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Nutritive Evaluation and Microbiological Assessment of Fermented Seed of RicinusCommunis (Castor Oil Seed)

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ABSTRACT

Fresh fermented seed of *Recinuscommunis* (Castor Oil Seed) was analyzed for its nutritive evaluation. Isolation and identification of micro-organisms associated with it was also analyzed. The fresh fermented seed contains the following: Fat 21.66± 0.02%; Protein 3.957±0.032%; Ash 5.09± 0.03%; Crude Fibre 2.66±1.15%; Moisture Content 32.85±0.537% and Carbohydrate 38.85%. The result indicated the percentage composition of the following elements: Ca 45.42±2.126%; Ca and Mg 18.4±1.876%, Na 34.26 ± 0.146%; P 187.92±2.126% and K 249. 46± 0. 83%. The micro-organisms isolated and identified to be associated with the fresh fermented seeds *of Ricinuscommunis* are: For bacteria isolates; *Staphylococcus aureus and Staphylococcus saprophiticus, Bacillus subtilis, Lactobacillus plaintarum, Escherichia Coli, Streptococcus Spp and Protein mirabus*. Fungi isolates are; *Aspergillusniger and favus, Penicillin notatum, Batryodiplodiatheombroma and Yeast. Three species of* yeast identified are *Saccharamyce; Pitia and Geotrichum*. Fresh fermented seeds of *Ricinuscommunis* are very nutritious and medicinal.

Introduction

Ricinuscommunis plant is a perennial, 10-13m tall in tropics with stem 7.5-13cm in diameter but it usually behaves as an annual in temperate region, 1-3m tall. The stem is succulent and herbaceous. The leaves are alternates, palmate compound, 1-6cm broad with 6-11 toothed lobes. Flowers are numerous with male flowers as base and female flowers at the tips. Petals are absent in both sex, Sepal is 3-5 in number and greenish in colour. Stamens are 5-10mm long and numerous. Ovary is superior, 3-celled with short style and 3 stigmas. The fruit is a globose capsule 2.5 cm in diameter (Reed, 1976). Although *Recinuscommunis* is indigenous to the Southeastern Mediterranean basin, eastern Africa and India today, it is widespread throughout topical region (Philips Rogers et al, 1999).

The use of castor oil in India has been documented since 2000 BC in lamps and in local medicine as a laxative, purgative. It is cultivated for the seed which yield a fast drying, non yellowing oil used mainly in industries and medicines. Castor oil is used in the coating fabrics and other protective covering material (Reed, 1976). It is used in the manufacture of high grade lubricants, transparent typewriters and printing ink. It is used in leather preservation, and in the production of Rilson (ie a polyamide nylon type fiber). Hydrogenated oil is utilized in the manufacture of waxes, polishes, carbon paper, candle and crayon.

Castor oil is used in making pomade, the residue after crushing, is used as a high nitrogen fertilizer. Although it is highly toxic due to Ricin, a method of detox, fying the meal has now been found so that it can safely be feed to livestock (Internet 1, 2009). In Africa, it's used as spice for cooking. It was used in ritual of sacrifices to please the gods, in early civilization (Internet 2,2009). According to Ayuvvedic and Unani treatises, if a woman chews caster oil seed daily for a period of seven days after the menstruation, she becomes sterile. This has been interpreted by many, that castor oil seed is herb for birth control and if the woman swallows one castor after the menstrual cycle she will not conceive during that month when pregnancy is desired, the practice can be given up and conception follows after a year (Benjamin, 2000). Castor oil is a simple harmless purgative drug. It simply passes out after completing its purgative action, making the patient feel a mild irritation in the anus at the time (Ryan et al,2004). Administration of Castor oil as a purgative is very simple about 30-60 grams pure odorless castor oil is given orally with 250-375 grams of lukewarm milk. It acts after an hour (Macro et al,1991) .

A poultice of castor seed can be applied with benefit result to gouty and rheumatic swellings. A decoction of root of castor plant with carbonate of potash is useful in the treatment of lumbago, rheumatism and sciatica. A paste of kernel with the embryo, boiled in milk, is also given as a medicine in these conditions (Graybill et al,1998). A poultice of castor leaves is useful as an external application to boils and swellings. Coated with some bland oil such as coconut oil and heated, the hot leaves can be applied over guinea worm sores to extract the worm. A poultice of castor seed is also applied to scrofulous sores and boils due to tuberculosis of lymph node (Kansenshogaku,1998).

