



ISSN: 2277- 7695

TPI 2015; 4(10): 16-18

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www.thepharmajournal.com

Received: 13-10-2015

Accepted: 15-11-2015

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Sensory Evaluation of different levels of Goat milk and Banana pulp on quality of fruit Yoghurt

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Abstract

Yoghurt is a snow white, custard like fermented milk product, obtained through the controlled lactic acid fermentation of milk by *Lactobacillus bulgaricus* and *Streptococcus thermophiles*. A study was undertaken by using different levels of Goat milk and Banana pulp i.e. T₁ (90:10), T₂ (85:15), T₃ (80:20) respectively. Experimental fruit yoghurt mix was standardized to 4.0% fat, 11.5% solids not fat, 10% sugar and 2% culture adjusted to 25.2% total solids. Yoghurt samples for different treatments were analyzed for organoleptic attributes (colour and appearance, body and texture, taste and flavour) by trained panelist using 9 point hedonic scale. The highest mean value for body and texture were found in T₃ (8.34). The highest mean value for flavour and taste was found in T₃ (8.16). The fruit yoghurt obtained from T₃ (80:20) ratio was the best product among all treatments. Thus, as far as product acceptability judged by organoleptic evaluation, the treatment can be rated as T₃ > T₀ > T₂ > T₁.

Keywords: Goat milk, Banana pulp, Fruit yoghurt.

Introduction

Fermented milk products have been the essential part of our food consumption; since ancient times. The symbiosis of two most important microorganisms, i.e., *Lactobacillus bulgaricus* and *Streptococcus thermophiles* resulted in lactic acid fermentation to convert milk into a fermented milk product known as Yoghurt. It is an exotic product but now very much accommodated as an Indian fermented milk product, because of its nutritional and therapeutic value like *Dahi* "curd". Yoghurt is a low caloric diet. It can serve as an alternative source of calcium for people, who are lactose intolerant. It can help in stimulation of immune system, reduction in bacterial enzymes and reduction of serum cholesterol. It also helps in anti-tumor activity, Folic acid and vitamin B synthesis and enhances mineral bioactivity (David, 2012) [5]. Yoghurt is a famous fermented dairy product which plays an important role in preventing gastrointestinal infections which cause diarrhea. It also reduces the chances of cancer and lowers the blood cholesterol (Gilliland, 1979) [6]. Mudgal and Devendra (1999) [8] remarked that after cow, buffalo, is the most important dairy species. In India, goat's milk in general is considered to be inferior to cow's or buffalo's milk and is entirely used for beverage purposes. Yoghurt prepared from goat milk has been widely accepted for infants and convalescents because of its easy digestibility. Goat milk is more digestible than cow and buffalo's milk because of the smaller average size of the fat globules (Jennes and Patton 2005) [7]. Goat milk yoghurt did not show any whey off but is preferred for its smooth body and texture and sharp flavour. By the addition of fruit pulps in yoghurt its nutritional content viz. proteins and vitamins is enhanced without compromising its palatability. This filler will also give a nutritious product at an economic rate, which will make the product further popular in domestic and international markets. In this study, an effort has been made to prepare good quality yoghurt from goat milk and banana pulp using the technique of manufacture as recommended by Balasubramanyam *et al.*, (1991) [3].

Material and Methods

First of all fresh goat milk was collected and standardized for 4% fat and 11.5% SNF using spray dried skim milk powder. Then the milk was heated at 85 °C for 5 minutes. Sugar was added @ 10% of milk. It was then cooled at 42 °C. Milk was then inoculated with 2% culture. At this stage banana pulp was added @ 10, 15 and 20%. The mix was then sent for incubation at 42 °C. After that yoghurt was filled in the cups and sent for storage under refrigeration. Thus the yoghurt was ready (Figure 1).

