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Varietal Difference On the Proximate, Mineral Component and Vitamin Contents of Named Local and Foreign Rice Water

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Abstract: *This study investigated the mineral properties, vitamin content as well as the proximate analysis of Abakaliki (local) rice water and Thailand (foreign) rice water, using standard method. Result obtained from the analysis showed that Abakaliki rice water had the higher content of moisture (7.75dry WT/100g) and Thailand rice water contains (7.06dryWT/100g). Abakaliki rice water contains less crude protein (3.50%) while Thailand rice water contains higher crude protein (5.00%). Fat and oil content is higher in Abakialiki rice water (0.32%) than in Thailand which had (0.22%). Crude fiber had higher percentage in Thailand rice water (1.19%) than in Abakaliki rice water (0.79%), Abakalike rice water contains more Ash (0.72%) than Thailand rice water (0.40%), Carbohydate is also higher in Abakaliki rice water (86.92%) than in Thailand rice water (86.13%). Also, Thailand rice water had more sodium (18.68ppm) than Abakaliki rice water (12.77ppm). Abakaliki rice water contains more iron (13.54ppm) than Thailand rice water which had (8.34ppm). Abakaliki rice also had more calcium (16.75ppm) than Thailand rice water (13.96ppm). Magnesium (15.52ppm), phosphorus (0.72mg/l) and potassium (5.48ppmm) are equally higher in Abakaliki rice water than in Thailand rice water which contains (13.53ppm), (90.32mg/l) and (4.95ppm) respectively. In vitamins, vitC is higher in Thailand rice water (0.65mg/100g) than in Abakaliki rice water (0.24mg/100g). Abakaliki rice water contains more VitA (0.01IU) than Thailand rice water(0.05IU), Abakaliki rice water had more $VitB_2$ (0.09mg/100g) than Thailand rice water (0.07mg/100g). Abakaliki rice water also had more $VITB_6$ (0.75mg/100g) than Thailand rice water which had (0.46mg/100g). Thailand rice water contains more $VitB_{12}$ (0.20ug/100g) than Abakaliki rice water (0.01ug). However, since there was not much varietal difference on both rice water, higher premium should be placed on their consumption. Knowledge about their nutrient composition can promote its acceptability and consumption among the consumers.*

KEYWORDS: Varietal difference, rice water, local rice, foreign rice, nutrient

INTRODUCTION

Rice is the seed of the grass species *"Oryza sativa or Oryza glaberima".* As a cereal grain, it is the most widely consumed staple food for a large part of the world's human population especially in Asia. Rice (Oryza sativa L.) is one of the most important staple food crops for half of humanity and dietary mainstay of mankind, which provides more than one half of dietary protein to people (Fresco, L.2005).

Rice provides about 75% of the calories and 55% of the protein in the average daily of the people (Kaul,et al.2002). Moreover, it is one of the most essential staple cereals in human nutrition, consumed by about 75% of the global population (Anjum,et al.2007). In many countries, essential development efforts are concentrated on

rice to meet domestic needs for food. In the developing countries of Asia, rice is also an important item of international trade (FAO,et al.1993). Currently, rice is grown in over 75% of the African countries with a total population close to 800 million people. Rice quality is one of the most important characters, as it exerts large effect on the market value and consumer acceptance. Next to yield grain quality is the most important factor considered by plant breeders. Although the demand for rice is likely to increase the rice breeding stations an institutions had tried to improve indigenous rice and release new rice varieties, the form and quality of the rice varieties that meet consumer preferences are not fully known. Experience shows that the rice plant covered by the term grain quality to a large extent determines market price and acceptance by the consumer (Tokpah, E. S.2010). Rice is grown in all the ecological and dietary zones of Nigeria, with different processing adaptation trait for ecology. The two commonly cultivated specie of rice are a *oryza sativa*, the Asian rice, grown worldwide and *oryza glaberima*, the African rice, grown on a limited scale in West African. Also there are twenty-one wild species of genus *Oryza*. Nine of the wild species are tetraploid while the remaining wild species as well as the cultivated species are diploid. The cultivated species are thought to be an example of parallel evolution in crop plant (Oko,et al.2011).

