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Sankati Quality Evaluation of Sorghum Cultivars

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Summary

Sorghum sankati *is a type of thick porridge consumed in South India and is prepared by cooking coarse flour grits from either dehulled grain or whole grain. Domestic methods of* sankati *preparation and consumption are described. Thirty sorghum cultivars were evaluated for* sankati *quality by using taste panels at two locations. Grain with intermediate and hard endosperm texture and a white, creamy pericarp produced* sankati *with the preferred qualities.*

Sankati (Telugu) is a type of thick porridge made from sorghum (*Sorghum bicolor* L. Moench) in several parts of South India. It is called by different names in various regional languages, e.g., *mudda* (Telugu), *mudde* (Kannada), and *kali* (Tamil). Sorghum *sankati* is consumed in the Rayalaseema tracts of Andhra Pradesh, the southern tracts of Karnataka, and all over Tamil Nadu. There is no authentic information on the extent of *sankati* consumption. However, keeping in view the dietary habits in various regions, we estimate that in the state of Tamil Nadu, about 60 to 70% of sorghum consumed is taken in the form of *sankati*. In Andhra Pradesh, approximately 50% of the sorghum produced is eaten as *sankati* while in Karnataka approximately 30% of the sorghum is consumed as *sankati*. On the basis of the statewide sorghum production figures (Government of India 1980), we estimate that approximately 15 to 20% of the sorghum produced in India is consumed in the form of *sankati*. It is eaten by adults as well as children from the age of 4 years. *Sankati* is usually consumed with a range of side dishes such as sauce, *dhal* from pulses, pickles, chutneys, butter milk, curd, curries, etc. Pushpamma and Geervani (1981) reported the nutrient composition of sorghum *sankati*. Pearl millet (*Pennisetum americanum* Leeke) and finger millet (*Eleucine coracana*) grains are also used for the preparation of *sankati*.

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Domestic Methods of *Sankati* Preparation

Milling

Traditionally, sorghum grains are dehulled in a stone mortar with a wooden pestle after moistening the grain. The endosperm (mostly broken) that is recovered after washing the grain is either used directly for cooking or dried and ground to a coarse flour in a rotary stone mill. The bran and washes are fed to animals. However in recent years, the dehulling process has been generally given up and is only occasionally practiced. Increased urbanization and the availability of electrically-powered flour mills have prompted consumers to use grits from whole grains to save time and avoid cumbersome processing. Whole grains are either ground to grits in rotary stone mills, or are taken to flour mills and a mixture of grits and coarse flour is obtained. The milled product is sifted with a very coarse sieve (comparable to U.S. standard mesh 20) to separate fines from grits. Coarse bran pieces are removed by winnowing.

Cooking

A 1 : 3 proportion of sorghum grits/flour and water is generally used for preparing *sankati*. Water is allowed to boil in a vessel and the grits are added to the boiling water coupled with stirring. After about 10 min the fines are added to the cooking medium followed by stirring. The cooking process continues for 3 more min; the vessel is removed from the fire. *Sankati* is poured onto a moist plate

Tabe 2. Mechanical dehulling results.

Sample	Dehulling time (min)	Extraction rate (%)	Dehulling characteristics
White Control	1	87	Excellent
Red Control	1.5	83	Traces of bran on kernels
Swarna	1	88	Excellent
CSH-5	1	90	Excellent
E35-1	1	65	Good but soft grain
IS-7035	1	90	Few broken grains, some bran still on kernels
S-29	1	89	Excellent
IS-7055	1.5	83	Kernel breakage 50%, soft grain, some bran still on kernels
C04	2	73[a]	Kernel breakage 50%
M35052	1	86	Excellent
Dobbs	1	82	Good but some not dehulled
IS-9985	1	83	Good, 30% broken grain
Segaolane	1	82	Excellent
S-14	1	89	Excellent

a. After 1.5 min of dehulling, the grain seemed to have all the bran removed; however the women said it should be dehulled again. In the last 30 sec the grain began to break. As a result, the sample was overprocessed.

Table 3. Summary of porridge taste test.

	Motogo wa ting		*Mosokwane*		
Sample	A[a]	NA[b]	A	NA	Comments
Control White	X		X		Appealing white porridge.
Control Red	X		X		Does not produce good fermented meal.
Swarna	X		X		Appealing white porridge.
CSH-5	X		X		Slight complaints on taste.
E35-1	X		X		Sample became very sour, but was still acceptable.
IS-7035			X		Porridge had a disagreeable taste when fermented.
S-29	X			X	Disliked color; would use only as last resort.
IS-7055			X		Disliked color; would use only as last resort.
C04	X		X		This was one of the most popular samples; color very appealing.
M35052	X		X		Appealing white porridge.
Dobbs				X	Unacceptable color and taste.
IS-9985	X		X		Acceptable.
Segaolane	X		X		Acceptable.
S-13	X		X		Appealing white porridge.

a. A = Acceptable.

b. NA = Not acceptable.

and is frequently made into balls of 10-cm diameter by hand. *Sankati* is eaten either fresh or stored overnight submerged in water or buttermilk. A *sankati* that is light in color and slightly sweet in taste is preferred. It should not be sticky or pasty. *Sankati* should remain firm when stored in water so as to allow eating by hand. It should not disintegrate into small pieces. Consumers prefer a *sankati* that is similar to cooked rice in texture.