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Table 1: Details of different treatments for making Banana pulp fruit Yoghurt.

| Materials (%) | Different treatments Banana pulp fruit Yoghurt | | | |
|---------------|--|----------------|----------------|----------------|
| | T ₀ | T ₁ | T ₂ | T ₃ |
| Goat milk | 100 | 90 | 85 | 80 |
| Banana pulp | - | 10 | 15 | 20 |

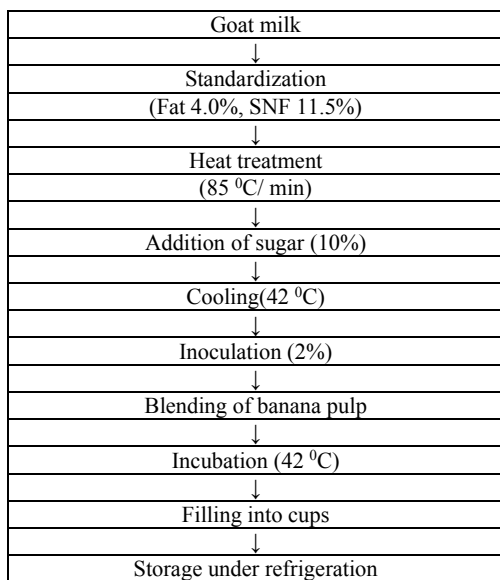


Fig 1: Flow chart for preparation of Banana pulp fruit Yoghurt

Organoleptic Evaluation of the prepared product

Freshly prepared control and Banana pulp fruit Yoghurt were served for evaluation to panel members consisting of 5 experienced persons. 9 point hedonic scale proforma was used as suggested by Amerine *et al.* (1965) [1].

Statistical analysis

The data obtained on different aspects as per plan were tabulated and statistically analyzed as per Chandel (1991) [4].

Results and Discussion

Average of different Organoleptic Parameters of the Control and Banana pulp fruit Yoghurt.

Table-2 shows organoleptic attributes of control and Banana pulp fruit Yoghurt

Table 2: Average of different Organoleptic Parameters of the Control and Banana pulp fruit Yoghurt.

| Parameters | Control and Banana pulp fruit Yoghurt | | | | F value | C.D. |
|-----------------------|---------------------------------------|----------------|----------------|----------------|---------|------|
| | T ₀ | T ₁ | T ₂ | T ₃ | | |
| Colour and Appearance | 8.30 | 8.02 | 7.70 | 7.78 | 50.884* | 0.11 |
| Body and Texture | 8.24 | 7.68 | 7.98 | 8.34 | 11.837* | 0.25 |
| Flavour and Taste | 8.04 | 7.92 | 7.94 | 8.16 | 4.246* | 0.25 |

* Significant at 5 % level

** Non-significant at 5 % level

Colour and Appearance

Table 2 showed that the highest mean value for colour and appearance in fruit yoghurt was found in T₀ (8.30), followed by T₁ (8.02), T₂ (7.7) and T₃ (7.78). There were significant differences found among the treatments. There were significant differences found among the treatments for colour and appearance. F Value was 50.884, indicating significant effect of treatment on colour and appearance (Fig 2).

Body and texture

The highest mean value for body and texture were found in T₃ (8.34), followed by T₀ (8.24), T₂ (7.98) and T₁ (7.68). There were significant differences found among the treatments. F Value was 11.837, indicating significant effect of treatment on body and texture (Fig 2).

Flavour and Taste

The highest mean value for flavour and taste was found in T₃ (8.16), followed by T₀ (8.04), T₂ (7.94) and T₁ (7.92). There were significant differences found among the treatments. F Value was 4.246, indicating significant effect of treatment on flavour and taste (Fig 2).

