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# EVALUATION OF RICE BRANDS BY SENSORY QUALITIES

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## Abstract

*A purposively selected 20 member sensory panel was used to do sensory and cooking qualities assessment of locally processed rice brands and popularly imported rice brands consumed by most Nigerians. The local brands are 'Enyi, Lobi, Eagle and Veetee; while the imported brands are 'Tomato and Caprice. The results showed that Olam was significantly better and distinguishable from Abakaliki, Tomato and Caprice brands for colour (P<0.05); Olam was significantly better than Caprice for flavour (P<0.05); Olam was significantly better than Abakaliki and Caprice for sogginess (P<0.05); Olam was significantly preferred than Veetee for stickness (P<0.05); Olam was significantly better than the other brands for taste (P<0.05); Olam was significantly preferred to other brands for texture (P<0.05) and significantly better from Tomato for general acceptability (P<0.05).     On assessment of rice grains, the results also showed that Enyi and Abakaliki had poor grain colour rating (P<0.05); the general acceptability of Olam, Caprice and Veetee grain brands were significantly better than the other brands (P<0.05). Generally speaking, the results of the analyses showed that local brands of processed rice competed well with imported brands for sensory qualities.*
**Key words:** rice brands, sensory qualities, consumer preference, general acceptability

## Introduction

Rice (*Oryza sativa*) is one of the staple food crops grown worldwide. The importance of rice as a staple food in Nigeria has risen dramatically since the early 1980s; accounting for nearly 12% of Nigeria's food consumption (IITA 1989; Lawani, 1992; Wudiri and Fatoba, 1992). The two commonly cultivated varieties in Nigeria are "*Oryza Sativa*" and "*Oryza glabberima*" (Adeyemi et al, 1986). Inherited traits, or genetic factors, environmental conditions and the way rice is handled during harvest, storage and at various times during milling contribute to the overall quality of the grain. Generally, rice varieties vary greatly in physico-chemical properties, cooking and processing behaviour. Significant changes in the physico-chemical and cooking properties of some Nigerian rice varieties during processing have been reported (Sanni et al 2004; Ebuehi and Oyewole, 2006). These grain quality differences affect consumer preference because eating quality is determined by the texture of the cooked rice (cohesiveness, tenderness, etc), (Ihedioha and Odoemena, 2006).

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In Nigeria, preference is generally for the imported long and slender grained rice varieties that are well parboiled, well milled, odorless, foreign-matter free, translucent, and with intermediate amylose content (20 to 25%) (Wudil, 1993). Unfortunately, the major limitations to acceptability of locally processed rice have long been identified to include unacceptable appearance, colour, grain size, presence of foreign materials, high percentage of broken grains, and undesirable odour, flavour, taste and texture (Adeyemi and Mustafa, 1979). Most of these problems are linked to the varieties grown and inefficient local processing methods in use. Over the last three decades, Nigeria has explored several initiatives aimed at developing and introducing improved rice varieties which are high yielding and of good grain quality. Similarly, development and promotion of improved processing methods to obtain the parboiled rice quality Nigerians prefer has also received considerable attention (Wudil, 1993; Omotola and Ikechukwu, 2006). Several small to medium scale rice processing mills have been established and promoted to improve product quality and thereby encourage increased consumption of local rice (Otegbayo,et al, 2001; Ihedioha, 2007). This study was therefore undertaken to evaluate the sensory and cooking quality attributes of four local and two imported rice brands consumed in Nigeria.

## 2. Materials and methods
### 2.1. Study area
The tests were conducted in Abuja, Nigeria with purposefully carefully selected panelist including expatriates; staff of eateries, market women, men and youths from various regions of Nigeria.

### 2.2. Sources of rice varieties
Five local varieties and two imported ones were used for the study. The local varieties were obtained from local rice processing mills in Nigeria, namely:

- Olam rice millers, Makurdi, that produce the brand "Lobi"

- Annes agro-industries, Abakaliki, that produce the brand Ëagle"

- Enyi agro-industries, Abakaliki, that produce the brand "Ënyi"

- Veetee industries, Lagos, that produce the brand "Veetee"

The imported varieties, most consumed in Nigeria and used for the study were:

- Tomato
- Caprice

### 2.3. Evaluation of rice grain quality
The different rice grains were poured into a transparent plastic container for easy visibility and assessment. The assessment was done by feeling, biting the grains with the teeth and by visual observation. Quality attributes assessed included: colour, hardness, length of grain, shape, smoothness and general acceptability.

