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Production and sensory evaluation of whey beverage prepared by using carrot juice

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Abstract
The present investigation was carried out to standardize the carrot juice. Carrot beverage was standardized by using and mixing different ingredient (juice, salt, whey, sodium benzoate, etc.) which were used at different quantity. Beverage was prepared by blending carrot juice and spinach juice at different ratios (T = 100:0, T_1= 90:10, T_2= 80:20 T_3 =70:30). Beverage was heated below boiling point for a few minutes and sodium benzoate was added into it. It can be concluded that the carrot beverage could be prepared by using carrot juice. The proportion carrot juice may be taken as 10 % juice and 90 % whey beverage for getting the best organoleptic quality product. Also, looking to the higher nutritious virtues, the developed whey based ready to serve beverage from carrot juice could be recommended for the large scale production at industrial level.

Keywords: Production and sensory evaluation

Introduction
The carrot provides many antioxidants. Studies have found that cooked carrots actually contain *more* of the antioxidants than raw carrots do. It's important to remember that carrots in any regard are known to contain powerful antioxidants and, in many cases, carrots are given to young children as a substitute for snacks that are high in sugar. Carrots provide with many of the essential vitamins and nutrients that are necessary for body to function properly. It contains vitamin A, B1, B3, B6, C, and K, Dietary Fiber, Potassium, Manganese, Molybdenum, Phosphorous, Magnesium, Folate.

The powerful antioxidants found in carrots help protect body from cardiovascular disease, as well as cancer, and they're also great for helping vision due to the high levels of beta-carotene. carrots can also help prevent postmenopausal breast cancer and also protects body from other forms of cancer in the bladder, colon, larynx and prostate.

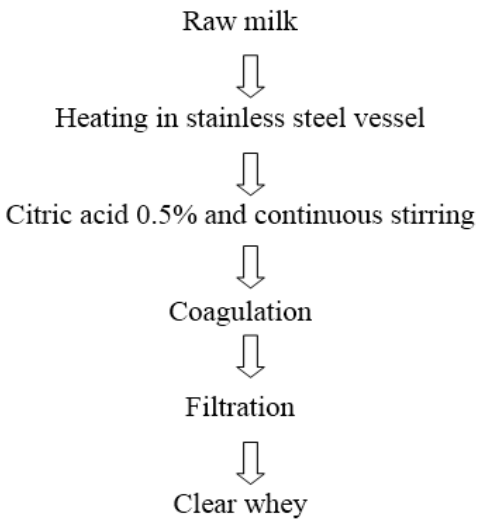
Whey is one of the principle by products of the cheese industry and fermented milk product. Whey retains about 55% of the native milk nutrients with half of the ash and one fourth of the protein. A study was made to concentrate channa whey by membrane process (ultra filtration) and its subsequent enhancement with sugar and flavour additives to produce a healthy stimulating and thirst-quenching beverage. Raffald, (1782) [6] also reported the use of whey. Whey was also used in central Spain to enrich bakery products Feedstuff, (2011) [3]. In 2005, researchers at Lund University in Sweden discovered that whey appears to stimulate insulin release, in type 2 diabetics (Frid, 2005) [4].

Therefore the present investigation was carried out to prepare carrot juice at different composition, to prepare product of good organoleptic properties, value addition to the waste from fermented milk products, to analyze product physically, and to prepare product which is economical and nutritious from consumer's as well as manufacturer's point of view.

Materials and Methods
This study was conducted in Deptt. Of Dairy science, Mahatma Basweshwar Mahavidyalaya, Latur. Fresh and sound carrot were purchased from local market and were washed with clean water to remove dust, dirt and outer material. Carrot was cut into desired pieces for further processing. Then, it was washed with water. Blanching was done for time and temperature 100 ^{0}C for 3 min and immediate cooling was done in cold water to prevent further cooking. After completion of pretreatments, It was difficult to extract the juice from it so that pieces were crushed in mixture after that placing in muslin cloth and carry out squeezing with pressing to extract the juice, then it was filtered to get clear strained juice.

Carrot beverage was standardized by using and mixing different ingredient (juice, salt, whey, sodium benzoate, etc.) which were used at different quantity. Beverage was prepared by blending carrot juice and spinach juice at different ratios (T = 100:0, T_1= 90:10, T_2= 80:20 T_3 =70:30). Beverage was heated below boiling point for a few minutes and sodium benzoate was added into it.

Preparation of Milk Whey
The milk was heated in a stainless steel vessel. The hot milk was acidified by adding citric acid (0.5%) followed by continuous stirring resulting in complete coagulation of milk protein (casein). The liquid (whey) was filtered using muslin cloth.



Preparation of carrot juice

The carrots were washed and peeled. The pulping was done by using mixer grinder and pulp was preheated in a water bath. The pulp was pressed through a muslin cloth to extract the juice. The carrot juice was kept at a refrigeration temperature (7±1°C) until used.

Sensory evaluation was made through panel of 6 semi-trained judges. The panel evaluated the acceptance level of beverage for odour, appearance, taste and overall acceptability. A 9-point hedonic scale was used for this purpose. The data obtained were subjected to statistical analysis using standard deviation and comparison of means by LSD test (Snedecor and Cochran, 1994) [9].

Results and Discussion

The mean sensory score given by the panelists to the beverage sample prepared at different treatment given in table, 1 the maximum mean sensory score was obtained by the beverage sample of treatment T_1 combination for the flavour, appearance, taste and overall acceptability attributes of sensory evaluation. Also the mean sensory score of beverage sample T_0 combination was found maximum in case of flavour, appearance, taste and overall acceptability. From the present investigation it is observed that as the level of carrot juice increased (T1) the flavor decreased (T3). Therefore the sample T1 prepared with 10% carrot juice secured highest score than the rest of the samples. The sample T2 prepared with 20% juice awarded with highest score for taste than the rest of the treatments. The reason might be that the all the panelists liked the taste of whey beverage as the level increased. But the sample T3 got low score that might be due to over addition of carrot juice as it gave the taste of carrot. For the appearance the sample T1 prepared with 10% carrot showed overall best appearance therefore got maximum score than all the treatments. The present investigation corroborates with the results reported by Dhamsania and Varshney (2013) [1] for the sensory characteristics of whey based water melon beverage and ripe banana juice beverage respectively. The present investigation also conformity with that of Duric, *et al.,* (2004) [2], Singh and Gaikwad (2012) [8], Singh and Singh (2012), Landge and Gaikwad (2013) [5]. However Yadav, *et al.,* (2013) reported that the sample with 14% juice content and 14% TSS supplemented with mint and ginger in a specified ratio (80:10:10) was found to be superior over the other samples in terms of organoleptic qualities.

Table 1: Effect of level of carrot juice on sensory quality of carrot whey beverage

Treatment	Sensory attributes			
	Flavour	Taste	Appearance	Overall acceptability
T_0	7.25±0.85	7.5±0.57	7.25±0.95	7.33±0.95
T_1	8.25±1.70	7.0±1.15	7.75±1.89	7.66±0.96
T_2	7.25±2.06	7.75±0.96	7.5±1.91	7.50±0.5
T_3	6±1.82	6.25±0.5	7.0±0.81	6.41±1.25

Mean ±SD of four replications

Conclusion

It can be concluded that the carrot beverage could be prepared using the carrot juice. The proportion carrot juice may be taken as 10 % juice and 90 % whey beverage for getting the optimum organoleptic quality of carrot whey beverage. Also, looking to the higher nutritious virtues, the developed whey based ready to serve beverage from carrot juice could be recommended for the large scale production at industrial level.

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