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

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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. T_1 (90:10), T_2 (85:15), T_3 (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 fruit yoghurt obtained from (80:20) (T_3) ratio was the best product among all treatments. Thus, as far as product acceptability judged by organoleptic evaluation, the treatment can be rated as $T_3 > T_0 > T_2 > T_1$.

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 help in anti-tumor activity, Folic acid and vitamin B synthesis and enhance mineral bioactivity (David, 2012). Yoghurt is a famous fermented dairy product which plays an important role in preventing gastrointestinal infections which causes 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 use for beverage purpose. 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 smaller average size of the fat globules (Jennes and Patton 2005). Goat milk yoghurt did not show any whey off but 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 enhanced without compromising its palatability. This filler will also give nutritious product at an economic rate, which will make the product further popular in domestic and international market. In this study 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).

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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 @ of 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. Anonymous (1972 a, b). Thus the yoghurt was ready (Fig. 1).

Table No. 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

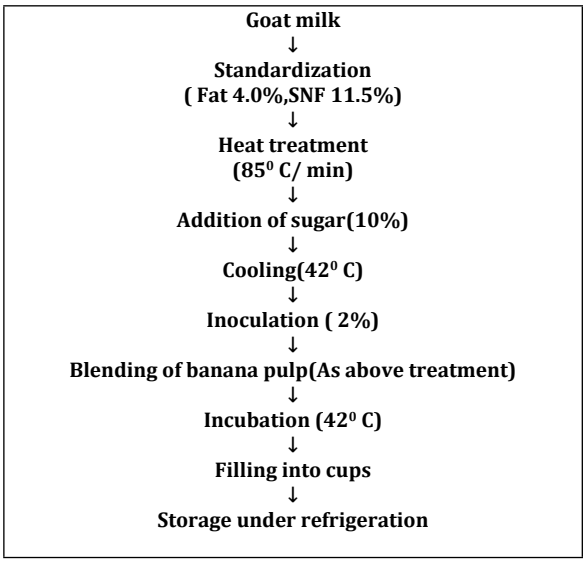

Fig. 1: Flow chart for preparation of Banana pulp fruit Yoghurt

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 Banana pulp fruit Yoghurt:

Carbohydrates:

The highest mean value for carbohydrate percentage in fruit yoghurt from banana pulps was found in T_3 (17.35), followed by T_2 (16.84), T_1 (16.19) and T_0 (15.16). There were significant differences among the treatments. F value was 90.325, indicating significant effect of treatment on carbohydrate percentage.

Table No. 2: Average of different physicochemical 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		
Carbohydrate	15.61	16.19	16.84	17.35	90.325*	0.24
Protein	3.49	3.43	3.50	3.35	38.851*	0.02
Fat	3.62	3.34	3.08	2.92	90.325*	0.11
Ash	0.71	0.68	0.67	0.64	21.137*	0.019
Acidity	0.72	0.75	0.78	0.82	54.643*	0.01
Total Solids	24.10	24.40	24.82	25.10	37.480*	0.21

* Significant at 5 % level; ** Non-significant at 5 % level

Protein percentage:

The highest mean value for protein percentage was found in T_2 (3.50) followed by T_0 (3.49), T_1 (3.43) and T_3 (3.35). There were significant differences found among the treatments. F value was 38.851, indicating significant effect of treatment on protein percentage.

Fat percentage:

The highest mean value for fat percentage was found in T_0 (3.62) followed by T_1 (3.34), T_2 (3.08) and T_3 (2.92). There were significant differences found among the treatments. F value was 90.325, indicating significant effect of treatment on fat percentage.

Ash percentage:

The highest mean value for ash percentage was found in T_0 (0.71) followed by T_1 (0.68), T_2 (0.67) and T_3 (0.64). There were significant differences found among the treatments. F value was 21.137, indicating significant effect of treatment on ash percentage.

Acidity:

The highest mean value for acidity percentage was found in T_3 (0.82) followed by T_2 (0.78), T_1 (0.75) and T_0 (0.72). There were significant differences found among the treatments. F value was 54.643, indicating significant effect of treatment on acidity percentage.

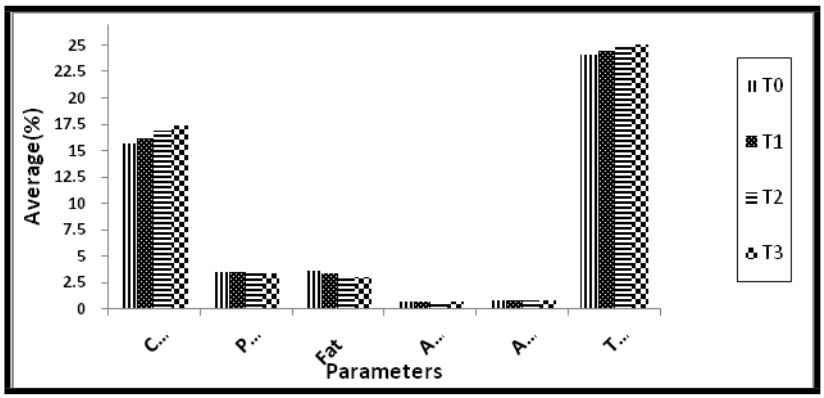

Fig. 2: Average of different physiochemical parameters of Control and Banana pulp fruit Yoghurt

Total solids:

The highest mean value for total solids percentage was found in T_3 (25.10) followed by T_2 (24.82), T_1 (24.40) and T_0 (24.16). There were significant differences found among the treatments. F value was 37.480, indicating significant effect of treatment on total solids percentage.

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

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

Table 2 showed the highest mean value for yeast and mold count in fruit yoghurt was found in T_1 (8.4), followed by T_2 (7.6), T_3 (7.2) and T_0 (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 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

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 (T_3) found to be best among all the treatments.

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