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Development of flavoured milk prepared with tulsi and turmeric

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Abstract

The study was planned to conduct the experiment for optimization of selected levels of basil (*Ocimum sanctum*, tulsi) and turmeric (*Curcuma longa*, haldi) used as a flavouring ingredient in milk. Preliminary trials were conducted to optimize the levels of tulsi, turmeric and ginger in milk. By preliminary trials range of ingredients selected. The optimum levels of each form of basil employed was selected on the basis of their sensory quality. Assessment for its compositional, physicochemical properties and sensory attributes. It is concluded that good quality flavoured milk prepared with tulsi and turmeric can be obtained in which tulsi juice (T₁) at the rate of 2.74 % (w/w of milk) and Sugar @ 8.63 % (w/w of milk). For turmeric juice (T₂) at the rate of 7 % (w/w of milk) and Sugar @ 10 % (w/w of milk).

Keywords: Tulsi, Turmeric, Flavoured milk

1. Introduction

Milk is regarded as the complete food so it provides all the nutrient elements which necessary for the nourishment of the human body. Today's modern trend of consumers prospect is that using natural ingredients in food because they are health benefits, natural antioxidant, natural colorant and free from synthetic additives.

Now a day increased in demand for natural flavours milk. Various milk products are prepared with herbal ingredients such as natural and healthy drinks like ginger milk, tulsi milk and turmeric milk etc.

Tulsi (*Ocimum sanctum*) has anti-inflammatory, antipyretic, analgesic, antiulcer, antimicrobial, antistress, anticarcinogenic, hypoglycaemic and hypolipidaemic. The active constituents of the herb include volatile oil chiefly eugenol and beta -caryophyllene, flavonoids and a number of other components present in fixed oil (Das and Vasudevan, 2006) [2].

Turmeric (*Curcuma longa*) is one of most natural powerful healers. In turmeric curcumin is chief pigment used for food color in dairy products. It makes low level of cholesterol, anticancerous, anti-inflammatory, antiseptic, regular use of turmeric can benefit in colitis. Turmeric milk was use for treating hepatitis and improving liver function. It is a valuable remedy for bronchial asthma. (Bhowmik *et al.*, 2009) [1] Turmeric being rich in iron is useful in anemia and also known for immunity boosting capability (Kaur and Kochar 2014) [5].

There are many dairy products are prepare by using medicinal plants such as development of Ice cream with basil by Trivedi *et al.* (2014) [8] and Shrikhand with incorporation of Tulsi and turmeric powder by Goswami *et al.* (2018) [4].

In current scenario there is pandemic outbreak of Covid-19 for that need to be developed self-immunity for good health condition. Since Vedic times health benefits of milk have been enhanced through use of herbal infusions. This correlation is used for prevention against a list of diseases and to overcome nutritional deficiencies. Nutritional deficiency is almost impossible to avoid in these modern times, thus natural supplements help in overall growth, development and enhanced immunity. Herbs are also useful in getting rid of toxins accumulating in the body. India as a country is rich in different herbs that have been used for various medicinal purposes (Mazid *et al.* 2012) [6].

Present study reveal to develop flavoured milk using tulsi and turmeric juice.

2. Materials and Methods**2.1. Materials**

Milk has been procured from AMUL while Tulsi plants (*Ocimum sanctum*) were obtained from 'Department of Medicinal and Aromatic Herbs', AAU, Anand. Turmeric (*Curcuma longa*) rhizomes green roots were purchased directly from local market of Anand.

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2.2 Methods

2.2.1. Preparation of Tulsi Juice Tulsi juice was prepared by sorting out the tulsi leaves by removal of stem, buds, flowers etc. The tulsi leaves were washed, blanched and crushed in the mixture and filtered through a muslin cloth. The proportion of tulsi leaves: water was 50:50.

2.2.2. Preparation of Turmeric Juice

Turmeric juice was prepared by pilling off turmeric rhizomes green roots. The turmeric rhizomes green roots were washed, crushed in the mixture and filtered through a muslin cloth. The proportion of turmeric rhizomes green roots: water was 50:50.

2.2.3. Preparation of Flavour milk

The flavour milk was prepared using Tulsi juice and Turmeric juice. The study was divided into two phases. Phase A: Selection of level of tulsi juice in milk. Phase B: Selection of level of turmeric juice in milk.

Double tone milk having an average fat $1.5 \pm 0.1\%$ and average milk solid not fat content of $9 \pm 0.1\%$ was used for preparation of flavoured milk. Addition of ingredients tulsi juice, Turmeric juice and sugar (w/w of flavoured milk). The product was heated at subjected to pasteurization at 72°C for 15 sec then cooling at room temperature.

The flow chart for preparation of flavour milk using Tulsi juice, Turmeric juice and sugar is given in Figure 1.

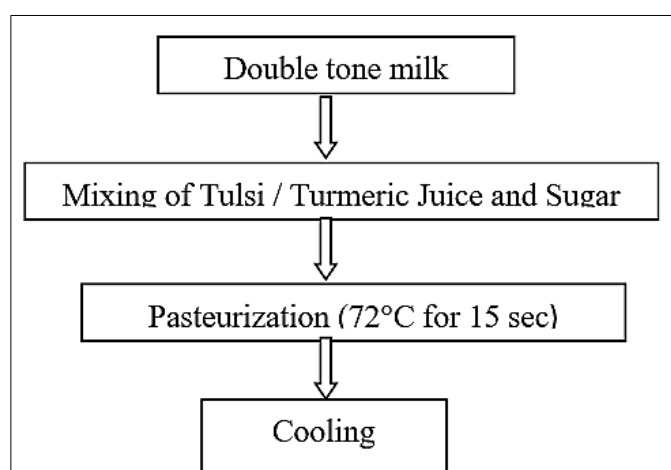


Fig 1: Flow chart for preparation of flavour milk.

