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## Chemical composition of flavoured milk blended with Jackfruit (*Artocarpus heterophyllus* L.) pulp

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### Abstract

The present study was conducted to know the chemical attributes of flavoured milk blended with Jackfruit pulp (*Barka*). In study, flavoured milk was prepared from buffalo skim milk. Jackfruit pulp was added at different levels viz. 2.5 (T<sub>1</sub>), 5.0 (T<sub>2</sub>), 7.5 (T<sub>3</sub>) and 10.0 percent (T<sub>4</sub>) of milk and sugar was added @ 8 percent of milk. Addition of jackfruit pulp improved sensory quality and acceptability of the product. The most acceptable quality flavoured milk could be prepared by using jackfruit pulp at the rate of 7.5 percent of the buffalo skim milk and it contained total solids, fat, protein, ash, total sugar and titratable acidity as 18.91, 0.52, 3.21, 0.919, 15.15 and 0.168 percent, respectively.

**Keywords:** Chemical attribute, flavoured milk and jackfruit pulp.

### 1. Introduction

Milk is regarded as rich source of nutrients as it contains high quality proteins, lactose, flavour enriching fat. Today Indian consumer is more conscious towards health and balanced nutrition and has desire for better quality and convenient food products. Milk also provides protection against ill health and promotes good health.

Flavoured milk is one of the special milks prepared which contains all the constituents of milk like proteins, carbohydrates and minerals. Besides, sugar, flavouring agents, colouring matter are also present in this beverage. Flavoured milk provides energy, water to digest food, regulates body temperature and prevents dehydration. From economic point of view flavoured milks are important because it makes milk more palatable to those who don't relish it as such.

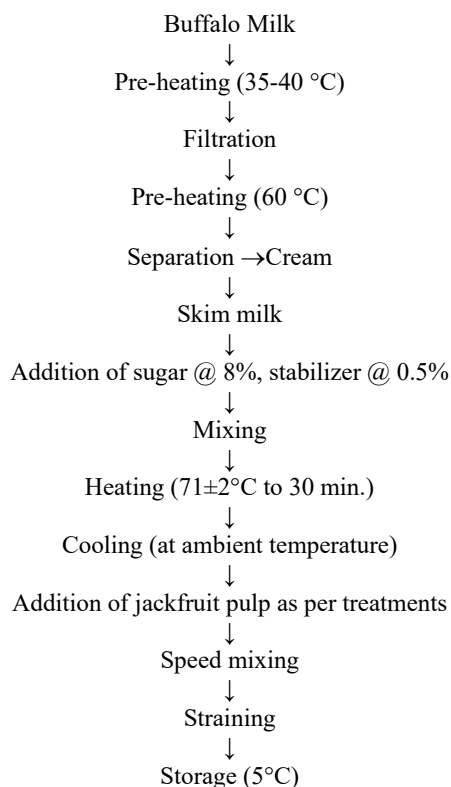
Jackfruit (*Artocarpus heterophyllus* L.) is an evergreen monocious, small to medium, tropical tree native to India. It is known by different names viz., kathal, kentakphal, phanas, mridangaphal etc. in various parts of the country. It is mainly of two types, *Kapa* (firm flesh) and *Barka* (soft flesh). The ripe jackfruit pulp has high nutritive value as well as peculiar taste. Incorporation of fruit and fruit products in the milk products enhances its palatability and nutritive value. Therefore, the main aims of present study, to know the sensory quality of flavoured milk blended with jackfruit (*Artocarpus heterophyllus* L.) pulp.

### 2. Material and Methods

The present study was carried out at the Department of Animal Husbandry and Dairy Science, College of Agriculture, Dapoli. For preparation of flavoured milk, buffalo milk was procured from Dairy Farm, College of Agriculture, Dapoli and cane sugar, stabilizer, canned jackfruit pulp were purchased from local market. Flavoured milk was prepared from buffalo skim milk. Jackfruit pulp was added in flavoured milk at different levels viz. 2.5 (T<sub>1</sub>), 5.0 (T<sub>2</sub>), 7.5 (T<sub>3</sub>) and 10.0 percent (T<sub>4</sub>) of milk with six replications and sugar was added @ 8 percent of milk. The total solids, fat, protein, ash and titratable acidity of jackfruit pulp were determined as per [1]. The data were tabulated and statistically analysed according to [2].

#### 2.1 Preparation of fruit flavoured milk

The flavoured milk was prepared as per procedure given by [3].

