

---

**PREPARATION OF VALUE ADDED DAHI AND LASSI**

---

**S.P. MATKAR, S.P. POUL**

**Abstract:** *Lassi* was prepared from papaya blend to study its acceptability and cost of production to obtain a value added milk product. Papaya *lassi* prepared from cow milk *dahi*, with addition of 8 per cent sugar and 14 per cent papaya pulp was most accepted amongst the various treatment combinations. Addition of papaya pulp at the rate of 14 per cent resulted into improvement of sensory score for colour and appearance. It is stated that higher level of papaya pulp improved the body and texture of papaya *lassi* to maximum extent and sugar level at some extent. It is revealed that the values of sugar and papaya level pulp has significant ( $P < 0.05$ ) effect on flavor in isolation and in interaction. From the study it was revealed that Treatment T<sub>5</sub> would be the choice for preparation of papaya *lassi*. The cost for the best liked papaya *lassi* (T<sub>5</sub>) occurred at Rs. 37.06 per kg; which was comparatively less than plain *lassi* (Rs.38.05 per kg). The papaya pulp can be suitably incorporated with *dahi* for preparation of *lassi* to increase the acceptability of *lassi* by improving its sensory quality.

**Keywords:** Dahi, Cost of production, Lassi, Sensory evaluation.

**Introduction:** *Lassi*, one of the ideal fermented milk products for serving with hot dishes as it helps the body to digest the spicy food. *Lassi* is not only perfect as a morning smoothie, but it is also relished as a hot weather refreshment to beat the scorching heat and it acts as an energizing liquid meal or it provides relief after eating a delicious but hot spicy meal. Thus, *lassi* is a digestive aid for the afternoon meal; it settles the upset stomach and it is the perfect cooling agent (Anonymous, 2006).

There are many new products flooding the market but the benefits of *lassi* cannot be replaced by any other drink. Moreover, *lassi* does not have any side effect. Therefore, it is appropriately said *lassi* is a natural stress buster. Being therapeutically valuable and delicious in taste; it is very popular among all age groups.

Most of the research related to *lassi* has been centered on technology development. Recently, there has been an increasing trend of fortifying the milk products with fruit extracts. Value addition of milk and milk products enhances consumer acceptability, their nutritive quality and these products fetch higher prices in the market which ultimately leads to socio-economic development of the producers and processors.

In India, a great variation is reported in technology of *lassi* preparation as well as the basic ingredients used. Observing the inclination of *lassi* manufactures towards preparing fruit *lassi* and the investigation will explore the possibility of incorporation of papaya pulp in *lassi*. Papaya is a good laxative; it stimulates digestion and is an energy giving food. Besides, it is an all season fruit. Therefore, it is planned to study

the effect of addition of papaya pulp on sensory evaluation of *lassi* with its economics.

**Material and Methods:** The research work was conducted in laboratory of Dept. of Animal and Dairy science, MPKV, Rahuri. Cow milk was obtained from herd maintained at the AICRP on cattle at university. Locally available papaya fruits were used to extract pulp. Total three levels of papaya pulp were finalized on the basis of organoleptic evaluation by judges.

**Preparation of Dahi:** Different lots of *dahi* were prepared in the laboratory using individual starter culture procured from market for different brands for preparation of *lassi*. Pre-experimental trials were conducted to decide best combination of rate of inoculums, incubation temperature and period of incubation to be used in experiment. Achieving the acceptable level i.e. 0.75 – 0.85 % LA was taken into account for this purpose without affecting other quality parameter of *dahi*. Based on the results of various pre-experimental trials, the experimental trials were planned and conducted. Three (1, 1.5 and 2 per cent) levels of rate of inoculums and three periods i.e. 8, 12 and 16 h. were considered. Total three levels of papaya pulp were finalized on the basis of organoleptic evaluation by judges. *Dehi* was prepared by using 10 (D<sub>1</sub>), 12 (D<sub>2</sub>) and 14 (D<sub>3</sub>) per cent papaya pulp.

**Preparation of Lassi:** *Lassi* was prepared as per procedure described by Gupta and Kulkarni (1983). Three levels viz. 10, 15 and 20 per cent of water were tried to prepare *lassi*, whereas the level of sugar was kept constant at the rate of 8 per cent. For preparation of *lassi*, following treatment combinations were studied.

