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IN VILLAGES OF MAHARASHTRA

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# STUDIES ON THE UTILIZATION OF HYBRID AND LOCAL SORGHUMS IN VILLAGES OF MAHARASHTRA

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## INTRODUCTION

Sorghum and pearl millet grains are used as staple food in several regions of India. They occupy nearly 27% of the total area under cereals and contribute about 14% of total cereal production in the country. A survey of traditional methods of food preparations from sorghum and millet was carried out in villages of seven Indian states, namely Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan and Tamil Nadu (Subramanian and Jambunathan, 1980). These states account for the production of about 77% of sorghum and about 73% of millet in India.

Sorghum is one of the major staple cereals in the villages of Maharashtra. Roti also called as bhakri or chapati is the common food product made from sorghum grains. It is estimated that the state of Maharashtra contribute to about 40% and 42% of area and production of sorghum in India respectively. During the survey of villages in Maharashtra state, majority of the farmers stated that they had to consume more bhakries (roties) prepared from hybrid as compared to local sorghum. According to them, this was due to the reason that bhakries prepared from hybrid sorghums were easily digested than local sor-

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glutens and therefore they felt hungry within a short time whenever they consumed bhakhria prepared from hybrid sorghum. In order to know whether the reported observation is a psychological or a real factor, a preliminary experiment on consumer acceptance of a hybrid and a local sorghum was conducted at Rahuri, Maharashtra state and the results are presented in this paper.

### EXPERIMENTAL PROCEDURE

Six farmers' families from 4 villages were selected for this study. They were interviewed and details about their family size, age and daily requirements of flour for preparing bhakhri were obtained (Table 1). One hybrid (CSH-8) which is popular in the area and a local sorghum (M.35-1) which is widely consumed in the area were chosen for the study. They were grown during the post-rainy season of 1979/80 at the MPAAU farm in Rahuri. These two sorghum cultivars possess similar grain and flour color.

The hybrid or local sorghum flour was supplied daily in a random fashion and in coded packets to the four families for about four weeks. Samples were freshly ground in the local mill and were provided to each of the four families in the evening and on the following day, the weight of the unused flour was taken and another fresh packet was supplied. In another study involving two families, either the hybrid or the local sorghum flour was supplied continuously for a duration of one week and then a change was made. Even though the supply of flour sample was made for a period of one week, in order to get an

unbiased information, the sample was given in coded packets on daily basis. This study was continued for a period of 4 weeks. The family members were interviewed in the local (Marathi) language every evening using a questionnaire (appendix 1) and information was gathered on flour, dough and bhakri qualities from the housewife. The ground samples were analysed for starch, protein, fat and ash contents.

The information obtained through the interviews of the families indicated that the housewives routinely pass the flour through a sieve to remove the coarse particles before making bhakries. About 30 g of the coarse particles were reported to be retained on the sieve for each kilogram of whole flour. The kneading qualities of dough prepared from the hybrid and local sorghum flours were reported similar and roties prepared from them were generally accepted. The starch, sugars and fat contents of the two flour samples were very similar. The protein content of M.35-1 was higher than CSH-8; and CSH-8 had a slightly higher ash content (Table 2).

## RESULTS

The average number of bhakries consumed per day per family was calculated at the end of the experimental period. There were very little differences in the quantities of roties consumed with either the hybrid or the local sorghum in all the six families tested (Table 3). When the results were subjected to 't' test the differences in the consumption of hybrid and local bhakries were not significant.

All the responses received from each of the family members were tabulated and tested using  $\chi^2$  (chi square) analysis. The results indicated that out of 4 families who were supplied with flour on a daily basis, only two families could point out the differences between the hybrid and local sorghum (Table 4). The other two families who were supplied the flour on a weekly interval could not differentiate between the hybrid and local sorghum as evidenced by their response.

