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ACCEPTABILITY OF RECIPES BASED ON NEW STRAINS OF HYBRID CHOLAM (SORGHUM VULGARE)

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One of the major problems facing India today is increasing food production to meet the requirements of its population. The position is more acute in food grains production because they contribute two thirds of the caloric intake of the average Indian. Attempts are being made to popularise the consumption of millets and wheat among rice eaters with a view to overcome the shortage of rice. The Agricultural Production Team (1959)[1] lists the various measures taken by the Government of India to increase agricultural production such as the seed multiplication programme, use of fertilizers and better techniques. All these are directed towards improving the quality and quantity of food grains production, especially of cholam (kaffir corn). Co-ordinated hybrid cholam (Sorghum) breeding projects are being sponsored by Central and State Governments in many parts of India, in collaboration with the Rockefeller Foundation. More recently, certain hybrid sorghum strains have been evolved in the combined project. The Central and State Governments have noted the high potentiality of these hybrid strains for giving double the yield as compared to local strains. Since these strains have a great possibility of replacing the local types, testing their acceptability for human consumption will help in popularising the use of the most promising varieties. Therefore a study was undertaken to develop and standardize suitable recipes using eight most promising hybrid seeds as substitutes for rice, in some of the commonly used rice preparations, and test the acceptability of the food products through a tasting panel.

Experimental

The hybrid strains of cholam selected for the study are given in Table I.

Table I. *The strains of hybrid cholam selected for the study*++

Strains.
MS X IS. 3961
MS X I.S. 532
MS X I.S. 84
MS X I.S. Karad
MS X I.S. Shenoli
MS X I.S. 2931
MS X I.S. Nandyal
MS X I.S. Aisppuri

++ The hybrid strains selected for the study were supplied through the PIRRCOM Centre at Agriculture College and Research Institute, Coimbatore.

The fresh cholam strains supplied were packed individually in paper bags and put in polythene bags, tied with a twine tightly and were left in the deep freeze and used whenever required.

The recipes were selected on the basis of a preliminary survey conducted in the city of Coimbatore in order to know cereal food preparations which are commonly consumed by the people. The food preparations frequently used were; *Uppuma, Pongal, Idli, Dosai,* Banana Fritter, Rice, *Chappathi* and *Poori.* From these preparations, five recipes which required different methods of cooking such as steaming, boiling, frying and parboiling were selected for the study. They were: *Uppuma, Pongal, Idli, Dosai* and Fritters.

Preparation of the Recipes :

The methods for the preparation of the standardised recipes are given below :

Uppuma

Ingredients:	*Quantity*
Cholam ravai†	80g
Onion chopped	25g
Water	360 ml
Green chillies chopped	4g
Salt	1 tsp*
Mustard	½ tsp
Blackgram dhal	1 tsp
Bengalgram dhal	1 tsp
Oil	2 tbsp. ‡

Method : Heat the oil in a shallow stainless steel pan. Add mustard, and the dhals to the heated oil. When the colour of the dhals turn golden brown, add chopped onions and chillies. Add the weighed quantity of ravai and roast for three minutes. Add boiling water and salt to the ravai and stir constantly, cook for about 6-8 minutes and serve hot.

Yield : 2 cups

†Semolina type of product

*tsp: teaspoon ‡Tbsp : tablespoon.

Sweet Pongal

Ingredients	*Quantity*
Cholam ravai	80g
Boiling water	360 ml
Jaggery powder	80g.
Cashew nuts	6 (number)
Cardamom	3 ,,
Oil	2 tbsp.

Method : Heat the oil in a stainless steel pan. Fry the cashewnuts in the oil, add ravai and roast for three minutes. Add 1½ cups of boiling water to the ravai and cook for four minutes. Add the powdered jaggery and cook for eight more minutes. Remove from fire and serve hot.

Idli

Ingredients	*Quantity*
Home pounded cleaned cholam	96g
Blackgram dhal	32g
Add salt to taste	
Water	
a) for soaking cholam	240 ml
b) for soaking blackgram dhal	240 ml
c) for grinding cholam	240 ml
d) for grinding blackgram dhal	120 ml

Method: *Preparation of batter*: Soak the cholam and blackgram dhal separately in 240 ml. of water each for 12 hours. Wash blackgram dhal and cholam two times with cold water. Add the washed cholam to the glass container of a Waring blender, and add 240 ml. of water. Switch on the blender and grind the cholam for about 1½ minutes. Pour the batter in a stainless steel vessel. Grind the blackgram dhal similarly adding 120 ml. of water for about 2 minutes. Add the ground dhal and salt to the cholam batter. Mix well and leave in an incubator maintained at 37°C Allow the batter to ferment for about 10 hours.

Steaming Idlis: Place the vessel used for steaming idli with 480 ml. of water on the stove. When the water boils spread a wet cloth on the perforated idli plate with depressions. Pour ⅓ cup of batter in each depression and place the plate over the boiling water in the vessel. Cover tightly with the lid and steam for 8-10 minutes. Sprinkle water on the wet cloth and remove the idlis from the cloth and keep them covered.

Yield : 8 idlis

Dosai

The batter prepared in the same way as for idli was used for preparing dosai.

Method : Heat a flat iron pan on the stove for five minutes. Smear one teaspoon oil on the heated pan. When the oil is heated, add ⅓ cup of batter over the pan and spread it evenly to a circular shape. Cook for about 1½ minutes. Using a flat laddle turn over the dosai to cook the other side. Add a teaspoon of oil and cook for about 1½ minutes and remove from the pan.