Rice is an important food component of the daily diet, providing carbohydrate, proteins, dietary fibers and vitamins. Epidemiological study has indicated protective role of whole grain food (e.g. rice) against several diseases associated with westernized societies such as Type 2 diabetes. Rice is an economic crop, which is important in household food security, nutritional diversification, income generation and employment. It is utilized mostly at the house hold level where it is consumed as boiled rice or fried with stew or soup. Rice is a good source of insoluble fiber, which reduces the risk of bowl disorder and fights constipation. Rice is also rich in mineral but the bioavailability of these minerals is usually low due to the presence of anti-nutritional factors like phytates, trypsin inhibitor, etc. Many Nigerians prefer to consume foreign rice brand compared to any local or unrefined rice varieties.

Rice quality refers to many aspects ranging from physical; (shape, length, width, brokenness partial milled, chalkiness and contaminants), physiochemical, (amylase, gel consistency, gelatinization temperature and cooking time), nutrient contents, (moisture, protein, fat, mineral and other), sensory (color, texture, aroma, mouth feel, taste and acceptability) and milling behaviors. Different countries have their own measures of rice quality and systems control, but such system and control lacking uniformity renders its international trade more difficult and less transparency creates areas of argument concern as well as uncertainty, and therefore planning for national supply is fraught with Pitfall (Lee, M. H.2001). Rice grain quality denotes different properties to various groups in the postharvest system (Juliano,et al.1989). Farmers refer to quality of seed for planting material and dry grain for consumption, with minimum moisture, microbial deterioration and spoilage. The millers or trader look for low moisture, variety integrity and high total and head milled rice yield. Market quality of rice is mainly determined by physical properties and variety name; whereas cooking and eating quality is determined by physiochemical properties, particularly apparent amylase content. Nutritional value

is mainly determined by the milled rice protein content. Consumers in all the countries studied by Juliano et al (Juliano,et al.1989) prefer higher head rice yield and more translucent grains. Although variety is the principal factor contributing to grain quality, good post-harvest handling can maintain or even improve it. This research is therefore aimed at determining the difference on the proximate and mineral contents of local (Abakaliki) rice and foreign (Thailand) rice water.

MATERIALS AND METHODS

Source of Raw materials

Local rice (Abakaliki) and foreign rice (Thailand) was purchased from garriki market Enugu and Nkwo Nkewi market Anambra state Nigeria respectively. Every other equipment /Aparatus was from technology incubation centre Anambra State Nigeria.

Processing of sample

Abakaliki rice water production

The local rice (Abakaliki) was sorted to remove the hell, stone and dirt like the black ones. The rice was washed with cold water, boiled for 20 minutes and was sieved of the water and the rice water obtained was allowed to cool overnight. The rice water was packaged in an airtight container.

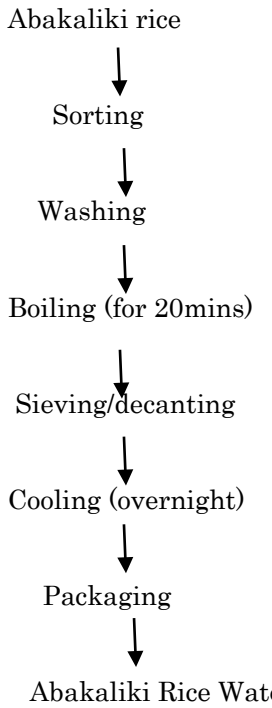

Fig.1 Flow chart for production of Abakaliki Rice Water

Thailand rice Water Production

Thailand rice was washed with cold water, it was boiled for 20mins, sieved out the rice from the water, it was then allowed to cool over the night and was packaged in an air tight container.

Thailand rice

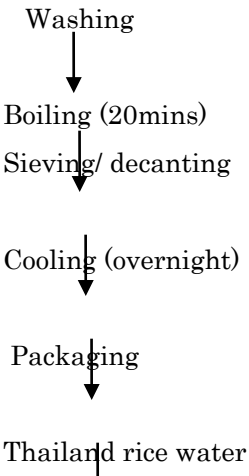

Fig 2 Flow chart for production of Thailand rice water

Proximate Composition

The proximate composition of the rice water was analysed by the method of AOAC (2010). Samples were analysed for moisture content, fat, crude protein, ash content, crude fibre and carbohydrate.