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Table 1. Proximate analysis of fresh fermented seeds of *Ricinuscommunis*

Constituents	Quantity (%)
Fat	21.66±0.02
Protein	3.957±0.32
Ash	5.09±0.032
Crude fiber	2.66±1.15
Carbohydrate	38.85

Table 2. Results for the mineral composition of fresh fermented seeds of *Ricinuscommunis*

Mineral elements	% composition
Sodium	34.26± 0.146
Phosphorus	187. 92± 2.126
Calcium	45.42± 2.325
Calcium and magnesium	18.4± 1.876
Potassium	249.46± 9.83

Experimental Methods

The fresh fermented seed of *RicinusCommunis* (Castor oil seed) used was bought from the producer in Ose Market Onitsha. The standard analytical procedures for food analysis were adopted in carrying out the determinations of moisture content, crude protein, crude lipid and crude fibre (AOAC, 1990). Available carbohydrate was calculated by difference. All proximate components were analyzed in triplicate and reported as mean ± standard deviation (SD) on % dry weight basis. Mineral analysis were done after triple acid digestion according to the method described elsewhere (Hassan et al, 2004) using atomic absorption spectrophotometer (Alpha 4 model). Phosphorus content was determined calorimetrically using phosphvanadomolybdate method with spectrophtometer (6100 model, Jenway, Uk), while flame photometer (corning 400, Uk) was used for Na and K analysis. Determinations were carried out in triplicate and reported as mean ± SD (mg/100 $dm^{3)}$.

Results

The results for the proximate analysis and microbiological assessment of fresh fermented seeds of R*icinuscommunis* are presented in Table 1-4.

Table 3. Bacteria isolates obtained from fresh fermented seeds of*Ricinuscommunis*

Sample	Bacteria	
Ogili	*Staphylococcus aureus*	+ve
	Staphylococcus saprophiticus	+ve
	Bacillus subtils	+ve
	Lactobacillus plantarum	+ve
	Escherichia coli	+ve
	Streptococcus spp	+ve
	Protein mirabus	+ve

Table 4. Fungi isolates obtained from fresh fermented seeds of*Ricinucommunis*

Sample	Fungi	
Ogili	*Aspergillusniger*	+ve
	AspergillusFlavus	+ve
	Penicillin notatum	+ve
	Batryodiplodiatheombromae	+ve
	Yeast	+ve
	1. saccharomyse	+ve
	Ii Pitia	+ve
	Iii Geotrichum	+ve

Discussion

The results obtained from (Table 1) the nutritive evaluation of fermented seeds of *Ricinuscommunis* commonly called Ogili in Ibo language showed the estimated value of nutrients or constituents to be as follows; Fat = 21.66± 0.02% Protein = 3.957± 0.032%; Ash = 5.09±0.03%; Crude Fiber = 2.66±1.15%, Moisture content = 32.85±0.537% and carbohydrate = 38.85%.

The result showed that the fermented seed is highly nutritious and could nourish the body. The high moisture content of the fermented seed showed that the food has good quantity of water and is prone to microbial attack. The fermented seed could serve as a proteinous food because it has some quantity of protein. Protein is responsible for body growth and repairs of cells. It also contains appreciable quantity of fat which implies that the sample could serve as high energy giving food. Fat plays a vital role in maintaining healthy skin and hair, insulating body organs, maintaining body temperature and promoting healthy cell function. A sample's total mineral content lies on its ash content. The ash content (5.09±0.03%) of fermented seed of *Ricinuscommunis* indicates that the fermented seed contains an appreciable amount of mineral elements.

The presence of Ca and K in the sample made it essential for growing children (Table 2). The calcium is also essential for many functions in the body. It includes regulating hormone secretion, clotting of blood and maintaining healthy bones. The presence of K and Na made the sample very important and recommendable for the maintenance of acid -base balance, osmotic regulation, control of body pH and digestion in the body. The mineral K is also responsible for reduced risk of high blood pressure, stroke and decrease in muscular strength. The appreciable amount of phosphorus present made it essential in bone and teeth formation and in various metabolic processes.

Table 3 showed the bacteria isolates obtained from fresh fermented seeds of *Ricinuscommunis*. The bacteria include; *S. aureus, S. saprophiticus, B. subtilis, L. plantarum, E. coli, Streptococcus spp. and Protein mirabus*. The fungi isolates as shown in Table 4 are as follows; *A. niger, A. flavus, P. notatum, B. theombromae* and three species of yeast mainly *Saccharomyce, pitia and Geotrichum*.

Some of these micro-organisms entered the food after fermentation has taken place. Some may either be responsible for fermentation or may be pathogenic in nature. However nature is wonderful. Cooking (heating) and salting of food can kill some of these pathogenic micro-organisms. Salt preserves foods by creating a hostile environment for certain micro-organisms. In food, salt (brine) dehydrates bacterial cells, alters the osmotic pressure and inhibits bacterial growth and

spoilage. Enzymes and hydrochloric acid present in the body can inhibit the growth or the adverse effect of some of them. Again the anti-body helps to fight against some of these pathogenic types. *Penicilliumnotatum* is a fungi from which the wonderful antibiotic (penicillin) is produced. It can also inhibit the growth of some pathogenic micro-organisms.

Conclusion

Fresh fermented seed of *Ricinuscommunis* is nutritious. Awareness should be created about the importance of eating it while still fresh

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