#### CONCLUSION

The present study suggested that the general impression existing among the villagers that the hybrid sorghum is more digestible than local sorghum may be solely a psychological phenomenon. Further detailed studies using more number of families are needed for making firm conclusions, since the present study was done with the limited number of families. However, this information is being circulated in the hope that the present findings would generate further interest among the breeders, nutritionists and home economists to carry out a detailed study in different parts of the country. The information obtained from such a study would perhaps highlight some of the consumer acceptance problems of other high yielding hybrids and hopefully would provide us with some ways and means to find some practical solutions to improve the general acceptance and utilization of hybrids.

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Subramanian, V. and Jambunathan, R. 1980. Traditional methods of processing sorghum (*Sorghum bicolor*) and pearl millet (*Pennisetum americanum*) grains in India. Reports of International Association of Cereal Chemistry (ICC), Vol. 10:115-118.

**Table-1: Details of family size, and flour requirements of each family for preparing bhakri.**

| <b>Village</b>              | <b>Family</b> | <b>Males</b> | <b>Females</b> | <b>Children</b> | <b>Total members in the family</b> | <b>Flour requirement per day (kg)</b> |
|-----------------------------|---------------|--------------|----------------|-----------------|------------------------------------|---------------------------------------|
| <b><u>DAILY TRIAL:</u></b>  |               |              |                |                 |                                    |                                       |
| <b>Kadamba</b>              | <b>A</b>      | <b>2</b>     | <b>2</b>       | <b>2</b>        | <b>6</b>                           | <b>3.5</b>                            |
| <b>Digras</b>               | <b>B</b>      | <b>1</b>     | <b>1</b>       | <b>3</b>        | <b>5</b>                           | <b>1.5</b>                            |
| <b>Rahuri</b>               | <b>C</b>      | <b>2</b>     | <b>2</b>       | <b>1</b>        | <b>5</b>                           | <b>3.5</b>                            |
| <b>Mula Nagar</b>           | <b>D</b>      | <b>2</b>     | <b>1</b>       | <b>-</b>        | <b>3</b>                           | <b>1.5</b>                            |
| <b><u>WEEKLY TRIAL:</u></b> |               |              |                |                 |                                    |                                       |
| <b>Digras</b>               | <b>E</b>      | <b>1</b>     | <b>1</b>       | <b>-</b>        | <b>2</b>                           | <b>1.0</b>                            |
| <b>Digras</b>               | <b>F</b>      | <b>1</b>     | <b>1</b>       | <b>-</b>        | <b>2</b>                           | <b>1.0</b>                            |

Table-2: Chemical composition of sorghum flour used in the utilization studies

| Component (%) | Hybrid <sup>a</sup> (CSM-8) | Local <sup>a</sup> (M.35-1) |
|---------------|-----------------------------|-----------------------------|
| Starch        | 69.49                       | 69.86                       |
| Sugars        | 1.06                        | 1.04                        |
| Protein       | 9.40                        | 11.00                       |
| Fat           | 3.16                        | 3.12                        |
| Ash           | 1.69                        | 1.46                        |

<sup>a</sup>Mean of 2 determinations; on dry weight basis



**Table-3** Bhakri consumption pattern of hybrid and local sorghums

| Family | Total members<br>in the family | Average number of bhakries<br>consumed/day/family <sup>a</sup> |       |
|--------|--------------------------------|--|-------|
|        |                                | Hybrid   | Local |

**DAILY TRIAL:**

|   |   |      |      |
|---|---|------|------|
| A | 6 | 23.2 | 21.5 |
| B | 5 | 13.8 | 14.1 |
| C | 5 | 24.6 | 24.6 |
| D | 3 | 13.6 | 14.1 |

**WEEKLY TRIAL:**

|   |   |     |     |
|---|---|-----|-----|
| E | 2 | 8.9 | 9.0 |
| F | 2 | 8.7 | 8.5 |

<sup>a</sup> No significant differences ( $P > 0.05$ ) among the values by paired 't' test.