**Flow diagram****3. Results and Discussion****3.1 Chemical composition of jackfruit pulp**

Average total solids, fat, protein, ash, total sugar and acidity content of jackfruit pulp used in present investigation were 23.57 percent, 0.28 percent, 1.88 percent, 0.95 percent, 17.78 percent and 0.24 percent, respectively. The results of present study agreement with [4], who observed fat (0.22%), total solids (23.69%), moisture (76.31%), protein (1.75%), ash (0.93%) and acidity (0.25%).

**3.2 Chemical analysis of buffalo skim milk**

The buffalo skim milk used for preparation of flavoured milk was confirming to legal standard described for the state of Maharashtra. The buffalo skim used in the present study for preparation of flavoured milk contained on an average 9.53 percent total solids, 0.55 percent fat, 3.62 percent protein, 0.83 percent Ash and 0.15 percent acidity. The figures are also in agreement with the figures mentioned by [5, 6, 3, 7].

[5] reported the average chemical composition of skim milk as fat 0.48 percent, protein 3.41 percent, total solids 9.21 percent and acidity 0.14 percent and it is in close agreement with the values observed during the present investigation [6] stated that buffalo skim milk contained an average total solids 9.15 percent, fat 0.45 percent, protein 3.46 percent and acidity 0.15 percent [3] mentioned an average chemical composition of skim milk as moisture 90.6 percent, fat 0.1 percent, protein 3.6 percent, lactose 5.0 percent and ash 0.7 percent. [7] stated a chemical quality of buffalo skim milk as: total solids-9.31 percent, fat-0.55 percent, protein-3.53 percent, ash-0.81 percent and acidity 0.15 percent.

**3.3 Chemical composition of flavoured milk**

Average chemical composition of flavoured milk blended with jackfruit pulp is given in Table 1 with below point.

**Table 1:** Chemical composition of flavoured milk blended with jackfruit pulp.

Treatments	Chemical attribute					
	Total solid	Fat	Protein	Ash	Total sugar	Titrateable acidity
T <sub>1</sub>	18.21	0.54	3.59	0.847	13.97	0.153
T <sub>2</sub>	18.48	0.53	3.40	0.898	14.52	0.159
T <sub>3</sub>	18.91	0.52	3.21	0.919	15.15	0.168
T <sub>4</sub>	19.53	0.52	3.07	0.960	16.49	0.173
Mean	18.78	0.52	3.32	0.906	15.03	0.163
SEM	0.25	0.003	0.04	0.01	0.14	0.00
CD	0.75	0.011	0.12	0.03	0.43	0.01

**3.3.1 Total solids**

The importance of total solids in dairy products is highly regarded because it plays an important role for adding taste and bulk to the product. The total solid content of flavoured milk increased significantly with increase in level of jackfruit pulp. The average values for 2.5, 5, 7.5 and 10.0 percent levels of jackfruit pulp were 18.21, 18.48, 18.91 and 19.53 percent, respectively. There was linear increase in total solids content of flavoured milk as quantity of jackfruit pulp increased. The total solids content was gradually increased from 18.21 to 19.53 percent with the raising levels of jackfruit pulp as the pulp contains higher amount of total solids (23.57%) as compared to skim milk (9.53%). The results of present study agreed with the findings of [8, 9, 7].

**3.3.2 Fat**

The average fat value is presented in Table 1. The fat content of flavoured milk varies significantly with the values of 0.54, 0.53, 0.52 and 0.52 percent at 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp, respectively. With increase in the level of jackfruit pulp, there was significant decrease in the fat content. The fat content decreased significantly with the increase in the level of pulp. Differences in fat content of flavoured milk due to level of pulp were statistically significant. This decrease in the fat content of flavoured milk may be attributed to the fact that fat content of jackfruit pulp is lower (0.28%) than that of skim milk (0.55%) used for flavoured milk preparation. So obviously when level of pulp increases there was linear decrease in fat content of finished product. The values of fat corroborate well with the values reported by [7] for fat content of ginger flavoured milk. [7] prepared ginger flavoured milk from buffalo skim milk and found on an average 0.531 percent fat.

