

## Sensory quality and cost of production of pineapple *chhana* whey beverage

ROHINI, V. DARADE, R.J. DESALE, SHITAL S.GHODKE., AND D.M. CHOUDHARI

### ABSTRACT

The *chhana* whey beverage was prepared by using different levels of pineapple juice @ 0, 10, 20 and 30 per cent with 13 per cent sugar. The overall acceptability of *chhana* whey beverage prepared with 20 per cent pineapple juice level was significantly superior and more acceptable than other levels of pineapple juice. The cost of production of *chhana* whey beverage prepared by utilizing 20 per cent pineapple juice was Rs.14.48 per litre.

**KEY WORDS :** *Chhana*, Whey, Pineapple, Beverage

V. Darade, Rohini, Desale, R.J., S. Ghodke, Shital and Choudhari, D.M. (2011). Sensory quality and cost of production of pineapple *chhana* whey beverage, *Res. J. Animal Hus. & Dairy Sci.*, 2 (1&2) : 56-59.

### INTRODUCTION

*Chhana* is acid coagulated milk product produced as a base for *Sandesh*, *Rasogolla*, *chhana Podo*, *chhana murki*, etc. Therefore, large quantity of *chhana* whey would be available in dairy industries. It has been estimated that the whey production in India from organized sector was about 70 million litres (Bambha *et al.* 1972). Whey obtained in our country as by product is mostly thrown away as waste. Whey is a serious source of environmental pollution in Indian dairy industries.

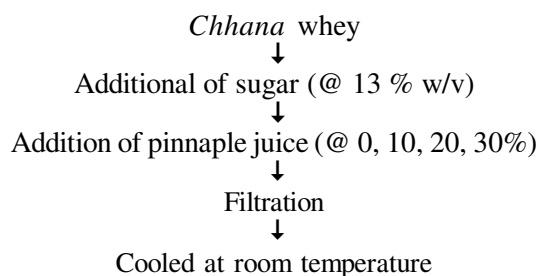
No proper attempts have so far been made particularly on small scale to exploit this by-product. Considerable economic benefit can also be secured from prompt utilization of whey. Whey is a by-product obtained by dairy industries on large scale. It contains important nutrients like lactose, protein, minerals and vitamins which are losses through whey. These nutrients can be utilized in better way for preparation of nutritious drink to human being with low cost. By adding different fruit juices or pulps in whey it can be converted into value added product. Thus,

converting the whey into whey beverage will increase the profit of dairy industries.

### MATERIALS AND METHODS

Good quality fresh cow milk was procured and then strained through muslin cloth. The fat content in milk ranged from 4.1 – 4.4 per cent. The milk was transferred to stainless steel vessel and heated to about 90°C. The vessel was then removed from the fire and cooled to 72°C. The coagulant *i.e.* citric acid solution @ 1.5 per cent was added slowly till the complete coagulation of milk. Then the mass was poured over stretched piece of clean muslin cloth over another vessel to drain the whey. The clear drained whey was collected in the vessel. The yellowish green whey was then used for the preparation of whey beverage. Fresh pineapple juice was obtained from the local market.

#### Flow chart : Preparation of *chhana* whey beverage:



#### Treatment details:

T<sub>0</sub> : 100% *Chhana* whey + 00% pineapple juice.

#### Correspondence to:

R.J. DESALE,, Department of Animal Science and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri , AHMEDNAGAR (M.S.) INDIA

Email : desaleraahul@yahoo.co.in

#### Authors' affiliations:

ROHINI, V. DARADE, SHITAL S.GHODKE., AND D.M. CHOUDHARI,

Department of Animal Science and Dairy Science, Mahatma Phule Krishi Vidyapeeth, Rahuri , AHMEDNAGAR (M.S.) INDIA

- T<sub>1</sub> : 90% *Chhana* whey + 10% pineapple juice.
- T<sub>2</sub> : 80% *Chhana* whey + 20% pineapple juice.
- T<sub>3</sub> : 70% *Chhana* whey + 30% pineapple juice.
- Sugar level kept constant *i.e.* @ 13% (w/v) of final product.

**Sensory evaluation:**

The product so obtained was subjected to organoleptic evaluation by the panel of judges using 9-point Hedonic scale (Gupta, 1976 and BIS, 1971). Cost structure of *chhana* whey beverage was calculated as per prevailing rates of all the ingredients used for the preparation of beverage. Cost of *chhana* whey was taken as Rs.0.50/lit. This cost was applied by the various research workers. The cost of pineapple juice was Rs.50/lit and the cost of sugar was Rs.16/kg. The obtained data were analyzed by Randomized Block Design with four treatments and five replications for statistical analysis method given by Panse and Sukhatme (1967).