Table-4: Consumer preference of hybrid and local sorghums

| Type              | Daily trials* |       |          |      |          |    | Weekly trials* |    |          |    |    |    |
|-------------------|---------------|-------|----------|------|----------|----|----------------|----|----------|----|----|----|
|                   | Family A      |       | Family B |      | Family C |    | Family E       |    | Family F |    |    |    |
|                   | A             | NA    | A        | NA   | A        | NA | A              | NA | NA       |    |    |    |
| Hybrid<br>(CSH-8) | 4             | 11    | 1        | 16   | 1        | 7  | 4              | 16 | 0        | 7  | 0  |    |
| Local<br>(M.35-1) | 13            | 1     | 15       | 3    | 10       | 1  | 16             | 0  | 14       | 0  | 23 | 0  |
| $\chi^2$          | 13.07         | 0.088 | 0.099    | 3.87 |          |    |                |    |          |    |    |    |
| P                 | <0.01         | NS    | NS       | NS   | <0.05    | NS | NS             | NS | NS       | NS | NS | NS |

\* indicates the number of days of response

A : Acceptable

NA : Not acceptable

P : Level of significance; NS : Not significant

Appendix-1

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Studies on utilization of sorghum

Sample No.

Date:

- I. (a) Name of the village:
- (b) Name of the head of the family:
- (c) No. of persons in the family:

|  |            |              |            |             |              |
|--|------------|--------------|------------|-------------|--------------|
|  | <u>Men</u> | <u>Women</u> | <u>Boy</u> | <u>Girl</u> | <u>Total</u> |
|--|------------|--------------|------------|-------------|--------------|

Age

II. Physical properties (Flour, dough etc):

(i) Flour:

- |                     |                   |                            |
|---------------------|-------------------|----------------------------|
| (a) Color of flour: | <u>Acceptable</u> | <u>Not acceptable</u>      |
| (b) Handfeel:       | <u>Soft</u>       | <u>Medium</u> <u>Rough</u> |

(ii) Dough:

- |                                  |               |                  |
|----------------------------------|---------------|------------------|
| (a) Water used for dough making: | <u>Hot</u>    | <u>Cold</u>      |
| (b) Stickiness:                  | <u>Sticky</u> | <u>Nonsticky</u> |

(iii) Bhakri:

- |                                 |             |                  |
|---------------------------------|-------------|------------------|
| (a) Ease in bhakri preparation: | <u>Easy</u> | <u>Difficult</u> |
| (b) Puffing:                    | <u>Good</u> | <u>Poor</u>      |

III. Organoleptic evaluation:

- |                                    |                   |                       |
|------------------------------------|-------------------|-----------------------|
| (a) Color of bhakri:               | <u>Acceptable</u> | <u>Not acceptable</u> |
| (b) Texture (by hand):             | <u>Soft</u>       | <u>Hard</u>           |
| (c) Taste:                         | <u>Sweet</u>      | <u>Bland</u>          |
| (d) Eating quality:                | <u>Soft</u>       | <u>Hard</u>           |
| (e) Keeping quality (after 6 hr.): | <u>Soft</u>       | <u>Hard</u>           |
| (f) General acceptability:         | <u>Preferred</u>  | <u>Not preferred</u>  |

IV. General:

(a) No. of bhatris consumed:

|    | <u>Person</u> | <u>Morning</u> | <u>Noon</u> | <u>Evening</u> | <u>Total</u> |
|----|---------------|----------------|-------------|----------------|--------------|
| 1. |               |                |             |                |              |
| 2. |               |                |             |                |              |
| 3. |               |                |             |                |              |
| 4. |               |                |             |                |              |
| 5. |               |                |             |                |              |
| 6. |               |                |             |                |              |

(b) Quantity of flour:

Supplied:

Used:

Balance:

(c) General opinion of the family  
about the sample :

V. Any other food grains used:

Wheat/ Rice/ Millet/ Others/

If yes, specify the food product and quantity of grains used.