**3.3.3 Protein**

The protein content of flavoured milk varied significantly with the values of 3.59, 3.40, 3.21 and 3.07 percent at 2.5, 5.0, 7.5, and 10.0 percent level of jackfruit pulp, respectively. Protein content of flavoured milk was decreased due to increase in the level of jackfruit pulp with values of 3.59, 3.40, 3.21 and 3.07 percent at 2.5, 5.0, 7.5 and 10.0 percent, respectively. This decrease may be attributed to the low protein content of the jackfruit pulp (1.88%) as compared to basic ingredient *i.e.* skim milk (3.63%). The values for protein of present investigation are well comparable reported by [9, 10, 9] prepared flavoured milk using cow milk and safflower milk in different proportion. He observed protein content of flavoured milk which ranges from 2.65 to 3.20 percent [10] worked on ginger flavoured milk herbal milk and he found on an average 3.48±0.017 percent protein in finished product [7] conducted studied on ginger flavoured milk and he stated that

protein content of flavoured milk ranged from 3.01 to 3.35 percent .

### 3.3.4 Ash

The ash content of flavoured milk increased significantly with increase in the level of jackfruit pulp. The average values for 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp were 0.847, 0.898, 0.919 and 0.960 percent , respectively. The ash content was gradually increased from 0.847 to 0.960 percent with the raising levels of jackfruit pulp. The highest ash content was noticed at 10.0 percent level of jackfruit pulp (0.960%). The perusal of data revealed that increase in the level of jackfruit pulp resulted in significant increase in ash content of flavoured milk. This may be due to slight higher ash content of jackfruit pulp (0.95%) as compared to ash content of skim milk (0.83%)<sup>[9]</sup> studied on preparation of flavoured milk from cow milk blended with safflower milk and they found 0.72 percent ash at treatment T<sub>0</sub> *i.e.* flavoured milk prepared from cow and safflower milk in the proportion of 1:2. The values for ash content of present investigation ranges from 0.847 to 0.960 which were slightly higher than the values reported by<sup>[9]</sup> as in present investigation the flavoured milk prepared from buffalo milk by incorporation of jackfruit pulp which contain 0.83 and 0.95 percent ash, respectively and these values are higher than the ash content of cow milk and safflower milk *i.e.* 0.72 and 0.56 percent , respectively.

### 3.3.5 Total Sugar

The total sugar content of flavoured milk varied significantly with the values of 13.97, 14.52, 15.15 and 16.49 percent at 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp, respectively. With the increase in the level of jackfruit pulp, there was significant increase in the total sugar content flavoured milk. The highest total sugar content was observed at 10.0 percent level of jackfruit pulp (16.49%) which was significantly decreased at 7.5, 5.0 and 2.5 percent level of jackfruit pulp to 15.15, 14.52 and 13.97 percent , respectively. Irrespective of levels of jackfruit pulp, the total sugar content in flavoured milk showed the gradual increase from 13.97 to 16.49 percent with the increasing level of jackfruit pulp. The increase in the total sugar content of flavoured milk may be due to higher amount of total sugar content in jackfruit pulp (17.78%).

### 3.3.6 Titratable Acidity

A difference in the titratable acidity due to jackfruit pulp was statistically significant with the values being 0.153, 0.159, 0.168 and 0.173 percent at 2.5, 5.0, 7.5 and 10.0 percent level of jackfruit pulp. There was linear increase in acidity of flavoured milk with the addition of jackfruit pulp. This may be due to high level of acidity in the original jackfruit pulp (0.24%) as compared to skim milk (0.15%). The acidity of any finished milk product depends upon acidity of ingredients used for its preparation and manufacturing techniques adopted. The higher acidity (0.173 percent ) of flavoured milk was observed at treatment T<sub>4</sub> *i.e.* addition of 10.0 percent jackfruit pulp whereas lowest (0.153%) acidity at treatment T<sub>1</sub> *i.e.* addition of 2.5 percent jackfruit pulp<sup>[7]</sup>. utilized ginger juice in the manufacture of flavoured milk. He observed that acidity of flavoured milk ranges from 0.149 to 0.164 percent . The results of present investigation are in close agreement with the results of<sup>[7]</sup>.

## 4. Conclusion

From results of the present study, it can be concluded that, the jackfruit pulp successfully be utilized for preparation of flavoured milk. Addition of jackfruit pulp in flavoured milk improved sensory quality and acceptability of the product. The most acceptable quality flavoured milk can be prepared by using 7.5 percent jackfruit pulp. Such replacement did not affect appreciably the composition of flavoured milk. Jackfruit had a positive effect on sensory attributes of flavoured milk on its acceptability and consumption. Besides peculiar flavour, it also adds nutritional importance to the product. On the basis of sensory evaluation parameters treatment T<sub>3</sub> addition of 7.5 percent jackfruit pulp was observed to be the best treatment.

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