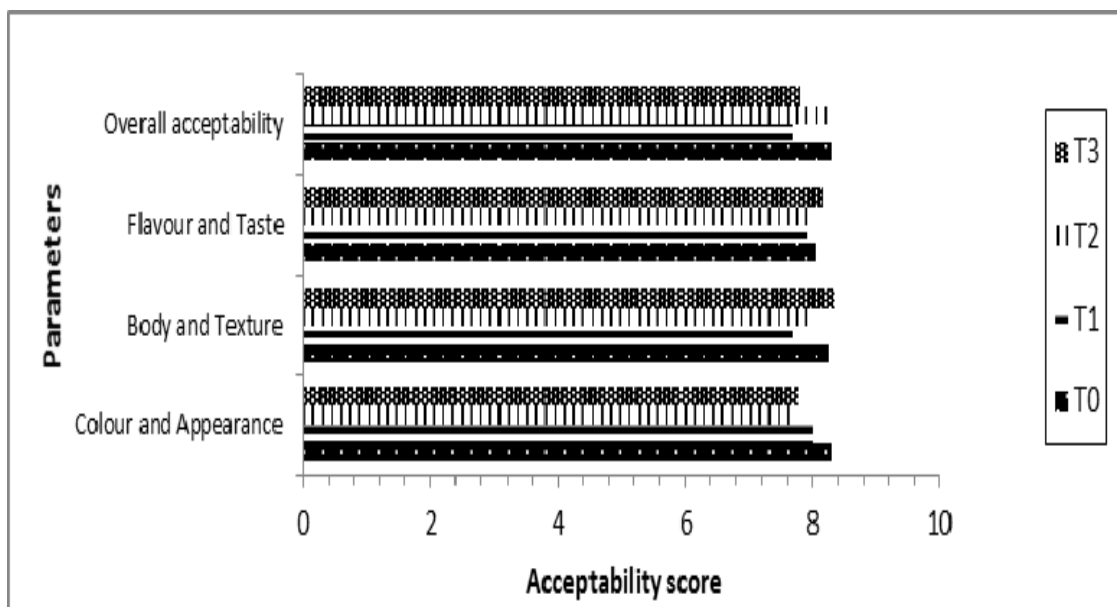


Fig 2: Average of organoleptic parameters and overall acceptability score control and Banana pulp fruit Yoghurt

Table 3: Overall acceptability of the Control and Banana pulp fruit Yoghurt.

| Replication | Control and Banana pulp fruit Yoghurt | | | | F value | C.D. |
|----------------|---------------------------------------|----------------|----------------|----------------|---------|------|
| | T ₀ | T ₁ | T ₂ | T ₃ | | |
| R ₁ | 8.70 | 7.9 | 7.8 | 8.0 | 3.621* | 0.48 |
| R ₂ | 8.50 | 7.8 | 8.3 | 7.9 | | |
| R ₃ | 8.20 | 7.7 | 8.2 | 7.8 | | |
| R ₄ | 8.06 | 7.6 | 8.0 | 7.7 | | |
| R ₅ | 8.04 | 7.5 | 8.1 | 7.6 | | |
| Mean | 8.30 | 7.70 | 8.28 | 7.80 | | |

* Significant at 5 % level

** Non-significant at 5 % level

Overall acceptability scores for Control and Banana pulp fruit Yoghurt

Table 3 and fig.2 showed the highest mean value for overall acceptability of the control and banana pulp fruit yoghurt was found in T₀ (8.3), followed by T₂ (8.28), T₃ (7.80) and T₁ (7.70). F Value was 3.621, indicating significant effect of treatment on Overall acceptability. The data differed significantly among the treatments, thus showed the acceptability of the fruit yoghurt from goat milk and banana pulp.

Table 4: Average of different Microbial Parameters of the Control and Banana pulp fruit Yoghurt.

| Parameters | Control and Banana pulp fruit Yoghurt | | | | F value | C.D. |
|--|---------------------------------------|----------------|----------------|----------------|---------|------|
| | T ₀ | T ₁ | T ₂ | T ₃ | | |
| Yeast and mold count (10 ²)cfu/g | 7.0 | 8.4 | 7.6 | 7.2 | 2.56** | - |
| Coliform count (10 ¹)cfu/g | Nil | Nil | Nil | Nil | | |

* Significant at 5 % level

** Non-significant at 5 % level

Average of different Microbial Parameters of the Control and Banana pulp fruit Yoghurt

Table 4 showed the highest mean value for yeast and mold count in fruit yoghurt was found in T₁ (8.4), followed by T₂ (7.6), T₃ (7.2) and T₀ (7.0). There were no significant differences found among the treatments. There were no coliform found in all the treatments, thus indicated proper hygiene was followed during the trials.

Conclusion

The results obtained from the statistical analysis revealed that the goat milk and banana pulp can be satisfactorily used to manufacture fruit yoghurt. Fruit yoghurt contain 20% banana pulp (T₃) found to be best among all the treatments.

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