Sankati Quality Evaluation

The *sankati* quality of 30 sorghum cultivars (25 of them were chosen for the International Sorghum Food Quality Trials, 1980), was evaluated at two different locations, Bhavanisagar (Tamil Nadu) and Anantapur (Andhra Pradesh), with the aid of farm women. Standard methods to prepare and evaluate *sankati* were determined after interviewing a large number of consumers, mostly farm workers. The following procedure was adopted for preparing *sankati* at the two locations:

1. Grain samples (300 g) were dried to a moisture level of about 10% and were ground to grits on a carborundum stone grinder (Milcent size D-2, 0.5 HP) by suitable uniform pressure adjustments. The mixture of grits and coarse flour was sifted on a Ro-Tap Shaker with a U.S. standard 20 mesh sieve. The grits and the fines were kept separate.

2. The samples were cooked on an electric stove. Three hundred ml of water was boiled in a vessel and 50 g grits were added to the water followed by stirring. Additional quantities of hot water were added as required. Just before the grits were completely cooked, the fine flour (50 g) was added to the cooking medium followed by stirring. *Sankati* was removed from the stove after a semisolid consistency was obtained which took approximately 2 min. The total quantity of water uptake and the cooking time were recorded.

3. *Sankati* samples were scored for color, taste, and texture on a scale of 1 to 5 (1 = good) by a panel of six farm women 1 hr after the *sankati* was prepared. Keeping quality of *sankati* was evaluated after overnight storage. At Bhavanisagar, *sankati* samples were submerged in water and left overnight while at Anantapur they were placed individually in a cloth wrap and left in a pot. The samples were evaluated for keeping quality next morning on a scale of 1 to 5 (1 = good).

Average scores for various quality characters of *sankati* obtained at the two locations are presented in Table 1. Traditionally, consumers use mostly yellow and red pericarp sorghums for *sankati* preparation, since these are widely grown in South India, although white pericarp types are also utilized for the same purpose. The yellow and red pericarp grain types are characterized by a medium to thick pericarp, 10 to 20% corneous endosperm confined to the periphery, and a large part of floury and slightly sweet endosperm. Their milling quality in terms of pericarp removal by the mortar-and-pestle method is good. However, the endosperm gets broken and losses in the process of washing are considerable. When the grains are milled in a flour mill to grits, some coarse bran gets separated and is rejected by winnowing. On the average, among the 30 cultivars studied the water uptake of grits from corneous grains was slightly higher. They also took more time for cooking. The range of variation for color, taste, texture, and keeping quality was broad. The cultivars CO4 and Patcha Jonna represent the local varieties of Tamil Nadu and Andhra Pradesh and their *sankati* acceptability scores were good. However, the panelists generally preferred a white colored product. *Sankati* from brown, or sorghums with a subcoat, was disliked because of poor color and bad taste. In general, white grain types with a medium to hard endosperm texture were preferred. *Sankati* made from grain samples of cultivars CSH-5, M500013, M50297, and Mothi was good for all the organoleptic qualities and proved better than the local yellow and red pericarp types. At Anantapur, *sankati* with a moderate hardness or firm texture was preferred while at Bhavanisagar, a moderate soft product was acceptable. These differences illustrated the variation in regional preferences for *sankati* texture.

References

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Table 1. ***Sankati*** **quality characters of 30 sorghum cultivars chosen for the International Sorghum Food Quality Trials.**