● **RESULTS AND DISCUSSION** ●

The finished product from all treatments combination was served to the five judges. The values given in Table1 of sensory attributes are the average of five judges for each observation. The scores given for the sensory evaluation were compiled analyzed and results are presented in Table1.

**Colour and appearance:**

It was observed from Table 1 that, the mean scores of colour and appearance for *chhana* whey beverage were 8.20, 8.36, 8.70 and 8.02 in treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively. The highest score was obtained by treatment T<sub>2</sub> while, lowest score by treatment T<sub>3</sub>. The colour and appearance of *chhana* whey beverage was significantly affected due to addition of pineapple juice. The highest score 8.70 was recorded by treatment T<sub>2</sub> with 20 per cent pineapple juice and this treatment appeared to be significantly superior over all the treatments. The results

of present investigation are contradictory to Saravanakumar and Manimegalai (2003). They reported that 10 per cent pineapple juice into whey beverage had highest colour and appearance score among different levels of pineapple juice.

**Consistency:**

The mean consistency scores for *chhana* whey beverage were 8.27, 8.33, 8.65 and 8.00 under treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively (Table 1). The highest score 8.65 was recorded by treatment T<sub>2</sub> with 20 per cent pineapple juice thus the treatment seems to be significantly superior over all treatments while, treatment T<sub>0</sub> was at par with T<sub>1</sub>. The lowest score 8.00 was obtained under treatment T<sub>3</sub> with 30 per cent pineapple juice. However, the consistency of *chhana* whey beverage increased with increase in the different levels of pineapple juice but beyond 20 per cent pineapple juice level consistency was decreased. In general the samples of *chhana* beverage were acceptable so far as consistency attribute is concerned. Above findings are in near to the results obtained by Saravankumar and Manimegalai (2003). They observed that, 10 per cent pineapple juice whey beverage recorded the highest consistency score among different levels of pineapple juice.

**Flavour :**

The mean flavour scores were 8.12, 8.27, 8.62 and 8.03 for *chhana* whey beverage prepared in treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub>, respectively (Table 1). The highest score was obtained by treatment T<sub>2</sub> while, the lowest score was recorded by treatment T<sub>3</sub>. The highest score (8.62) recorded by treatment T<sub>2</sub> with 20 per cent pineapple juice and the treatment seemed to be significantly superior over all the treatment while, treatment T<sub>0</sub> was at par with treatment T<sub>3</sub>. The lowest score 8.03 was obtained under T<sub>3</sub> treatment with 30 per cent pineapple juice. However, pineapple juice with proportion more than optimum level of 30 per cent imparted the stronger flavour in treatment T<sub>3</sub> and hence, decrease in

**Table 1: Sensory evaluation of pineapple whey beverage**

Treatments	Sensory attributes			
	Scores			
	Colour and appearance	Consistency	Flavour	Overall acceptability
T <sub>0</sub>	8.20	8.27	8.12	8.19
T <sub>1</sub>	8.36	8.33	8.27	8.32
T <sub>2</sub>	8.70	8.65	8.62	8.66
T <sub>3</sub>	8.02	8.00	8.03	7.99
Result	sig	sig	sig	sig
SE (±)	0.03	0.06	0.04	0.03
CD at(5%)	0.10	0.18	0.12	0.10

**Table 2: Estimated cost structure of *chhana* whey beverage (Rs./lit)**

Particulars	Treatments							
	T <sub>0</sub>		T <sub>1</sub>		T <sub>2</sub>		T <sub>3</sub>	
	Quantity	Amount (Rs.)	Quantity	Amount (Rs.)	Quantity	Amount (Rs.)	Quantity	Amount (Rs.)
<i>Chhana</i> whey (ml)	1000	0.50	900	0.45	800	0.40	700	0.35
Sugar (g)	130	2.08	130	2.08	130	2.08	130	2.08
Pineapple juice (ml)	-	-	100	5.00	200	10.00	300	15
Other charges (fuel labour etc.)	-	2.00	-	2.00	-	2.00	-	2.00
Total cost (Rs./lit)	-	4.58	-	9.53	-	14.48	-	19.43
Cost of 200 ml whey beverage	-	0.91	-	1.90	-	2.89	-	3.88

its acceptability. In general, the samples of *chhana* whey beverage were acceptable so far as flavour attribute is concerned. The results of present study were not exactly in agreement with Gagrani *et al.* (1987) but somewhat near to it. They observed higher flavour score in case of 15 per cent pineapple juice whey beverage.

