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EFFECT OF DIFFERENT LEVELS OF PANEER WHEY ON PHYSICO- CHEMICAL PROPERTIES AND SHELF LIFE OF CARROT HALWA

Dr. Narotham Reddy, K., *Siddarama, R., Shree Hari, H., Bushrah Anjum, B., Venkata Subbaiah, M.

Department of Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad-211007

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ABSTRACT

A study was undertaken by utilizing different levels of Paneer Whey(i.e. 0.5%, 1%, and 1.5%) for manufacturing of good quality Carrot Halwa. Grated carrot and a mixture of Ghee, Sugar, cardamom, and cashewnut were used as other ingredients. The quality of Halwa was highly influenced by Carrot and their concentration in whey. Whey greatly improved the shelf life of Carrot Halwa. The product was analyzed for organoleptic attributes (colour and appearance, body and texture, flavour and taste) by trained panelist using 9 point hedonic scale. Chemical (Fat, protein, carbohydrate) and microbiological (SPC, Coliform, Yeast & mold count) analysis were done for estimating its nutritional content and shelf life. As per as product overall acceptability judged by the panelist, the treatment can be rated as $T_3 > T_2 > T_1 > T_1$.

INTRODUCTION

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 (Indian variety of soft cheese) industry which contains nearly half of all solids found in whole milk. These solids include protein, fat, minerals and lactose. The liquid whey contains approximately 93% water, 0.6% whey protein, 1.05% fat, 0.7% ash, and 4.9% lactose. Whey is available all over India, both for forage and human consumption. It is a by- product of cheese, Paneer or chhana industry. Generally it is wasted or dumped by the dairy industry and not having any direct use (Bhatia, 1997). Carrots are very rich in B-carotene and contains appreciable amount of Thiamin and Riboflavin (Kotecha *et al.,* 1998). Whey is used in the preservation of curries, pickles and sweetmeats. It has a beneficial effect on the kidneys and preventive for brick dust sediments sometimes found in urine (Devaraj *et al.,* 2006). Carrot is recommended in chronic Diarrhea; a decoction of carrot is a popular remedy for jaundice in Europe and is also considered as a source of sugar (Jayprakasha and Braeckner 1999). A good stimulating poultice ointment of rasped carrot made with lard is very useful in burns and scalds (Hoffman, 1996).

Corresponding author: Siddarama, R.,
Department of Dairy Technology, Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad-211007.

Carrots are exceptionally rich in iron and it is said that they beautify the complexion. It is also a very good appetizer (Manjunatha *et al.,* 2003). In this study an effort has been made to prepare good quality Carrot Halwa with the help of Paneer Whey using the technique of manufacture as recommended by (Singh *et al.,* 1994).

MATERIALS AND METHODS

The carrots are first cleaned with water and then the skin removed. They are subsequently, turned into fine shreds with the help of the coconut shredder. The milk is brought to boil over low fire in a karai. The shredded carrots are added to the boiling milk and stirring continued till the milk get fully condensed and the carrot shreds get fully cooked. In the mean while cashew nuts are cut into small bits and fried with a little ghee. Almost simultaneously the cane sugar is prepared in a separate vessel by boiling the sugar with about half of its quantity of water till it gets concentrated to a perceptibility sticky consistency. At this stage, the milk cooked carrot is stirred into the sugar, simultaneously adding the ghee fried cashew nut, saffron, cardamom or elaichi (small) powder and mixed with different ratios of paneer whey 1 : 0.5, 1 : 1 and 1 : 1.5 (ratio of grated carrot and Paneer Whey) for T_1, T_2 and T_3 respectively. The samples were analyzed for physicochemical, microbial and organoleptic qualities as per procedure laid down by [8] and [9].

Table 1. Details of different treatments for makingcontrol and paneer whey carrot halwa

Materials(%)	Different treatmentscontrol and paneer whey carrot halwa			
	T_0	T_1	T_2	T_3
paneer whey	-	0.5	1.0	1.5

RESULTS AND DISCUSSION

Average of different physicochemical parameters and yield of control and paneer whey Carrot Halwa

Table -2 showed average data obtained on different parameters.

Moisture percentage

The highest mean for moisture percentage in Carrot Halwa with Paneer Whey was T_0 (46.76), followed by T_1 (46.75), T_2 (46.72) and T_3 (46.70). There were no significant difference found in average moisture percentage of Carrot halwa of control and experimental samples. F value was 0.002, indicating no significant effect of treatment on moisture percentage.