**Treatment combination**

T<sub>0</sub> = S<sub>2</sub>P<sub>0</sub> (8% sugar + 0 % Papaya Pulp)

T<sub>1</sub> = S<sub>1</sub>P<sub>1</sub> (6% sugar + 12 % Papaya Pulp)

T<sub>4</sub> = S<sub>2</sub>P<sub>1</sub> (8% sugar + 12 % Papaya Pulp)

T<sub>5</sub> = S<sub>2</sub>P<sub>2</sub> (8% sugar + 14 % Papaya Pulp)

T<sub>6</sub> = S<sub>2</sub>P<sub>3</sub> (8% sugar + 16 % Papaya Pulp)

T<sub>7</sub> = S<sub>3</sub>P<sub>1</sub> (10% sugar + 12 % Papaya Pulp)

T<sub>8</sub> = S<sub>3</sub>P<sub>2</sub> (10% sugar + 14 % Papaya Pulp)

T<sub>9</sub> = S<sub>3</sub>P<sub>3</sub> (10% sugar + 16 % Papaya Pulp)

(Where, T – Treatment, S – Sugar and P- Papaya)

*Lassi* samples prepared under this study were organoleptically evaluated by the panel of six judges adopting 9 point Hedonic scale. A score card given by Dharam Pal and Gupta (1985) with slight modification (Ashwani, 1992) was used for sensory evaluation of *lassi*. The data generated was analyzed in respect of completely randomized block design and factorial completely randomized block design (Snedecor and Cochran, 1967).

**Result and Discussion:**

**Sensory evaluation of Dahi:** The data on the effect of different papaya pulp blends on sensory score of *dahi* was presented in Table 1. The score obtained for colour and appearance attribute differed significantly (p<0.05). Treatment D<sub>4</sub> scored significantly higher value (7.93) than other three treatments indicating that Treatment D<sub>4</sub> produced superior quality *dahi* which was graded as “liked very much”. Treatments D<sub>1</sub> and D<sub>2</sub> were at par.

The mean values of the scores of *dahi* for body and texture attribute showed statically significant variation (p<0.05). The mean values obtained for treatment D<sub>1</sub>, D<sub>3</sub> as well as D<sub>2</sub>, D<sub>4</sub> were at par. The treatment D<sub>4</sub> scored highest (8.20) and graded in between “liked very much” and “liked extremely”.

The mean values of the score for flavor of *dahi* sample showed that there is variation in the values which differed significantly (p<0.05). Maximum (8.00) score was obtained by the sample D<sub>4</sub>. Flavor is the major contributing attribute in the process of sensory evaluation of *dahi*. The treatment D<sub>4</sub> ranked at top, this treatment was found to be superior. However, statistically, the sample D<sub>1</sub>, D<sub>2</sub> and D<sub>3</sub> were at par. These observations indicated that as the proportion of papaya milk in the blend increased, the sensory quality of the *dahi* increased.

**Sensory evaluation of Lassi:**

**Colour and Appearance:** The mean values of the sensory scores of *lassi* for different attributes were presented in Table 2. It is revealed from the values that the effect of sugar level is statically non significant and that of papaya pulp level is statically significant (P<0.05). This indicates that sugar level (6, 8 and 10 per cent) has not but level (12, 14 and 16 per cent) of papaya pulp has significant role for sensory

T<sub>2</sub> = S<sub>1</sub>P<sub>2</sub> (6% sugar + 14 % Papaya Pulp)

T<sub>3</sub> = S<sub>1</sub>P<sub>3</sub> (6% sugar + 16 % Papaya Pulp)

attribute. P<sub>2</sub> level of papaya (14 per cent) is found significantly superior over P<sub>1</sub> but at par with P<sub>3</sub>. Interaction effect of sugar and papaya pulp has significant effect on colour and appearance of *lassi*. Treatment T<sub>5</sub> found superior and was statically at par with T<sub>9</sub>, T<sub>8</sub>, T<sub>6</sub>, T<sub>2</sub> and T<sub>3</sub>. Addition of papaya pulp at the rate of 14 per cent resulted into improvement of sensory score for colour and appearance.