### 2.4. Evaluation of parboiled rice

A 20-member purposively untrained sensory evaluation panelist comprising males, females from the low and middle income groups, including workers of the eateries, market women, men and youths from various regions of Nigeria were used to evaluate parboiled rice samples from local and imported brands. The quality attributes assessed were: colour, taste, stickiness, flavour, texture, sogginess and general acceptability.  The panelist used a 7 point Hedonic scale corresponding to: 7= Excellent/extremely liked, 6 = very good, 5 = good, 4 = fair, 3 = poor, 2 = very poor, 1 = extremely poor.

### 2.5. Data analysis

Data from rice grain and parboiled rice evaluations were analyzed using the simple Analysis of Variance procedure of the Super ANOVA (Abacus Concepts Inc, Berkeley, CA, USA) in the Statistical Analysis System (SAS) package (SAS,) software.  Duncan's Multiple Range Test was used to test and determine statistical difference.

## 3. Results and discussion
### 3.1. Evaluation of grain quality and parboiled rice
**Table 1** shows the result from parboiled rice assessment.

From the analysis, Olam Rice was significantly better than all other imported and local varieties, especially for Taste and General Acceptability.  Other local rice varieties were at par with popular imported varieties, suggesting that except for Olam which was significantly different and better, consumers could not detect the difference between imported and local rice varieties. It should be noted that in rice quality attributes, taste and general acceptability are usually the most important parameters, in which Olam Rice excelled.

A multiple comparison scoring difference test was also used to determine if there were differences among the different rice grains. **Table 2** shows the result.

From the analysis, Caprice (imported) and Olam (local) rice are significantly different and better than the other varieties ($P<0.05$) with respect to grain quality parameters, suggesting that both varieties of rice can easily be sold at the same price easily.  The results also revealed that the long -grain rice promoted by Olam is the same rice species produced for export outside Nigeria; hence Olam and Caprice varieties are indistinguishable.

### Conclusion
From the above analysis and results, it came clear that rice processing has come of age in Nigeria, since consumers can no longer distinguish between locally processed and   imported rice varieties. The results also confirmed that the long-grain rice promoted in Nigeria is what is needed to shore-up the competition between imported and locally processed rice.  Thus Olam rice and other locally processed rice varieties can compete favourably with imported rice for quality attributes distinguishing rice varieties.

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**Table 1: Assessment of parboiled qualities of different rice varieties**

| Rice Variety | Colour | Flavour | Sogginess | Stickiness | Taste | Texture | Gen. accept. |
|---|---|---|---|---|---|---|---|
| Olam Rice | 5.64a | 5.23a | 5.14a | 5.31a | 5.74a | 5.57a | 5.50a |
| Enyi Rice | 5.05ab | 4.91ab | 4.77ab | 5.27a | 4.81b | 4.67b | 5.09ab |
| Veetee Rice | 5.00ab | 4.82ab | 5.57ab | 4.76 | 4.86b | 4.76b | 4.82ab |
| Abakaliki Processor | 4.91b | 4.74ab | 4.27b | 4.82a | 4.86b | 4.71b | 4.82ab |
| Tomato Rice (imported) | 4.91b | 4.60ab | 4.36ab | 4.90a | 5.00b | 4.86b | 4.94ab |
| Caprice Rice (imported) | 4.60c | 4.46b | 4.18b | 5.14a | 4.86b | 4.48b | 4.82ab |

*The sample score means with the same letters are not significantly different (P<0.05); the higher the scores, the better in quality attribute, 7 point Hedonic scale corresponding to: 7= Excellent/extremely liked, 6 = very good, 5 = good, 4 = fair, 3 = poor, 2 = very poor, 1 = extremely poor*

**Table 2: Assessment of rice grain quality by variety**

| Rice variety | Colour | Hardness | Length | Shape | General acceptability |
|---|---|---|---|---|---|
| **Olam Rice** | 5.24a | 5.19a | 5.40a | 5.25a | 5.05a |
| **Enyi Rice** | 3.91b | 4.14c | 4.20c | 4.53bc | 4.80b |
| **Veetee Rice** | 4.91a | 5.57a | 5.15ab | 5.11ab | 5.52a |
| **Abakaliki Processor** | 3.86b | 4.14c | 4.14c | 4.3c | 4.40b |
| **Tomato Rice (imported)** | 4.67a | 4.7bc | 4.85bc | 4.53bc | 4.52b |
| **Caprice Rice (imported)** | 5.19a | 5.14ab | 5.65a | 5.53a | 5.67a |

*The sample score means with the same letters are not significantly different (P<0.05); the higher the scores, the better in quality attribute, 7 point Hedonic scale corresponding to: 7= Excellent/extremely liked, 6 = very good, 5 = good, 4 = fair, 3 = poor, 2 = very poor, 1 = extremely poor*