Fat percentage

The highest mean for fat percentage in Carrot Halwa with Paneer Whey was T_3 (19.0), followed by T_2 (17.8), T_1 (17.4) and T_0 (17.0). There were significant difference found in average fat content of Carrot halwa of control and experimental samples. F value was 4.81, indicating significant effect of treatment on fat percentage.

Protein percentage

The highest mean value for protein content in Carrot Halwa with Paneer Whey was T_3 (6.30), followed by T_2 (6.28), T_1 (6.25) and T_0 (6.24). The average protein percentage in different treatments not differed significantly. F value was0.0017, indicating no significant effect of treatment on protein percentage.

Total solids

The highest mean for total solids percentage was found in T_3 (53.30) followed by T_2 (53.28), T_1 (53.25) and T_0 (53.24). The treatments were non-significant. F value was 0.002, indicating no significant effect of treatment on total solids.

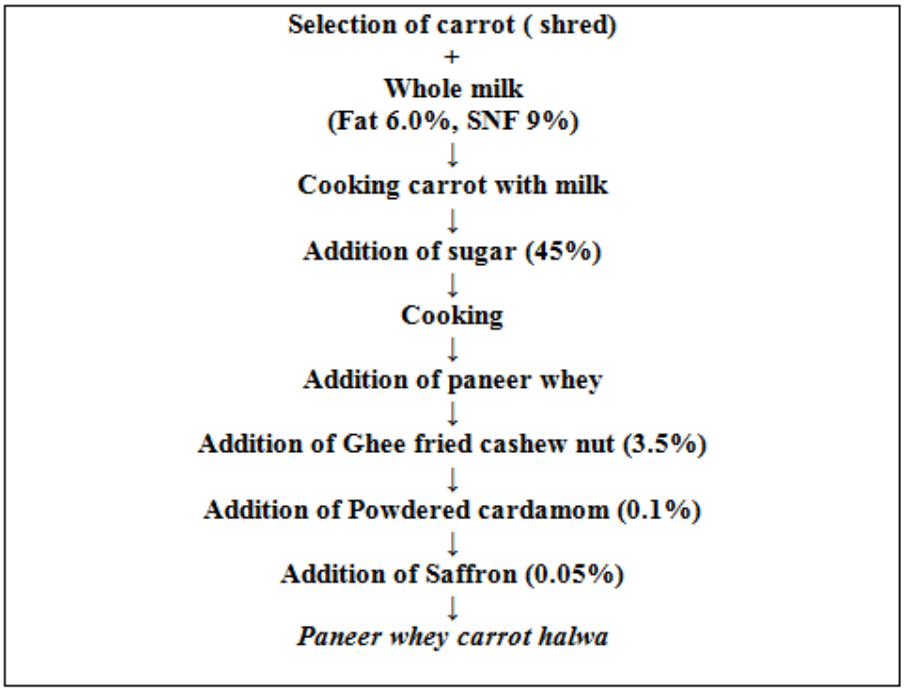

Figure 1. Flow chart for preparation of control and paneer whey carrot halwa

Table 2. Average of different physicochemical parameters and yieldof control and paneer whey Carrot Halwa

Parameters (%)	Control and paneer whey carrot halwa				F value	C.D.
	T_0	T_1	T_2	T_3		
Fat	17.0	17.4	17.8	19.0	4.81*	1.356
Moisture	46.76	46.75	46.72	46.7	0.002**	-
Total solids	53.24	53.25	53.28	53.30	0.002**	-
Protein	6.24	6.25	6.28	6.30	0.017**	-
Carbohydrate	29.98	29.58	29.19	27.99	4.79*	1.35
Yield	52.06	52.4	52.72	53.58	32.46*	0.394