Genotype	Endo-sperm texture	Water uptake[a] (ml)	Time for cooking[a] (min)	Color[b]			Taste[b]			Texture[b]			Keeping quality[b]		
				A[c]	B[c]	Mean	A	B	Mean	A	B	Mean	A	B	Mean
M35-1	3	328	7.5	1.3	2.5	1.9	1.6	2.0	1.8	2.9	2.1	2.5	3.0	2.0	2.5
CSH-5	2	323	9.3	1.0	1.7	1.3	1.3	1.4	1.3	1.6	1.8	1.7	2.5	1.3	1.9
M50009	2	340	11.0	1.1	1.8	1.4	1.3	2.1	1.7	1.7	2.3	2.0	3.0	3.1	3.0
M50013	2	349	11.3	1.2	1.8	1.5	1.8	1.8	1.8	1.0	2.0	1.5	1.4	2.1	1.7
M35052	2	325	11.3	1.0	1.7	1.3	1.3	2.3	1.8	2.8	2.3	2.5	2.3	2.4	2.3
M50297	2	325	10.8	1.3	1.9	1.6	1.5	2.0	1.7	1.5	2.2	1.8	1.5	2.2	1.8
P-721	4	325	8.3	2.9	2.7	2.8	3.3	3.0	3.1	4.2	3.5	3.8	4.3	4.0	4.1
CO-4	3	318	8.8	4.4	3.0	3.7	2.6	2.0	2.3	2.1	2.1	2.1	2.0	2.8	2.4
Patcha Jonna	3	323	10.3	4.0	3.9	3.9	4.1	4.2	4.1	2.5	2.3	2.4	2.2	1.9	2.0
Mothi	2	335	10.5	1.0	1.6	1.3	1.7	1.8	1.7	1.9	1.8	1.8	1.9	2.1	2.0
E35-1	1	325	9.8	1.1	1.5	1.3	1.44	2.8	2.1	1.2	3.2	2.2	1.7	2.8	2.2
IS158	3	349	7.3	1.3	1.9	1.6	4.8	2.4	3.6	4.9	3.4	4.1	4.8	4.3	4.5
WS-1297	4	313	7.3	4.2	4.1	4.1	3.8	3.2	3.5	3.6	3.1	3.3	3.6	3.1	3.3
Swarna	2	328	9.3	2.8	3.1	2.9	2.0	2.8	2.4	1.8	2.3	2.0	1.3	2.9	2.1
S-29	1	325	9.3	1.1	2.2	2.6	1.4	2.6	2.0	1.5	2.1	1.8	1.2	2.7	1.9
S-13	1	328	9.0	1.1	1.6	1.3	1.3	2.5	1.9	1.5	2.7	2.1	1.1	2.9	2.0
IS2317	3	300	5.8	4.2	4.1	4.1	3.7	3.5	3.6	2.3	3.2	2.7	2.4	3.5	2.9
IS7035	3	313	9.5	4.8	4.9	4.8	3.8	4.0	3.9	3.4	4.0	3.7	2.4	4.0	3.2
IS7055	3	313	7.0	4.1	4.7	4.4	4.2	3.2	3.7	3.4	3.1	3.2	2.0	3.1	2.5
IS9985	3	313	9.0	3.0	3.6	3.3	2.3	2.6	2.4	2.8	2.3	2.5	2.6	2.3	2.4
IS8743	3	325	8.5	4.0	4.6	4.3	3.5	2.7	3.1	2.8	2.7	2.7	2.4	2.7	2.5
Dobbs	4	323	6.0	4.1	4.8	4.4	4.0	2.9	3.4	3.0	2.4	2.7	2.9	2.1	2.5
CS3541	2	346	10.0	1.3	1.6	1.4	1.4	2.4	1.9	1.5	2.3	1.9	1.9	2.6	2.2
Segaolane	2	325	11.0	2.4	2.1	2.2	1.7	3.2	2.4	2.3	2.9	2.6	2.1	2.5	2.3
Market-1	1	335	10.0	1.7	1.9	1.8	1.5	2.7	2.1	1.3	2.7	2.0	1.6	2.4	2.0
Gato-1001	4	300	8.3	3.6	3.9	3.7	2.9	3.1	3.0	2.3	3.6	2.9	2.9	2.8	2.8
Awash-1050	3	356	12.5	4.1	2.4	3.2	4.2	3.2	3.7	3.1	3.9	3.5	2.4	3.2	2.8
SPV-352	2	325	9.5	1.0	1.5	1.2	1.5	1.9	1.7	1.7	1.8	1.7	1.7	2.7	2.2
Kanye standard	4	331	9.8	4.5	4.0	4.2	3.5	3.9	3.7	3.2	4.4	3.8	3.4	4.5	3.9
Langi langa	3	349	11.3	2.0	2.5	2.2	2.2	3.2	2.7	2.5	2.8	2.6	2.6	2.0	2.3
Mean	2.6	327	9.3	2.5	2.8	–	2.5	2.7	–	2.4	2.7	–	2.4	2.8	–
SE	0.16	2.4	0.3	0.2	0.2	–	0.2	0.1	–	0.2	0.1	–	0.1	0.1	–
Range	1–4	300–356	5.8–12.5	1.0–4.8	1.5–4.9	–	1.3–4.8	1.4–4.2	–	1.2–4.9	1.8–4.4	–	1.1–4.8	1.3–4.5	–

A = Anantapur; B = Bhavanisagar

a. Average of two independent observations at each of 2 locations, Anantapur and Bhavanisagar.

b. Color, taste, texture, and keeping quality were scored by the taste panelists on a scale of 1 to 5 (1 = good). The taste panel consisted of five farm women at Bhavanisagar and six at Anantapur. Values presented are averages of two independent observations made on two different weeks.