

SENSORY QUALITY OF FOUR COOKED RICE VARIETIES



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1.0 BACKGROUND

Rice (*Oryza sativa*) is a member of the *Poaceae* or *Graminaceae* family. It is a plant with ancient cultivation, native to South-east Asia. Along with wheat and corn, it is an important source of energy for sustaining the world's population; rice is the staple food for more than half the world's population providing more than one fifth (20%) of the total calories consumed worldwide by humans (Bologna, 2008).

FAO estimates that nearly 3 billion people share the culture, traditions and potential of rice, in the different parts of the world. To date, Italy is one of the most important producer of rice in Europe (about 227000 hectares in 2015 (data Ente Nazionale Risi) and Italian rice is considered a high-quality product (1/3 consumed and 2/3 exported).

Rice is commonly consumed as milled or white rice, which is produced by removing the hull and bran layers of the rough rice kernel in dehulling and milling processes, respectively. The rice milling operation involves dehulling (removal of hulls from rough rice kernels) to give brown rice, and milling (removal of bran from brown rice). There are a few properties that characterize rice kernels: amylose content, biometrics value (length and width of kernel), texture properties (hardness and stickiness) and gelatinization time.

The sensory attributes of cooked rice such as texture, flavor, and color are very important to ensure the quality of cooked rice and its products since rice is usually consumed in large quantities with other dishes (Bourne, 2002; Son *et al.*, 2013). Several researchers have studied the effects of quality and rice variety on the sensory attributes of cooked rice. Srisawas and Jindal (2007) evaluated the relationships between descriptive sensory quality attributes of cooked rice for selected Thai rice varieties by varying the cooking W/R ratio. Syahariza *et al.* (2013) reported significant correlations between starch molecular structures characteristics, including fine structures of the distributions of branch (chain) lengths in both amylose and amylopectin, and digestibility of cooked rice grains. V1, V2 and V4 are rice samples developed by CSIR- Crops Research Institute. V3 is Nerica 1, best aromatic upland rice variety in Africa.

This objective of this study was to determine the consumer acceptability of four rice varieties which were used to prepare boiled rice and rice balls.

2.0 Methodology

Thirty (30) consumer panelists were recruited to evaluate the sensory acceptability of ready-to-eat rice samples. Each sample (30 g) was presented to consumers in a clear disposable saucer labeled with three-digit random codes. In order to minimize residual effects, water was provided between the samples. Consumers were asked to rate their liking (appearance, colour, aroma, stickiness, taste, smoothness and overall acceptability) using a nine-point hedonic scale (1: dislike extremely to 9: like extremely).

Figure 1: Cooked rice samples



Figure 2: Cooked Rice ball samples

Figure 3: A consumer assessing cooked Rice samples

2.1 Statistical analysis

To determine significant differences in sensory attributes and CA between the samples, one-way analysis of variance (ANOVA) was performed. A statistically significant difference was defined as $p \leq 0.05$. If a significant difference was present at $P \leq 0.05$, Duncan's multiple range comparison was performed by a post hoc test. All statistical analyses were performed using SPSS (Statistical Package for Social Science, ver. 18.0, Chicago, IL, USA) and SAS (ver. 9.3, SAS Institute, Cary, NC, USA).

3.0 RESULTS AND DISCUSSION FOR COOKED RICE

The results indicated that the appearance of samples V1, V2 and V3 were moderately accepted with no significant difference existing between them (Table 1). The least preferred was sample V3. The same trend was observed for the colour. The aroma of sample V4 was most preferred amongst the four samples evaluated, least preferred was sample V3. Sample V4 scored the highest stickiness, the least preferred was sample V2. Sample V4 scored highest in taste and smoothness. Sample V4 scored the highest overall acceptability of 8 which implied that the samples was liked very much.

