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Studies on Physicochemical Quality of Whey -Based Mango Beverage.

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ABSTRACT

Whey had been viewed as nothing more than waste product since long ago. But the addition of whey to certain products helps to thicken them, thereby increasing the viscosity which is important in production of a wide variety of foods such as soups, sauces and beverages. An investigation was carried out with the objective of preparing nutritionally enhanced mango beverage by incorporation of whey, cane sugar, mango pulp and to assess the sensory acceptability of the product with its enhanced nutrient content. Control and experimental treatments were prepared with varying proportion of whey and mango pulp in three different combinations i.e. $T_1(90:10)$, $T_2(85:15)$ and $T_3(80:20)$ @ 12% cane sugar was used for each treatment. Each treatment replicated five times. Sensory evaluation of the product was carried out using 9 point hedonic scale. The data obtained during the study were analyzed statistically using analysis of variance and critical difference techniques. On the basis of findings it was concluded that $T_3(80:20)$ was found to be the best in terms of taste and flavour, colour and appearance, consistency and overall acceptability and chemical attributes. The treatments can be rated as $T_3 > T_2 > T_1 > T_0$.

Keywords: physicochemical, Whey based, mango.

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INTRODUCTION

Whey is a by-product obtained during coagulation of milk using acid and/or rennet or by physico-chemical process for the preparation of Cheese, Paneer, Chhana, Chakka and Casine. Whey is a yellow-green watery liquid that separates from the curd during the cheese making process. It is also a major byproduct of paneer and chhana industry which contains nearly half of all solids found in whole milk [1]. These solids include protein, fat, minerals and lactose. Whey is an excellent beverage base and genuine thirst quencher, full of nutrients and possess medicinal properties but treated as waste dairy byproduct [3]. On one side, it controls the pollution and on the other hand, adds value to the product. Channa whey soup increases the appetite and it is helpful in case of diarrhea and liver problems. As far as mango is concerned it is a juicy fruit with an excellent flavour, attractive fragrance, delicious taste and high nutritional value that made it one of the best fruits. The present investigation is an alternate to make an acceptable quality of mango whey beverage using different levels of Channawhey by adopting the technique of manufacture as recommend by Rodwan [6].

MATERIALS AND METHODS

The ingredients used for preparation of whey based mango beverage were whey, sugar and mango pulp. The ripe mango were collected, washed, peeled, blended and filtered. Then whey was pasteurized at 71°C for 15 seconds. Whey and Mango pulp was added together in 90:10 (T₁), 85:15 (T₂) and 80:20 (T₃) ratio. Sugar was added uniformly to all the treatments @12%. Pulp and whey were mixed and blended and Packaged in sterilized glass bottle. The beverage stored at 5°C. The samples were analyzed for physicochemical, microbial and organoleptic qualities as per procedure laid down by IS:2802 (1964), IS: 1479, Part II 1961(20) and ICAR manual for Dairy Chemistry and Dairy microbiology (1972) respectively [4, 5].

T₀ = Whey

T₁ = Whey + Mango pulp (90:10)

T₂ = Whey + Mango pulp (85:15)

T₃ = Whey + Mango pulp (80:20)

The data on different aspects as per plan were tabulated and statistically analyzed as per Chandel [2].

RESULT AND DISCUSSION

Average of physicochemical parameters in Control and Whey -Based Mango Beverage

Table -1 showed average of physicochemical parameters in Control and Whey -Based Mango Beverage.

Carbohydrate

The highest mean value for carbohydrate percentage was found in T₃ (22.09), followed by T₂ (20.68), T₁ (19.49) and T₀ (16.58). There were significant differences found among the treatments, which may be attributed to addition of whey in different ratio. F Value was 150.33, indicating significant effect of treatment on carbohydrate percentage (Fig.1).

Table 1: Average of different physicochemical parameters in control and Whey -Based Mango Beverage

Parameters(%)	Control and Whey -Based Mango Beverage				F Value	C.D.
	T ₀	T ₁	T ₂	T ₃		
Protein	0.51	0.48	0.55	0.59	0.891**	0.154
Carbohydrate	16.58	19.49	20.68	22.09	150.33*	0.583
Moisture	82.06	78.80	77.35	75.60	232.29*	0.549
Ash	0.50	0.46	0.50	0.64	2.811**	0.142
Total Solids	17.94	21.20	22.65	24.40	93.483*	0.865
Acidity	0.52	0.52	0.55	0.58	0.966**	0.096
Fat	0.35	0.77	0.92	1.08	218.22*	0.065

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

Total solids content

The highest mean value for total solids content was found in T₃ (24.40), followed by T₂ (22.65), T₁ (21.20) and T₀ (17.94). The treatments were significantly different. This may be due to the addition of whey in different proportions. F Value was 93.483, indicating significant effect of treatment on total solids contentpercentage (Fig.1).

Moisture

The highest mean value for moisture was found in T₀ (82.06), followed by T₁ (78.80), T₂ (77.35) and T₃(75.60).The treatments were significantly different. F Value was 232.29, indicating significant effect of treatment on moisture percentage (Fig.1).

