# A note on taste tests on rice in Northern Nigeria

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*Summary*

A description is given of a taste-preference test on rice carried out by the Federal Rice Research Station in two different centres of Northern Nigeria in 1961.
In this method any factor that might influence the taste was avoided. No definite ranking could be given to two series of four rice varieties when the tasters were blindfolded. When the tasters could see the cooked rice, a significant ranking could be given in only one test.
This indicates that the alleged preference for cooked rice is influenced by other factors than the taste itself.

## 1. Introduction

In 1959 and 1960 a palatability test with eight varieties, one of which was used as a control, was carried out at the Federal Rice Research Station Badeggi, Nigeria, following the design described by ROBERTS (1959). Significant varietal differences, not evident when the tests were analysed separately, were demonstrated in a combined analysis of the results. However, this method has several disadvantages. It is too complicated to be carried out by unskilled staf and there is no control over the homogeneity of the tasting panel or the cooking method. Furthermore the statistical analysis is rather complex.
STANTON (1960) listed several criteria which should be observed when a true estimate of preference is required. In this paper, a method based upon these criteria is described; it has been successfully used in the evaluation of varietal differences in palatability of rice in Northern Nigeria.

## 2. Method

When designing the new palatability test, the following criteria were kept in mind:
a. The design had to be simple and therefore only a few varieties could be included;
b. The palatability test had to be carried out by, preferably, a consistent panel;
c. The cooking and tasting had to be strictly controlled. The rice had not to be tasted with side dishes and a minimum of varieties had to be tasted at one time;
d. The influence of the taste of one variety on another had to be avoided as far as possible;
e. To obtain a higher precision of the final results, the group of people comprising the test panel had to be as homogeneous as possible with regard to age, tribe, sex, profession. In consequence, the results are restricted to that particular group of people.

Four different rice varieties were included in each test. Each individual of the tasting panel tasted the four varieties in pairs, in all combinations, but he did not receive the same variety twice in one combination. Thus six pairs were tasted and each variety was tasted three times. The order in which the different pairs were tasted and the order in which each variety of a pair was tasted, was randomised. The varieties were identified by numbers only.

The samples of rice were cooked by the same person throughout the test and served with a spoon. The tasters were blindfolded; after each variety had been tasted, water was given to the taster.

After tasting a combination, the taster said which variety number was the best. That number was noted. After the taster had finished his test, he was not allowed to speak to the people who had not yet sat the test.

When a taster was consistent in his answers, a rank order could be assigned to the different varieties. The variety preferred in three trials received a score of 1. If no rank order could be given, it was concluded that the taster was not consistent.

The ranking of the consistent tasters was analysed by the non-parametric multiple rank test of FRIEDMAN, extended by Mathematical Centre, Amsterdam (DE JONGE, 1958). According to this test, when the calculated K-value of the experiment is higher than the theoretical K-value, one can conclude that there is a general accepted rank order.

After all the tasters had completed the blindfolded test, the whole test was repeated, during which time the tasters were not blindfolded. The second test was done to see if appearance affected the taste of the cooked rice. It was expected that grain shape, colour and stickiness would have an influence on the taste. There was also the possibility, that the varieties could be recognised by sight.

## 3. Selection of panel

For each complete test, a taste panel of ten persons was chosen as homogeneous as possible with regard to tribe, age, sex and profession.

Two tests were carried out in the Shendam area of Plateau Province. The first was with male labourers of the Yergam tribe, aged between 25 and 32 years, and the second was with male traders of the Ibo tribe, aged between 20 and 40 years.

Two tests were also carried out at Badeggi in Niger Province. The first series here was with male Nupe labourers, aged between 35 and 50 years, and the second series was with Nupe traders, aged between 25 and 35 years.

## 4. Materials

At Shendam the tests were carried out with the rice varieties BG 79, D 52/37, D 99 and G.E.B. 24/37. At Badeggi the rice varieties used were BG 79, D 114, MAS 2401 and a local variety. The varieties in the two places were not the same, the most promising varieties of each area being tested. BG 79 is the most common variety grown in the Badeggi area. G.E.B. 24/37 is the variety most commonly grown in the Shendam area and has a reputation for palatability. D 52/37, D 99, D 114 and MAS 2401 are recent promising introductions (HARDCASTLE, 1959).

The varieties came from the 1960 harvest at the Rice Research Station and were parboiled and milled in the laboratory. The local variety used in the test at Badeggi had been locally parboiled and was bought in the local market.

## 5. Results

The results of the tests at Shendam and Badeggi are given in TABLES 1 and 2 respectively.