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

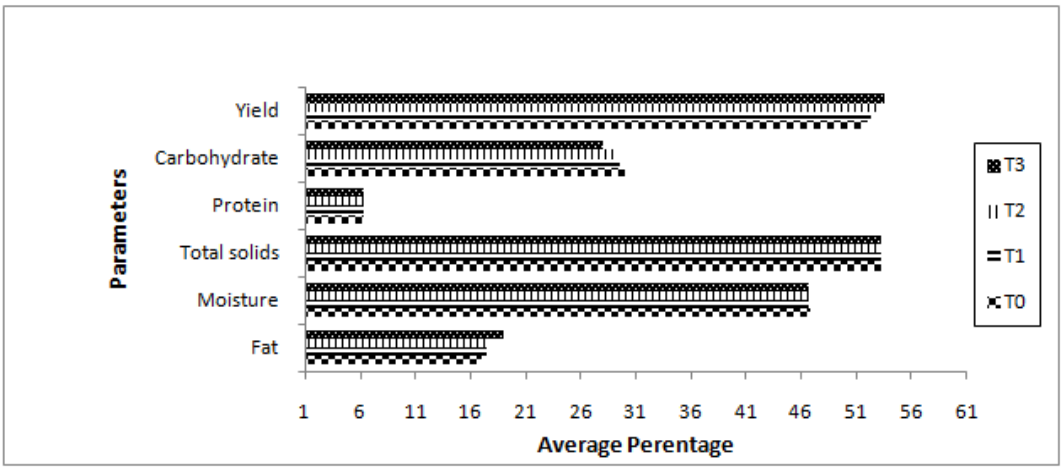

Figure 2. Average of different physiochemicalparametersand yield of Control and paneer whey Carrot Halwa

Table 4. Microbial parameters ofControl and paneer whey carrot halwa

Parameters	Control and paneer whey carrot halwa				F value	C.D.
	T_0	T_1	T_2	T_3		
SPC 10^3cfu/gm(1st day)	90.80	81.80	70.60	53.0	33.08*	9.756
SPC 10^3cfu/gm (3rd day)	95.20	86.20	76.20	62.20	23.26*	10.11
Yeast and Mold count 10^2cfu/gm(1st day)	23.4	20.20	17.80	16.4	32.59*	1.85
Yeast and Mold count 10^2cfu/gm(3rd day)	25.60	21.80	19.80	19.0	16.68*	2.40
Coliform 10^1cfu/gm	Nil	Nil	Nil	Nil	Nil	Nil

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

Carbohydrate percentage

The highest mean for carbohydrate content was T_0 (29.98), followed by T_1 (29.58), T_2 (29.19) and T_3 (27.99). There were significant differences between the treatments. The average carbohydrate percentage in different treatments differed significantly. F value was 4.79, indicating significant effect of treatment on carbohydrate percentage.

Yield

The maximum yield of carrot halwa (53.58) was obtained for treatment T_3 followed by T_2 (52.72) and T_1 (52.4), whereas the minimum yield was (52.06) found in T_0. There was significant difference found in average yield (%) of carrot halwa of control and experimental samples. F value was 32.46, indicating significant effect of treatment onyield. Thus, the data showed the experimental product was a good as control

Shelf life of paneer whey Carrot Halwa

Microbial parameters of Control and paneer whey carrot halwa (1st day of storage)

The highest SPC (10^3cfu/g) was recorded in Carrot Halwa with Paneer Whey was T_0 (90.80), followed by T_1 (81.80), T_2 (70.60) and T_3 (53.00).

F Value was 33.08, indicating significant differences between the treatments. The highest mean for yeast and mold count was found in T_0 (23.4), followed by T_1 (20.20), T_2 (17.80) and T_3 (16.4). F Value was 32.59, indicating significant differences among the treatments. All the samples of Carrot Halwa with Paneer Whey did not show the presence of coli form. Thus the product was proved to be of good quality.

Microbial parameters of Control and paneer whey carrot halwa (3rd day of storage)

The highest SPC (10^3cfu/g) was recorded in Carrot Halwa with Paneer Whey was T_0 (95.20), followed by T_1 (86.20), T_2 (76.20) and T_3 (62.20). F Value was 23.26, indicating, significant differences between the treatments. The highest mean for yeast and mold count was found in T_0 (25.60), followed by T_1 (21.80), T_2 (19.80) and T_3 (19.0). F Value was 16.68, indicating significant differences among the treatments. All the samples of Carrot Halwa with Paneer Whey did not show the presence of coliform. Thus the product was proved to be of good quality. Although, SPC and yeast and mold count increased during storage but within permissible level. It showed that Paneer whey extend shelf life of the product.

Conclusion

From the present investigation it may be concluded that an acceptable Carrot Halwa can be prepared with the help of Paneer Whey.

The shelf life of Carrot Halwa with paneer whey is longer and its cost of production is comparatively low. So the experimental Carrot Halwa has a good market potential.

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