolysis of erythrocytes) with its powerful surfactant property and this anti-nutrient was decreased by roasting. Phenol is a hydroxyl benzene, a poisonous anti-nutrient according to Stedman's Medical Dictionary (2000) and Counous, (2000).

Phenol, according to Oladunmoye, (2007) is escharotic in the concentrated form and neurolytic in 3-4% solution. Since this particular anti-nutrient was highly decreased by boiling, roasting and fermentation, these treatments makes beniseed safer for consumption. Alkaloids are heterocyclic nitrogen containing substances such as morphine, atropine, codeine sulfate/phosphate and colchicines that makes it possess pharmacological activity and constitute the active principle of the crude drug nature. Alkaloid was decreased by open fermentation. Cyanogen consists of cyano radicals that are highly toxic. The cyanogens content was almost completely removed by fermentation and roasting. Since open fermentation best decreased the quantities of these anti-nutrients, the relevant variables and/or reproduction of these benefits at differing locals should be further examined to provide a better, and economically feasible, preparative method for a well known local food and medicine source.

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