TABLE 1. Results of four tasting tests with four rice varieties at Shendam

| Group | | Number of con-sistent tasters | Total ranking figures | | | | K | |
|---|---|---|---|---|---|---|---|---|
| occupation | type of test | | BG 79 | D 52/37 | D 99 | G.E.B. 24/37 | calc. | theor. |
| Traders . . . | blindfolded | 6 | 18 | 12 | 20 | 10 | 68 | 76 |
| Traders . . . | not blindfolded | 7 | 22 | 20 | 18 | 10 | 83 | 92 |
| Labourers . | blindfolded | 4 | 13 | 8 | 8 | 11 | 18 | 52 |
| Labourers . | not blindfolded | 9 | 27 | 22 | 26 | 15 | 89 | 118 |

TABLE 2. Results of four tasting tests with four rice varieties at Badeggi

| Group | | Number of con-sistent tasters | Total ranking figures | | | | K | |
|---|---|---|---|---|---|---|---|---|
| occupation | type of test | | BG 79 | D 114 | local | MAS 2401 | calc. | theor. |
| Traders . . . | blindfolded | 6 | 19 | 12 | 12 | 17 | 38 | 76 |
| Traders . . . | not blindfolded | 7 | 17 | 17 | 25 | 11 | 99 | 92 |
| Labourers . | blindfolded | 5 | 12 | 7 | 15 | 16 | 49 | 62 |
| Labourers . | not blindfolded | 2 | 4 | 3 | 8 | 5 | 14 | — |

At Shendam none of the tests gave a definite rank order. Furthermore, in each of the four tests the rank order was different. Consistency of preference was more evident from both groups of tasters when the tests were carried out without blind-folding. In the "open" tests, consistency was more marked amongst labourers than amongst traders.

At Badeggi only the "open" test with a group of traders gave a definite ranking order, i.e. MAS 2401 (best) > BG 79 = D 114 > Local (worst). None of the rank orders were identical. In the "open" test with labourers, the number of consistent tasters was lower than in the blindfolded test with the same panel.

## 6. Discussion

The method adopted for the taste tests on four rice varieties at Shendam and Badeggi worked satisfactorily in so far that the execution was simple and, apart from the randomisation and the final analysis, the tests could be carried out by junior staff. In most of the cases the tasters gave their answers promptly and only in very few cases one of the varieties of a pair was tasted a second time. The whole test did not take more than three hours.

It can be seen, that the number of members consistently able to distinguish dif-ferences in taste, varied in each panel. Those who could not distinguish differences were excluded in the analysis. Thus, the choise of the taste panel and the actual taste test were combined in one operation. This was thought to be an advantage, espe-cially as the tests were not made with a permanent panel and the tasters were not used to this kind of judging. This is often the case in countries where tests of this kind are carried out for the first time or introduced only first. Furthermore, this

method has an advantage when taste tests have to be carried out in other parts of the country and little control over the tasters can be achieved.

At Shendam none of the tests resulted in a significant ranking. G.E.B. 24/37 was the best variety in three out of the four tests. As far as this variety was concerned, the traders were more consistent than the labourers. The latter scored G.E.B. 24/37 third in the blindfolded test and first in the test when they could recognise the variety most popular in their area. It must be concluded, that the popularity of G.E.B. 24/37 is not based on taste alone. Its popularity depends upon the "quality" of the grain.

At Badeggi only the "open" test with the traders gave a definite ranking. The different ranking order of the local variety in the blindfolded test and the "open" test of the traders is understandable, because in the "open" test the traders could see the local variety, which had many red grains of a different shape. As this mixture does not give a good trading product, it was naturally ranked as the lowest.

This result was not shown in the "open" test of the labourers. In this test only two out of the ten tasters were consistent in their answers. The explanation is, that rice does not constitute such an important part of their diet as it does in the case of the traders. Badeggi, although an important rice growing area exporting to other parts of the Federation of Nigeria, is not a centre of rice consumption. Here again it may be concluded, that the taste of the rice was influenced by its "quality".

In the method described, only the significance of the ranking order was determined. If it is necessary to demonstrate significant differences between varieties, the calculation can be extended by an analysis of variance of the scores for the ranked data (FISHER and YATES, 1957). This analysis is only worthwhile when the calculated K-value is close to or higher than the theoretical K-value. The analysis of the variance of the scores for the ranked data, was carried out for two tests at Shendam and one test at Badeggi. The following significant differences between varieties were obtained. In the "open" test of the traders at Shendam G.E.B. 24/37 was significantly better than D 52/37 and BG 79 (P = 0,05) and in the "open" test of the traders at Badeggi MAS 2401 and BG 79 were significantly better than the local variety (P = 0,05).

These results confirm the previous conclusion, that the popularity of G.E.B. 24/37 in Shendam and the low scoring of the local variety at Badeggi is a reflection of qualities other than taste only. In view of the results obtained, more preference tests will be carried out at several centres. They will not only include taste tests as described, but preference tests on the appearance of paddy, rice and cooked rice as well. This will enable other factors affecting palatability to be taken into account.

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## LITERATURE

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