2.3. Physico-chemical characteristics

The samples were analysed for pH, Moisture, Fat, Protein, Carbohydrate, Ash and total solid was determined by the method described in FSSAI manual (2015)

2.4. Sensory evaluation.

Flavoured milk prepared with Tulsi juice and Turmeric juice were evaluated for sensory attributes by a panel of seven judges selected from the department. The samples were evaluated for flavour, odour, colour / appearance and overall acceptability on 9-point hedonic scale (Stone and Sidel, 2004).

2.5 Experimental design

The central composite rotatable design was used for designing the experimental combinations. The experimental plan consisted of sets of thirteen experiments Table 1 and 2

3.0 Results and Discussion

Preliminary trials were conducted for selections of level of each ingredient are given in Table 1 and 2.

3.1 Preliminary Studies

Preliminary trials were conducted to select the levels of tulsi juice, turmeric juice and sugar.

Table 1: Experimental Design development by Response surface methodology (RSM) for flavoured milk prepared with tulsi juice

Treatments	Factor-1	Factor-2
	Level of Tulsi Juice (%)	Level of sugar (%)
1	4.0	8.0
2	1.17	8.0
3	4.0	8.0
4	2.0	6.0
5	4.0	10.83
6	6.0	10.0
7	4.0	8.0
8	6.83	8.0
9	4.0	8.0
10	4.0	8.0
11	4.0	5.17
12	6.0	6.0
13	2.0	10.0

Table 2: Experimental Design development by Response surface methodology (RSM) for flavoured milk prepared with turmeric juice

Treatments	Factor-1	Factor-1
	Level of Turmeric Juice (%)	Level of sugar (%)
1	11.0	6.0
2	9.0	8.0
3	11.0	10.0
4	6.2	8.0
5	9.0	8.0
6	9.0	8.0
7	7.0	10.0
8	11.8	8.0
9	7.0	6.0
10	9.0	10.8
11	9.0	5.2
12	9.0	8.0
13	9.0	8.0

3.2. Optimization of Product Formulation for Flavoured Milk

3.2.1 Optimization of Product Formulation for Flavoured Milk Prepared with Tulsi Juice

Considering the parameters and their limits, the Response Surface Methodology (RSM) suggested the one most suited solution for flavoured milk prepared with tulsi Juice. Suggested solution from RSM analysis for Tulsi juice (T1) @ 2.74 % (w/w of milk) and Sugar @ 8.63 % (w/w of milk).

3.2.1 Optimization of Product Formulation for Flavoured Milk Prepared with Turmeric juice

Considering the parameters and their limits, the RSM suggested the one most suited solution for flavoured milk prepared with turmeric juice. Suggested solution from RSM analysis for turmeric juice (T2) @ 7 % (w/w of milk) and Sugar @ 10 % (w/w of milk).

3.3 Physico-chemical characteristics of flavour milk

Physico-chemical characteristics of tulsi flavour milk and turmeric flavour milk given in Table 3

Table 3: Physico-chemical characteristics of optimization of product.

Parameters	Tulsi flavour milk (T1)	Turmeric flavour milk (T2)
pH	6.54	6.47
Moisture, % by wt.	81.38	81.13
Total Solid, % by wt.	18.62	18.87
Fat, % by wt.	1.55	1.45
Protein, % by wt.	2.91	2.82
Carbohydrates, % by wt.	13.32	15.64
Ash, % by wt.	0.84	0.96

The pH of Tulsi-flavoured milk (6.54) was slightly higher than that of Turmeric-flavoured milk (6.47). This marginal decrease in pH in T2 may be attributed to the acidic nature of turmeric constituents, which tend to lower the overall pH of milk.

Moisture content was observed to be 81.38% in T1 and 81.13% in T2. Consequently, the total solids were slightly higher in Turmeric-flavoured milk (18.87%) compared to Tulsi-flavoured milk (18.62%). This indicates that turmeric incorporation resulted in marginally higher solid content in the final product.

The fat percentage was found to be 1.55% in Tulsi-flavoured milk and 1.45% in Turmeric-flavoured milk. The slight reduction in fat content in T2 could be due to the dilution effect caused by turmeric powder addition.

Protein content was marginally higher in Tulsi-flavoured milk (2.91%) compared to Turmeric-flavoured milk (2.82%). This minor difference suggests that flavouring agents had negligible impact on the protein fraction of milk.

A significant variation was observed in carbohydrate content, with Turmeric-flavoured milk recording a higher value (15.64%) than Tulsi-flavoured milk (13.32%). This increase in T2 may be attributed to the natural carbohydrate constituents of turmeric.

The ash percentage, which represents mineral content, was slightly higher in T2 (0.96%) compared to T1 (0.84%). The higher mineral content in turmeric may have contributed to this increase.

3.4 Sensory Score for flavour milk

The sensory scores, viz. flavour score, odour score, color & appearance score and overall acceptability score for Tulsi flavour milk (T1) for was observed in the range from 7.87, 7.37, 7.37 & 7.75 (out of 9). Where as for and Turmeric flavour milk (T2) sensory scores, were range from 7.75, 7.25, 7.75 & 7.87 (out of 9) respectively.

4. Conclusion

On the basis of these present studies flavoured milk prepared with tulsi juice at the rate of 2.74 % and flavoured milk prepared with turmeric juice at the rate of 7 % were found that suitable for good for health benefits.

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