**Body and Texture:** Statically significant (P<0.05) variation was observed in the body and texture due to sugar, papaya level and integration thereof. Considering sugar as an individual factor, sugar level S<sub>3</sub> (10 per cent) scored significant higher (7.86) than S<sub>2</sub> (7.82) and S<sub>1</sub> (7.71). For papaya level, maximum score was recorded by P<sub>3</sub> (8.02). The score recorded by P<sub>2</sub> and P<sub>1</sub> was 7.88 and 7.49, respectively. The maximum (8.07) sensory score was recorded by treatment T<sub>6</sub> for interaction of sugar and papaya pulp (8 per cent sugar and 16 per cent papaya) than T<sub>2</sub>, T<sub>3</sub>, T<sub>5</sub>, T<sub>8</sub> and T<sub>9</sub> treatments. It is stated that higher level of papaya pulp improved the body and texture of papaya *lassi* to maximum extent and sugar level at some extent.

**Flavor:** It is revealed that the values of sugar and papaya level pulp has significant (P<0.05) effect on flavor in isolation and in interaction. The 10 per cent sugar level (S<sub>3</sub>) was found significantly superior over S<sub>1</sub> (6 per cent) and at par with S<sub>2</sub> (8 per cent). P<sub>2</sub> level of papaya pulp (14 per cent) was statically superior over P<sub>1</sub> but at par with P<sub>3</sub>. The combined effect of sugar (8 per cent) and papaya pulp (14 per cent) i.e. treatment T<sub>5</sub> scored highest, but statically it was at par with T<sub>3</sub>, T<sub>6</sub> and T<sub>8</sub>.

**Cost of production:** The cost of production of *lassi* prepared of treatment T<sub>1</sub> and T<sub>3</sub> was calculated and is presented in Table 2. The cost was calculated on the basis of market price of ingredients. The per kg cost of production of *lassi* for treatment T<sub>0</sub> and T<sub>3</sub> was 28.05 and 27.06, respectively. The cost of production of papaya *lassi* was comparatively less (Rs.27.06 per kg) than control *lassi* (Rs.28.05 per kg) which is sufficiently lower with the value added and nutritionally enriched combination of papaya. From the study it was revealed that Treatment T<sub>5</sub> would be the choice for preparation of papaya *lassi*.

**Conclusion:** Based on the above results, *Dahi* prepared from 14 per cent papaya pulp was most acceptable for sensory attributes. *Lassi* prepared from cow milk and papaya pulp blend (86:14) was most acceptable. The cost of production of papaya *lassi* was comparatively less than control *lassi* which

was sufficiently lower with the value added and nutritionally enriched combination of papaya.

### References:

1. Anonymous (2000). Market profile on chilled drinks and snacks.  
Htt://www.indiancookerylessons.com/fruit/lassi.htm.
2. Ashwani, K. (1992). Evaluation of selected technological parameters for manufacturing of lassi. M.Sc. Thesis, Dept. of Dairy Technology, Gujarat Agri. Uni. Anand.
3. Dharampal, P.V. and Gupta, S.K. (1985). Sensory evaluation of Indian milk products. Indian Dairyman. 37(10):593.
4. Gupta, S.K. and Kulkarni, S. (1983). Recent technological advances in milk based beverages. Indian Dairyman. 35(10): 593.
5. Snedecor, G.W. and Cochran, W.G. (1997). Statistical methods. 6<sup>th</sup> Edn. Oxford and IBH Pub.Co. Pvt. Ltd. New Delhi.

**Table 1. Sensory evaluation of Dahi (score out of 9).**

| Sr. No | Treatment                 | Colour and appearance | Body and texture | Flavour |
|--------|---------------------------|-----------------------|------------------|---------|
| 1.     | D <sub>1</sub> (Control)  | 7.53                  | 7.00             | 6.93    |
| 2.     | D <sub>2</sub> (10% pulp) | 7.53                  | 7.65             | 7.20    |
| 3.     | D <sub>3</sub> (12% pulp) | 7.13                  | 6.93             | 6.93    |
| 4.     | D <sub>4</sub> (14% pulp) | 7.93                  | 8.20             | 8.00    |
|        | CD at 5%                  | 0.10                  | 0.19             | 0.66    |

