

THE USEFULNESS OF SENSORY METHODS OF ANALYSIS BY A TASTE PANEL IN DIFFERENTIATING THE QUALITY OF CASSAVA TUBERS UNDER DIFFERENT MANURIAL TREATMENTS

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Cultivators and rural women hold the opinion that even the taste of cooked cassava tubers are significantly affected by the manurial treatment under which the tubers are grown. Taste quality is enhanced by starch and free sugars and decreased by HCN content (Oke, 1975). In studies conducted at Vallayani it has been observed that higher levels of nitrogen increase HCN content of the tubers and higher levels of P significantly increases the starch and protein content (Vijayan and Aiyer, 1969). The applicability of methods of sensory analysis (Jellinck, 1964) has been tested in the present study with respect to tubers grown under different levels of nitrogenous and phosphate fertilizers.

Materials and Methods

A fertiliser experiment on Cassava (Variety M-4) was conducted at the college of Agriculture, Vellayani, with 3 levels of nitrogen ($n_0=0$, $n_1=75$ and $n_2=150$ kg N per hectare) and 3 levels of P ($P_0=0$, $P_1=50$ and $P_2=100$ kg P_2O_5 per ha) replicated three times. Fresh tubers from plots receiving combinations of the two extreme levels of N and of P were combined over replications and a random sample of about 5 kg of fresh tubers were selected from the four treatment combinations n_0P_0 , n_0P_2 , n_2P_0 and n_2P_2 . These samples were used for the quality evaluation test. Since the sensitivity in taste discrimination tests will be adversely affected by increasing the number of samples to be tasted, only the combinations of the extreme levels were utilised.

The four samples of 5 kg each of fresh tubers were derinded, cut in to pieces 5 cm to 8cm long, washed clean and cooked in four different earthenware pots for 15 minutes. The water was drained, as is the usual practice, more water added and again cooked till soft. Cooking was done at Athiyanloor, where a taste panel of 30 rural women selected from the Athiyanloor, block area had assembled.

Taste was measured on a discrete scale with 5 points. The best taste was described as sweetness and was allotted a score of 4, the other scores in the decreasing order of taste were watery sweetness having a score of 3, starchy with a score of 2, bitter with a score of 1 and watery bitter with a score of 0. The members of the

panel of tasters were served the freshly cooked tapioca samples in a random order. After each sample was tasted, the taster was asked to write down her judgement in terms of the five levels of taste specified.

The fresh tubers were analysed for their dry matter content, starch content and protein content by the methods prescribed in AOAC (1956) and the HCN content by the method of Sinha and Nair (1968).

Results and Discussion

The summary of scores obtained from the panel is furnished in Table 1. This was statistically analysed. The mean scores corresponding to the levels of

Table 1
Summary of scores

	$n_0 P_0$	$n_0 P_2$	$n_2 P_0$	$n_2 P_2$
Sweet	7	10	0	0
Watery Sued	8	6	3	10
Starchy	10	1	5	20
Bitter	3	5	18	0
Watery bitter	2	8	4	0
Total	10	30	30	30

N and P are given in Table 2. The analysis indicates that quality is significantly influenced by the level of N the higher level of N significantly reduces the quality. The effect of P is to improve quality but the comparison between the two levels of P is significant only at the 10% level. The interaction between N and P also is highly significant. It is worth mentioning that a balanced nutrition of N and P does not have a deleterious effect on quality as is evident from the fact that the mean score for $n_2 p_0$ is 2.33 which is not significantly lower than the maximum mean score obtained for $n_0 p_0$ of 2.50.

Table 3 presents the relevant extracts from the analysis of the data on the dry matter percentage, starch protein and HCN content of fresh tubers giving the mean values corresponding to the two levels of N and P

An enhanced dose of nitrogen and P increased dry matter in tubers. The interaction between N and P was also significant. The starch content also showed increase with increase in nitrogen application. The influence of phosphorus in

Table 2
Mean scores

	no	n ₂	mean
PO	2.50	1.23	1.87
P ₂	2.17	2.33	2.25
mean	2.33	1.78	—
CD (0.5) for comparison between marginal means	0.40		
CD (0.5) for comparison between means of combinations	0.57		

Table 3

Mean percentage of dry matter, starch protein and HCN content of fresh tapioca tubers grown under different levels of nitrogen and phosphorus