Yield: 6 dosai.

Banana Fritters

Ingredients	*Quantity*
Cholam flour	50g
Wheat flour	5g
Jaggery	35g
Banana	30g
Boiling Water	120g

Method: Add jaggery to the boiling water and stir till it dissolves. Add cholam flour, wheat flour and banana to the jaggery syrup and mix well to make a soft dough. Divide the dough into seven equal portions, each portion being one table spoon. Heat two cups of refined

groundnut oil in a shallow iron pan. Add one portion of the dough to the oil heated to 50°C and deep fat fry for eight minutes.

Yield: 7 fritters.

Nutritive value of the recipes: The nutritive value of the recipes calculated according to the food composition tables published by Aykroyd *et al*[2] is given in Table II. From the data presented in Table II, it is observed that 'idli' and 'dosai' contain more proteins and B-complex vitamins than the other preparations. This may be attributed to the inclusion of blackgram dhal in the recipe. Adding jaggery to pongal increases the calcium and iron contents of the preparation. Of the five preparations, only uppuma contains some vitamin C due the addition of chillies to uppuma.

Testing the palatability of the cooked products: After standardising the recipes, each item was prepared four times with the eight selected strains of hydrid cholam and their palatability tested. The method selected for testing the palatability of the cooked products in this experiment was 'Scoring' the product as described by Lowe[3]. Scores were awarded by a selected panel of judges for each product on its qualities such as colour, texture, flavour, taste and appearance. The judges were served samples of the same preparation, made with the four different strains of cholam at a time. They were requested to taste the products and rank the preparations, using a score card specially designed for the purpose. Four replicates were carried out for each of the five preparations with the eight strains.

The order of preference for the eight hybrid cholam samples was assessed by applying the analysis of rank[4] to all the preparations. The results of the analysis of variance for rank are presented in Table III

From the total rank obtained by each hybrid strain of cholam for all the five preparations, the one getting the topmost place in the ranking order was taken as preferred strain. Thus from the ranking presented in table III, it is evident that MS x IS 2931 was the most preferred strain and MS x IS 84 occupying the next place. According to this rank order, Karad and Shenoli were the least acceptable strains, the others falling within this range.

Conclusion

The following conclusions were arrived at:

1. The strain MS x IS 2931 is the most suitable for preparing *Uppuma*, *Pongal*, *Idli*, *Dosai* and Fritters.
2. The strain MS x IS 84 ranked next to MS x IS 2931
3. Among the remaining strains, MS x IS Aispuri, MS x IS 3961, MS x IS Nandyal and MS x IS 532 ranked third, fourth, fifth and sixth respectively.
4. The strains of Karad and Shenoli were not suitable for preparing the selected recipes.

REFERENCES

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3. Lowe Belle, *Experimental Cookery*. John Wiley & Sons Inc., N.Y. 1955 pp 34-46.
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Table II. *The Nutritive value of the recipes*

Preparations	Ingredients	Quantity (g)	Nutrients								
			Protein (g)	Calories	Calcium (mg)	Iron (mg)	Vitamin A (I.U.)	Vitamin B_1 (mg)	Riboflavin (mg)	Niacin (mg)	Vitamin C (mg)
UPPUMA	Cholam ravai	80	8.3	279	20	4.6	63	0.29	0.22	1.4	—
	Onion	45	0.3	12	45	0.1	—	0.02	—	—	5.0
	Chillies	4	0.1	1	1	0.1	11	0.01	0.01	—	4.4
	Oil	25	—	225	—	—	—	—	—	—	—
	Total		8.7	517	66	4.8	74	0.32	0.23	1.4	9.4
PONGAL	Cholam	80	8.3	279	20	4.6	63	0.29	0.22	1.4	—
	Jaggery	80	0.3	306	64	9.1	—	—	—	—	—
	Cashew nut	13	2.7	77	6	0.7	13	0.08	0.02	0.3	—
	Oil	25	—	225	—	—	—	—	—	—	—
	Total		11.3	887	90	14.4	76	0.37	0.24	1.7	—
IDLI	Cholam	96	9.9	335	23	5.5	75	0.35	0.26	1.7	—
DOSAI*	Blackgram dhal	32	7.6	111	49	2.9	—	0.21	0.11	0.6	—
	Total		17.5	446	72	8.4	75	0.56	0.37	2.3	—

* Dosai also contains extra added oil.

Table III. *Analysis of variance of the scores*

Samples	Uppuma		Pongal		Dosai		Idli		Fritters		Total for rank	T	Order of ranking
	Score	R	Score	R	Score	R	Score	R	Score	R	R		
MS X IS 3961	334	4	332	5	328	3	387	5	377	3	18.5	342.5	1. MS X IS 2931
MS X IS 532	330	5	299	6	307	6	392	4	357	5	26.0	676	2. MS X IS 84
MS X IS 84	356	2	332	3.5	341	2	398	2	350	6	15.5	225.25	3. MS X IS Aispur
MS X IS Karad	265	8	245	8	275	8	353	7	364	4	35	1225	4. MS X IS 3961
MS X IS Shenoli	281	7	264	7	276	7	349	8	340	7	36	1272	5. MS X IS Nandyal
MS X IS 2931	371	1	371	1	375	1	438	1	441	1	5	25	6. MS X IS 532
MS X IS Nandyal	327	6	315	5	310	5	396	3	334	8	27	729	7. MS X IS Karad
MS X IS Aispuri	335	3	333	2	326	4	386	6	392	2	17	306	8. MS X IS Shenoli

R = Rank