

Studies on Physicochemical Quality of fruit Yoghurt prepared from different levels of Goat milk and Apple pulp

J. David*

Department of Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad-211007.

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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 Apple 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. The highest mean value for carbohydrate percentage in fruit yoghurt from apple pulps was found in T₂ (17.29). The highest mean value for fat percentage was found in T₀ (3.62). The highest mean value for total solids percentage was found in T₁(25.50). 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, Apple 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). 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). Mudgal and Devendra (1999) 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). 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 apple pulp using the technique of manufacture as recommended by Balasubramanyam, et al. (1991).

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 apple 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 (Fig. 1).

Table No. 1: Details of different treatments for making Apple pulp fruit yoghurt

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

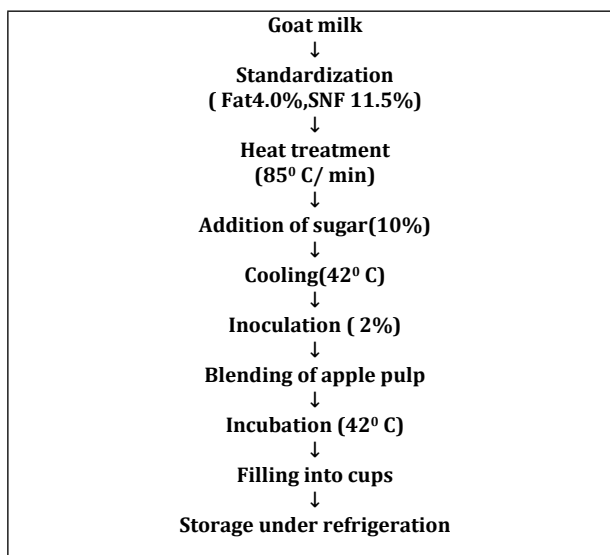


Fig. 1: Flow chart for preparation of Apple pulp fruit Yoghurt

***Corresponding author:**

J. David

Department of Dairy Technology,
Sam Higginbottom Institute of Agriculture,
Technology and Sciences, Allahabad-211007.

*E-Mail: profjohndavid06@gmail.com

Statistical analysis:

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

RESULTS AND DISCUSSION

Average of different physicochemical properties of the Control and Apple pulp fruit Yoghurt:

Carbohydrates: The highest mean value for carbohydrate percentage in fruit yoghurt from apple pulps was found in T₂(17.29), followed by T₃(17.22), T₁(16.37) and T₀(15.51). There were significant differences among the treatments. F value was 29.493,

indicating significant effect of treatment on carbohydrate percentage.

Protein percentage: The highest mean value for protein percentage was found in T₀(3.49) followed by T₁(3.45), T₂(3.41), and T₃(3.35). There were no significant differences found among the treatments. F value was 1.889, indicating no significant effect of treatment on protein percentage.

Fat percentage: The highest mean value for fat percentage was found in T₀(3.62) followed by T₁(3.28), T₂(3.02) and T₃(3.0). There were significant differences found among the treatments. F value was 51.872, indicating significant effect of treatment on fat percentage.

Table No. 2: Average of different physicochemical parameters of the Control and Apple pulp fruit Yoghurt.

| Parameters(%) | Control and apple pulp fruit Yoghurt | | | | F value | C.D. |
|---------------------|--------------------------------------|----------------|----------------|----------------|---------|------|
| | T ₀ | T ₁ | T ₂ | T ₃ | | |
| Carbohydrate | 15.51 | 16.37 | 17.29 | 17.22 | 29.493* | 0.47 |
| Protein | 3.49 | 3.45 | 3.41 | 3.35 | 1.889** | - |
| Fat | 3.62 | 3.28 | 3.02 | 3.00 | 51.872* | 0.12 |
| Ash | 0.71 | 0.67 | 0.67 | 0.63 | 13.231* | 0.02 |
| Acidity | 0.72 | 0.73 | 0.77 | 0.82 | 29.766* | 0.02 |
| Total Solids | 24.20 | 25.50 | 25.26 | 25.04 | 22.55* | 0.31 |

* Significant at 5 % level;

** Non-significant at 5 % level

Ash percentage:

The highest mean value for ash percentage was found in T₀(0.71) followed by T₁(0.67), T₂(0.67) and T₃(0.63). There were significant differences found among the treatments. F value was 13.231, indicating significant effect of treatment on ash percentage.

Acidity:

The highest mean value for acidity percentage was found in T₃(0.82) followed by T₂(0.77), T₁(0.73) and T₀(0.72). There were significant differences found among the treatments. F value was 29.766, indicating significant effect of treatment on acidity percentage.

Total solids:

The highest mean value for total solids percentage was found in T₁(25.50) followed by T₂(25.26), T₃(25.04) and T₀(24.20). There were significant differences found among the treatments. F value was 22.55, indicating significant effect of treatment on total solids percentage.

Thus, it showed that different levels of goat milk and apple pulp have a great impact on the quality of fruit yoghurt.

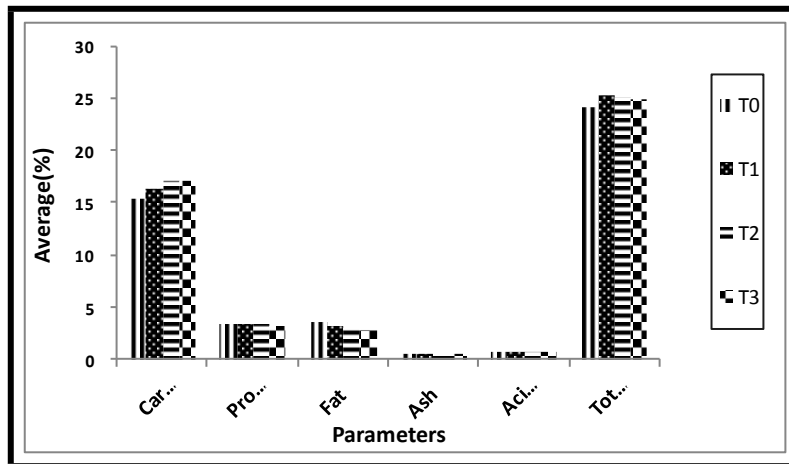


Fig. 2: Average of different physicochemical parameters of Control and Apple pulp fruit Yoghurt

Average of different Microbial Parameters of the Control and Apple pulp fruit Yoghurt:

Table 3 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.

Table No. 3: Average of different Microbial Parameters of the Control and Apple pulp fruit Yoghurt.

| Parameters | Control and apple pulp fruit Yoghurt | | | | F value | C.D. |
|---|--------------------------------------|----------------|----------------|----------------|---------|------|
| | T ₀ | T ₁ | T ₂ | T ₃ | | |
| Yeast and mold count (10²)cfu/g | 7.00 | 8.4 | 7.60 | 7.20 | 2.43* | - |
| Coliform count (10¹)cfu/g | Nil | Nil | Nil | Nil | Nil | Nil |

* Significant at 5 % level;

** Non-significant at 5 % level

CONCLUSION

The results obtained from the statistical analysis revealed that the goat milk and apple pulp can be satisfactorily used

to manufacture fruit yoghurt. Fruit yoghurt contain 20% apple pulp (T₃) found to be best among all the treatments.

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