	Dry matter			Starch			Protein			HCN		
	no	n ₂	mean	no	%		no	%		no	mg/kg	
					n ₂	mean		n ₂	mean		n ₂	mean
P ₀	36.2	37.3	36.8	69.4	73.3	71.4	1.49	1.89	1.69	41.7	48.9	45.3
Pa	57.1	39.9	38.5	76.7	80.0	78.3	1.69	2.19	1.94	37.4	40.3	48.9
mean	36.7	38.6	—	73.0	76.7	—	1.59	2.04	—	39.6	44.6	—
C. D. (0.5) marginal means		0.33			1.56			0.06			2.02	
C. D. (0.5) combinations		0.57			2.71			0.11			3.50	

increasing starch content was greater than that of Nitrogen. Nitrogen phosphorus and their interaction was significant in increasing the percentage of crude protein. The influence of nitrogen and phosphorus on HCN content was found to be opposite the former increasing the HCN content and the latter decreasing it. The interaction was therefore highly significant.

Though cooking the tubers is known to decrease their HCN content (Oke, 1956) and probably increase the soluble sugar content, a determination of which was not made in the present study, the results of the quality assessment made by the taste panel closely parallel the chemical components of fresh tubers.

The results of this investigation point to the effectiveness of the taste panel method for comparing the quality of the same variety of cassava tubers grown under different manurial conditions. The results strengthen the view that quality assessment by a taste panel arranged on sound statistical methods will be very effective method for comparing the quality of new varieties, with a standard variety. The attributes that make a variety acceptable to the consumers has to be first assessed by conducting an investigation. However, the varieties for comparison should be grown under similar conditions of manuring and other environmental factors.

Summary

Five kg. of cooked tubers from 4 treatment combinations from the two extreme levels of nitrogen and phosphorus in a fertilizer experiment conducted at Vellayani with 3 levels of nitrogen ($N_0=0$, $N_1=75$, $N_2=150$ kg P_2O_5 /ha) and 3 levels of P ($P_0=0$, $P_1=50$ and $P_2=100$ kg P_2O_5 /ha) were subjected to a quality evaluation by a panel of 30 rural women. Taste was measured on a discrete scale with 5 points. The fresh tubers were analysed for their dry matter, starch, protein and HCN content. Quality assessed by the taste panel was found to be significantly influenced by the levels of N, higher levels reducing the quality, Higher levels of P significantly enhanced the quality. A balanced application of N and P_2O_5 at a ratio of 3:2 had no deleterious effect on quality. The results of chemical investigation on quality factors of the fresh tubers closely parallels the taste panel assessment. The effectiveness of the taste panel method of assessment for comparing quality is discussed emphasising, the usefulness of such a method for comparing quality of varieties in view of its sensitiveness in adjudging differences in quality of the same variety under different manurial treatments.

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സംഗ്രഹം

വിവിധ അളവിൽ നൈട്രജനും ഫോസ്ഫറസും നൽകുന്നതുമൂലം 'fijo' കപ്പയിലുണ്ടാകുന്ന വ്യത്യാസം മനസ്സിലാക്കുന്നതിനുവേണ്ടി വെള്ളായണിയിൽ ഒരു പരീക്ഷണം നടത്തുകയുണ്ടായി. കീഴ്ത്തിലെ അന്നജം, മാംസ്യം മറ്റു ഖരവസ്തുക്കൾ, എച്ച്. സി. എൻ എന്നിവയും നിർണ്ണയിക്കുന്നതുപോലെ ആഹാരസാധനമെന്ന നിലയിൽ ഇതിനുള്ള സ്വീകാര്യതയും നിർണ്ണയിക്കപ്പെട്ടു.

നൈട്രജൻ തോതു വർദ്ധിപ്പിച്ചതനുസരിച്ച് കപ്പയുടെ ഗുണം കുറയുന്നതായി കണ്ടു. എന്നാൽ ഭാവഹത്തിന്റെ അളവ് വർദ്ധിക്കുന്നതോടൊപ്പം ഗുണം കൂടുന്നതായാണ് കണ്ടത്. 3:2 എന്ന അനുപാതത്തിൽ നൈട്രജനും ഭാവഹവും സമീകൃതമായി നൽകിയപ്പോഴും കീഴ്ത്തിയതിന്റെ ഗുണത്തെ പ്രതികൂലമായി ബാധിക്കുന്നതായി കണ്ടില്ല. ഗുണത്തെ നിയന്ത്രിക്കുന്ന രാസഘടകങ്ങളും സ്വീകാര്യതയും തമ്മിൽ വളരെ യോജിപ്പുകാണുകയുണ്ടായി.

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