Protein

The highest mean for protein percentage in whey based mango beverage was found in T₃ (0.59), followed by T₂ (0.55), T₀ (0.51) and T₁ (0.48). F Value was 0.891, indicating no significant effect of treatment on protein percentage. Therefore, it may be suggested that the product was as good as control (Fig. 2).

Ash

The highest mean value for ash content in mango based beverage was found in T₃ (0.64), followed by T₂ (0.50),T₀ (0.50) and T₁ (0.46). The treatments did not differ significantly.F Value was 2.811, indicating no significant effect of treatment onash percentage. Therefore, it may be suggested that the product was as good as control(Fig. 2).

Acidity percentage

The highest mean value for acidity percentage was found in T₃ (0.58), followed by T₂(0.55), T₁ (0.52) and T₀ (0.52). The treatments did not differ significantly.F Value was 0.966, indicating no significant effect of treatment on acidity percentage. Therefore, it may be suggested that the product was as good as control (Fig. 2).

Fat percentage

The highest mean for fat percentage in whey based mango beverage was found in T₃(1.08), followed by T₂ (0.92), T₁ (0.77) and T₀ (0.35). The treatments were significantly different. F Value was 218.22, indicating significant effect of treatment on fatpercentage (Fig. 2).

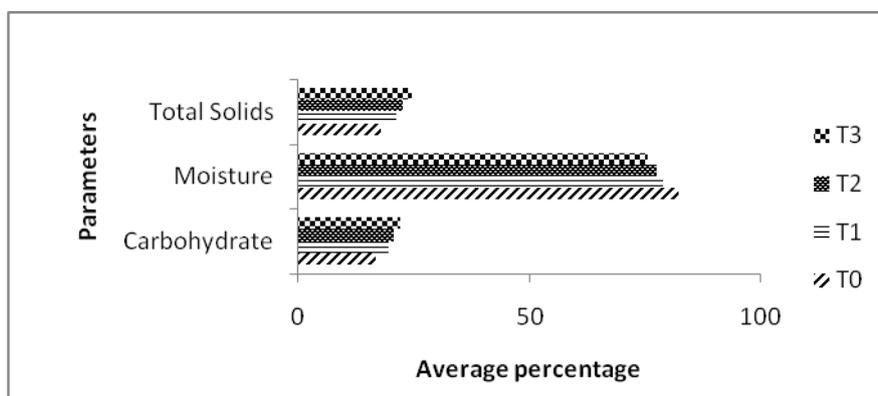


Figure 1: Average of different physiochemical parameters (Total solids, Moisture, Carbohydrate) in control and Whey - Based Mango Beverage

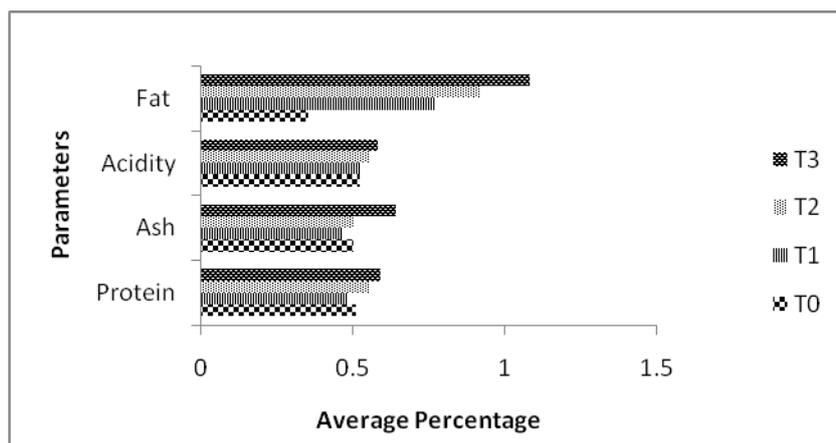


Figure 2: Average of different physicochemical parameters (Fat, Acidity, Ash, Protein) in control and Whey -Based Mango Beverage

Table-2 showed microbial parameters in Control and Whey -Based Mango Beverage. The highest mean value for SPC in whey based mango beverage was found in T₁ (74.20), followed by T₀ (72.80), T₂ (69.20) and T₃ (69.00). There were no significant differences found among the treatments. The highest mean value for Yeast and mould count was found in T₃ (19.00), followed by T₂ (18.40), T₁ (11.80) and T₀ (11.80). There were no significant differences found among the treatments. All samples of whey based mango beverage did not show the presence of coliform, thus the product was good in quality.

Table 2: Microbial parameters in Control and Whey -Based Mango Beverage

Parameters	Control andMango-Based Whey Beverage				F Value	C.D.
	T ₀	T ₁	T ₂	T ₃		
SPC (cfu ⁻³ /g)	72.80	74.20	69.20	69.00	0.101**	24.989
Yeast and mould (cfu ⁻² /g)	11.80	11.80	18.40	19.00	2.352**	7.949
Coliform (cfu ⁻¹ /g)	Nil	Nil	Nil	Nil	-	-

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

CONCLUSION

In view of experimental results it may be concluded that whey based mango beverage has a great marketing potential in Indian market. The treatment with 20% mango pulp and 80% whey gave the best overall acceptability among the treatments.

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