**Overall acceptability :**

The mean score for overall acceptability for treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were 8.19, 8.32, 8.66 and 7.99, respectively. The average score for treatments T<sub>0</sub>, T<sub>1</sub> and T<sub>2</sub> were more than T<sub>3</sub>. The overall acceptability of *chhana* whey beverage was significantly affected by addition of pineapple juice in whey beverage preparation. *Chhana* whey beverage with 20 per cent pineapple juice in treatment T<sub>2</sub> was significantly superior in respect of acceptability of overall treatments. *Chhana* whey beverages prepared under all treatments were acceptable as score was more than 7. *Chhana* whey beverage with treatment T<sub>2</sub> obtained highest score and was significantly superior due to its flavour, colour and appearance and consistency (Table 1). The good colour, peculiar flavour and proper consistency observed in this *chhana* whey beverage was appreciated by the panel of five judges. It indicates that blending of beverage with pineapple juice more than 20 per cent (T<sub>2</sub>) level decreased the score of overall acceptability which might be due to high intensity of flavour, dark colour and consistency. The results obtained are in agreement with Yalcin *et al.* (1994). They reported that, 20 per cent mango juice into whey had highly acceptable taste and overall acceptability. The 20 per cent mango juice whey beverage was adjudged as best for final comparison (Prasad *et al.*, 2001) and the similar results were obtained in present investigation.

**Cost structure of *chhana* whey beverage :**

The cost of production of one litre *chhana* whey beverage was calculated by taking into consideration the

prevailing retail market prices for the various items viz., *chhana* whey, pineapple juice, sugar, while the other charges such as fuel and labour etc. were worked out on the basis of actual hours of the work performed for the preparation of one litre *chhana* whey beverage (Table 2).

The data presented in Table 2 indicate that the cost of production of 1 litre *chhana* whey beverage under various treatments T<sub>0</sub>, T<sub>1</sub>, T<sub>2</sub> and T<sub>3</sub> were Rs.4.58, 9.53, 14.48 and 19.43, respectively. The cost of production of control treatments *i.e.* T<sub>0</sub> was considerably less than pineapple juice added *chhana* whey beverage. Increased level of pineapple juice showed the increasing trend in cost of production of *chhana* whey beverage. The lowest cost of production Rs.4.58/lit was calculated in case of treatment T<sub>0</sub>. However, a superior treatment selected by the panel of judges on sensory evaluation was T<sub>2</sub> with 20 per cent pineapple juice costing Rs.14.48/lit. The cost of production of *chhana* whey beverage in best treatment was somewhat more than the control treatment. Based on 200 ml beverage bottle, the cost of treatment T<sub>2</sub> was only Rs.2.89 which seems to be very much cheaper as compared to different soft drinks/ beverages sold in market. Results obtained in present investigation are in agreement with Kersarkar *et al.* (2004). They reported the cost of 250 ml beverage as Rs.3.60.

**Conclusion:**

Good quality *chhana* whey beverage was prepared with 20 per cent pineapple juice and 80 per cent whey. The cost of production of *chhana* whey beverage prepared by utilizing 20 per cent pineapple juice was Rs.14.48 per litre.

**LITERATURE CITED**

Bambha, P.P., Setty P.A.S and Nambudripad, V.K.N. (1972). Whevit5fg a nourishing soft drink. *Indian Dairyman*, **25** (7):153-157.

BIS (1971). IS:6273, Part-II. *Guide for sensory evaluation of foods. Methods and evaluation Cards*. Bureau of Indian Standards, MANAK BHAVAN, DELHI (India).

Gagrani, R.L., Rathi, S.D. and Ingle, U.M. (1987). Preparation of fruit flavoured beverage from whey. *J. Food Sci. & Technol.*, **24** (3/4):93-94.

Gupta, S.K. (1976). Sensory evaluation of food. *Indian Dairyman*, **28** (7):293-295.

Kesarkar, T.V., Bhosale, D.N., Gaikwad, U.S., Pagote, D.D. and Khedkar, C.D. (2004). Standardization of a method for preparation of paneer whey beverage and assessment of its economical feasibility. *Beverage & Food World*, **31** (8): 48-49.

Panse, V.G. and Sukhatme, P.V. (1967). *Statistical methods for agriculture workers*. 2nd Edn. ICAR, NEW DELHI (India).

Prasad K., Sharma, H.K., Mahajan, D. and Jaya, (2001). Utilization of whey based mango beverage. *Beverage & Food World*, **28** (11): 31-32.

Saravanakumar, R. and Manimegalai, G. (2003). A study on storage behaviour of whey based pineapple juice RTS beverage. *Indian Food Packer*, (3/4): 51-55.

Yalcin, S, Wade, V.N. and Hassan, M.N. (1994). Utilization of *chhana* whey for the manufacture of soft drinks. *Gida*, **5**:351-355.