**Table 2. Sensory score for Sugar, Papaya pulp level and their interactions**

| Sr. No                    | Treatments                                      | Colour and appearance | Body and texture | Flavour |
|---------------------------|---|-----------------------|------------------|---------|
| <b>Sugar Level</b>        |   |                       |                  |         |
| 1                         | S <sub>1</sub> (6%)                             | 7.53                  | 7.71             | 7.71    |
| 2                         | S <sub>2</sub> (8%)                             | 7.71                  | 7.82             | 7.82    |
| 3                         | S <sub>3</sub> (10%)                            | 7.62                  | 7.86             | 7.86    |
|                           | CD at 5%  | 0.859                 | 0.033            |         |
| <b>Papaya pulp</b>        |   |                       |                  |         |
| 1                         | P <sub>1</sub> (12%)                            | 7.33                  | 7.49             | 6.95    |
| 2                         | P <sub>2</sub> (14%)                            | 7.79                  | 7.88             | 7.65    |
| 3                         | P <sub>3</sub> (16%)                            | 7.73                  | 8.02             | 7.50    |
|                           | CD at 5%  | 0.075                 | 0.033            | 0.397   |
| <b>Interaction Effect</b> |   |                       |                  |         |
| 1.                        | S <sub>1</sub> P <sub>1</sub> (T <sub>1</sub> ) | 7.33                  | 7.37             | 6.80    |
| 2.                        | S <sub>1</sub> P <sub>2</sub> (T <sub>2</sub> ) | 7.67                  | 7.73             | 7.37    |
| 3.                        | S <sub>1</sub> P <sub>3</sub> (T <sub>3</sub> ) | 7.60                  | 8.02             | 7.60    |
| 4.                        | S <sub>2</sub> P <sub>1</sub> (T <sub>4</sub> ) | 7.40                  | 7.47             | 7.13    |
| 5                         | S <sub>2</sub> P <sub>2</sub> (T <sub>5</sub> ) | 8.00                  | 7.93             | 7.87    |
| 6                         | S <sub>2</sub> P <sub>3</sub> (T <sub>6</sub> ) | 7.73                  | 8.07             | 7.60    |
| 7                         | S <sub>3</sub> P <sub>1</sub> (T <sub>7</sub> ) | 7.27                  | 7.63             | 6.93    |
| 8                         | S <sub>2</sub> P <sub>2</sub> (T <sub>8</sub> ) | 7.73                  | 7.97             | 7.70    |
| 9                         | S <sub>3</sub> P <sub>3</sub> (T <sub>9</sub> ) | 7.87                  | 7.97             | 7.30    |
|                           | CD at 5%  | 0.513                 | 0.373            | 0.474   |

| Table 3. Cost of production of <i>lassi</i> (control and T <sub>5</sub> treatment) per kg. |                 |               |  |           |   |           |
|--|-----------------|---------------|--|-----------|---|-----------|
| Sr. No   | Particulars     | Rate (Rs./kg) | T <sub>1</sub> (Control)<br>(8% Sugar) |           | T <sub>5</sub><br>(8% sugar +14 % pulp) |           |
|  |                 |               | Qty. (kg)                              | Amt (Rs.) | Qty.(kg)                                | Amt (Rs.) |
| 1  | Starter Culture | 50.00         | 1 gm                                   | 0.05      | 1 gm                                    | 0.05      |
| 2  | Milk (lit)      | 12.50         | 1 lit.                                 | 12.50     | 1 lit.                                  | 12.50     |
| 3  | Sugar           | 18.00         | 80.80 gm                               | 1.45      | 80.80 gm                                | 1.45      |
| 4  | Papaya          | 30.00         | --                                     | --        | 152.71                                  | 4.58      |
| 5  | Miscellaneous   | --            | --                                     | 10.00     | --                                      | 10.00     |
| 6  | Labour charges  | --            | --                                     | 1.75      | --                                      | 1.75      |
|  | Total           | --            | 1090.8 gm                              | 31.50     | 1243.51 gm                              | 36.08     |
|  |                 | ---           | 1 kg                                   | 28.05     | 1 kg                                    | 27.06     |

\* \* \*

S.P. Matkar/ Raje Sambhaji Chowk/At post. Khedgaon/Tq.Dist. Ahmadnagar – 414 005/Agricultural Officer/Bank of India./Sheetal/Matkar@bankofindia.co.in  
 Dr.S.P. Poul/ Mangalmurti Nagar/Karegaon Road/Parbhani -431 401. Asstt. Prof./MGM Agril. College/Gandheli/Aurangabad / poulmau@gmail.com