Table 1: Mean sensory scores for prepared rice balls using four rice varieties

Sample	Appearance	Colour	Aroma	Stickiness	Taste	Smoothness	Overall acceptability
V1	7.93±1.14 ^a	7.63±1.30 ^a	7.13±1.14 ^a	6.86±1.90 ^{ab}	6.90±1.32 ^a	7.30±1.71 ^a	7.50±1.46 ^a
V2	7.43±0.86 ^a	7.23±1.01 ^a	6.93±1.02 ^{ab}	5.87±1.76 ^b	6.27±1.91 ^a	6.13±1.61 ^b	6.80±1.38 ^{ab}
V3	5.87±1.78 ^b	5.77±1.72 ^b	6.20±1.61 ^b	6.53±1.48 ^{ab}	6.30±1.92 ^a	6.10±2.04 ^b	6.20±1.65 ^b
V4	7.80±0.85 ^a	7.67±0.76 ^a	7.23±1.04 ^a	7.20±1.22 ^a	7.17±1.37 ^a	7.57±1.10 ^a	7.60±1.13 ^a

Interpretation of scores: 1= dislike extremely; 2=dislike v. much, 3=dislike moderately, 4= dislike slightly, 5=neither like nor dislike, 6=like slightly, 7=like moderately, 8=like v. much, 9=like extremely.

V1, V2 and V4 are rice samples developed by CSIR- Crops Research Institute. V3 is Nerica 1, best aromatic upland rice variety in Africa

The results in (table 2). Brought to the fore that the appearance of sample V4 was the most preferred.

Table 2: Mean sensory scores for cooked rice using four rice varieties

Sample	Appearance	Colour	Aroma	Texture	Taste	Mouthfeel	Overall Acceptability
V1	7.53±1.11 ^a	7.73±0.94 ^a	7.20±1.06 ^a	6.33±1.27 ^a	6.23±2.00 ^a	6.23±1.85 ^a	6.57±1.87 ^a
V2	7.20±1.13 ^a	7.17±0.95 ^a	6.63±1.45 ^a	6.27±1.72 ^a	6.73±1.57 ^a	6.17±1.58 ^a	8.67±10.95 ^a
V3	5.53±2.01 ^b	5.67±1.63 ^b	6.43±1.19 ^a	5.63±1.79 ^a	6.53±1.46 ^a	5.90±1.95 ^a	5.87±1.96 ^a
V4	7.60±0.93 ^a	7.63±0.93 ^a	6.97±1.19 ^a	6.57±1.25 ^a	6.80±1.52 ^a	6.73±1.14 ^a	7.13±1.17 ^a

Interpretation of scores: 1= dislike extremely; 2=dislike v. much, 3=dislike moderately, 4= dislike slightly, 5=neither like nor dislike, 6=like slightly, 7=like moderately, 8=like v. much, 9=like extremely.

V1, V2 and V4 are rice samples developed by CSIR- Crops Research Institute. V3 is Nerica 1, best aromatic upland rice variety in Africa

Even though samples V1 and V2 were also liked very much, on the average sample V4 performed better. The appearance of V3 was the least preferred. The scale of preference for the colour of the cooked rice ranged from “neither like nor dislike” to “like moderately”. The colour of sample V1 was rated highest followed by sample V4 whilst sample V3 had the lowest rating amongst the samples evaluated. The aroma of the samples were not significantly different but on the average sample V1 was preferred. The texture, taste and mouthfeel of the cooked rice samples followed a similar trend with sample V4 being the preferred sample on the average. Sample V2 had the highest mean score (liked extremely) for the overall acceptability whilst sample V3 had the lowest

mean score of 5.87 (neither like nor dislike). In summary sample V4 had the highest mean score in four of the attributes (appearance, texture, taste, and mouthfeel) evaluated. Sample V3 scored poorly in all the attributes evaluated.

4.0 Conclusion

Sample V4 is recommended for use for the preparation of rice balls. In summary, sample V4 scored highest in 6 of the attributes evaluated (colour, aroma, stickiness, taste, smoothness and overall acceptability) making it the most preferred sample.

Samples V2, V4 and V1 are highly recommended to be used for preparation of cooked rice.

5.0 References

AA.VV. Il riso, Bayer CropScience, Ed. Script, Bologna (2008).

Source: data Ente Nazionale Risi.

Bourne, M.C. (2002), In Food Texture and Viscosity: Concept and Measurement, 2nd ed., Academic Press, Inc., London.

Son, J.S., Do, V.B., Kim, K.O., Cho, M.S., Suwonsichon, T. and Valentin, D. (2013), "Consumers' attitude towards rice cooking processes in Korea, Japan, Thailand and France", Food Quality Preference, Vol. 29 No. 1, pp. 65-75.