Mineral Composition

Digestion of Sample

The mineral contents of the samples were determined by the dry ash extraction method following each specific mineral elements as described by AOAC (2010). Twenty (20) g of the samples was burnt to ash on a muffle. The ash was cooled and dissolved in 20ml 10% HNO_3. The solution was filtered through an acid washed filtered paper into a 100ml volumetric flask and made to volume with HNO_3 and well mixed where.

TV = Titrate value

0.4008 = Standard amount of calcium liberated by 0.01EDTA.

RESULT AND DISCUSSION

Table1: Result of the Proximate Analysis and Mineral Properties of Local Rice (Abakiliki) and Foreign Rice (Thailand)

SAMPLE/ PARAMETER	Local Rice Water (Abakilik)	Foreign Rice Water(Thailand)
Moisture content	7.75	7.06
(%Drywt/100g)		
Crude protein %	3.50	5.00
Fat and oil %`	0.32	0.22

Crude fibre %	0.79	1.19
Ash content %	0.72	0.40
CHO %	86.92	86.13
Sodium (ppm)	12.77	18.68
Iron (ppm)	13.54	8.34
Calcium (ppm)	16.75	13.96
Magnesium (ppm)	15.52	13.53
Phosphorous (mg IL)	0.72	0.32
Potassium (ppm)	5.48	4.95
VitC(mg/100g)	0.24	0.65
VitA(IU)	0.10	0.05
$VitB_2$(mg/100g)	0.09	0.07
$VitB_6$ (mg/100g)	0.75	0.46
$VitB_{12}$(ug/100g)	0.01	0.02

DISCUSSION

This study investigated the mineral properties, vitamin content as well as the proximate analysis of Abakaliki (local) rice water and Thailand (foreign) rice water, using standard method. Result obtained from the analysis showed that Abakaliki rice water had the higher content of moisture (7.75dryWT/100g) and Thailand rice water contains (7.06dryWT/1000g). Abakaliki rice water contains less crude protein (3.50%) while Thailand rice water contains higher crude protein (5.00%). Fat and oil content is higher in Abakaliki rice water (0.32%) than in Thailand which had (0.22%). Crude fiber had higher percentage in Thailand rice water (1.199%) than in Abakaliki rice water (0.79%), Abakaliki rice water contains more Ash (0.72%) than Thailand rice water (0.40%), Carbohydrate is also higher in Abakaliki rice water (86.92%) than in Thailand rice water (86.13%). Also, Thailand rice water had more sodium (18.68ppm) than Abakaliki rice water (12.77ppm). Abakaliki rice water contains more iron (13.54ppm) than Thailand rice water which had (8.34ppm). Abakaliki rice also had more calcium (16.75ppm) than Thailand rice water (13.96pmm). Magnesium (15.52ppm), phosphorus (0.72m/l) and

potassium (5.48ppm) are equally higher in Abakaliki rice water than in Thailand rice water which contains (13.53ppm), (0.32mg/l) and (4.95ppm) respectively. In vitamins, vitC is higher in Thailand rice water (0.65mg/100g) than in Abakaliki rice water (0.24 mg/100g). Abakaliki rice water contains more vitA (0.01IU) than Thailand rice water (0.05IU), Abakaliki rice water had more vit B_2 (0.09mg/100g) than Thailand rice water (0.07mg/100g). Abakaliki rice water also had more vitB_6 (0.75mg/100g) than Thailand rice water which had (0.46mg/100g). Thailand rice water contains more VitB_{12} (0.20ug/100g) than Abakaliki rice water (0.01ug). However, since there were not much varietal differences on both rice water, higher premium should be placed on their consumption. Knowledge about their nutrient composition can promote its acceptability and consumption among the consumers.

CONCLUSION

The result of the research shows that the two selected varieties of rice (Abakaliki rice and Thailand rice) water had no significant differences in their proximate analysis, mineral component and Vitamins contents. Therefore, since there was no much differences on the both rice water, high premium should be placed on their consumption. Knowledge about their nutrients composition can promote its acceptability and consumption among consumers.

RECOMMENDATION

Rice water contains Vitamins A, B_2 B_6 B_{12} and considerable amount of minerals meaning that throwing of rice water is wasteful as it is used to tighten skin and shrinkage of open pores or face. It also promotes skin cell growth, stimulates blood flow and slow down the aging process. It is also used as hair treatment as it helps to strengthen elasticity of hair and reduce surface frictions.

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