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UTILIZATION OF DIFFERENT LEVELS OF WHEY PROTEIN CONCENTRATE FOR PREPARATION OF CHHANA BASED SWEET RASGULLA

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Whey protein is one of the major protein found in cow's milk comprising of 20% of total milk protein. Whey protein referred to as a group of individual proteins contains water, lactose, protein, minerals (Calcium, Phosphorous, Magnesium) and fat (1). The best known effect of whey protein are its ability to increase lean muscle mass and to boost the immune system. Whey protein contains minerals for bone strength, plus essential, semi-essential and non-essential amino acid for tissue formation. Common WPC available in the market areWPC-35,WPC-60,WPC-70,WPC-80. Whey protein concentrate is largely used for development of texture in food products, food formulation and for clinical diets. It is also used for health beverages, meat products, bakery products, confectionaries and protein supplement of various coagulated milk products like chhana, paneer (2). Whey proteins are highly functional and nutritional used in a variety of products. The most commonly used value added forms of Whey protein in industry are Whey protein isolate (W.P.I.), WPC contains 34-80% proteins and WPI contains at least 90% protein. Whey protein concentrate (WPC) has the highest biological value and protein efficiency ratio as compared to other protein, which make it suitable for wide range of neutraceutical and functional food system. Whey protein ideally have a bland flavour to facilitate application in foods (3). Rasgulla regarded as the king of Indian milk sweets are prepared by kneaded chhana balls under control cooking in boiling sugar syrup. In appearance it is snow white, soft and succulent sphere shaped (4). Keeping in mind the functional properties and other use of WPC, an attempt has been made to explore the use of WPC inrasgulla making using the method of manufacture as laid down by (5).

First of all, cow milk was standardized to 4%fat and 8.5% SNF. Three different levels of WPC now added i.e. T_1 (0.5% WPC), T_2 (1% WPC) and T_3 (1.5% WPC) with cow milk.It was then heated at 90°C and cooled at 70°C. 1% citric acid was used to coagulate the milk. The chhana obtained then kneaded for making Rasgulla balls. Balls are then cooked in sugar syrup to get Rasgulla. The samples were tested for physicochemical parameters (fat, proteins, total solids, moisture, acidity and yield) and microbiological parameters (SPC, yeast and mould count, coliform count) as per procedure given in the food chemistry manual of Allahabad Central University. Organoleptic attributes (colour and appearance, body & texture, flavour and taste) were judged by trained panelist using 9 point hedonic scale. The data collected on different aspects as per plan were tabulated and statistically analyzed as per (6). Table-1 shows average of different parameters studied.

Physicochemical properties : There were significant differences found in the average fat% of different treatments. T_3 had highest score of 7.17% followed by T_2 (6.58%), T_1 (5.97%) and T_0 (3.68%). Protein contentalso differs significantly. T_3 is the highest (5.92%), followed by T_2 (5.80%), T_1 (5.52%) and T_0 (3.44%).Total solids content was highest inT_3 (61.6%), T_2 (60%), T_1 (57.80%) and T_0 (48.8%). The treatments differed significantly.The moisture content differed

Table-1: Physicochemical parameters.

Parameters (%)	Treatments			
	T_0	T_1	T_2	T_3
Fat	3.68	5.97	6.58	7.17
Protein	3.44	5.52	5.80	5.92
Total Solids	48.8	57.80	60.0	61.6
Moisture	51.2	42.20	40.0	38.4
Acidity	0.17	0.17	0.18	0.16
Yield	341.51	405.22	423.40	433.02

Table-2: Microbial parameters

Parameters	Treatments			
	T_0	T_1	T_2	T_3
SPC	6.8	7.8	8.2	8.4
Yeast and mold	2.8	3.0	4.8	5.2
Coliform count	Nil	Nil	Nil	Nil

Table-3: Organoleptic attributes.

Parameters	Treatments			
	T_0	T_1	T_2	T_3
Colour and Appearance	7.92	7.48	7.48	7.32
Body and Texture	7.98	7.68	7.42	7.38
Flavour and Taste	8.24	7.90	7.94	7.92

Table-4: Overall acceptability of the product

Replication	Treatments			
	T_0	T_1	T_2	T_3
R_1	7.46	8.5	4.7	6.93
R_2	7.60	9.0	8.29	6.97
R_3	8.27	9.32	4.75	7.13
R_4	8.40	9.14	7.56	7.36
R_5	8.46	8.9	7.30	7.10
Mean	8.03	8.97	6.52	7.09

significantly too.The highest moisture percentage was found in T_0 (51.2), followed by T_1 (42.20%), T_2 (40.0%) and T_3 (38.4%).The acidity of the different treatments were non-significant.The highest value was found inT_2 (0.18%), followed by T_0 (0.17%), T_1 (0.17%) and T_3 (0.16%).There were significant differences found among the yields of different treatments. The highest value was found in T_3 (433.02%), followed by T_2 (423.40%), T_1 (405.22%) and T_0 (341.51%).

Microbial Parameters : There were non-significant differences found among the treatments for SPC. The highest value was found inT_3 (8.4), followed by T_2 (8.2), T_1 (7.8) and T_0 (6.8). Yeast and mould countwere non-significant also.The highest value found inT_3 (5.20), followed by T_2 (4.80), T_1 (3.00) and T_0 (2.80). Coliform count were negative in all the treatments.

Organoleptic attributes : There were non-significant difference observed in different treatments for colour and appearance. The highest value was found in T_0 (7.92), followed by T_1 (7.48), T_2 (7.48) and T_3 (7.32). Body and texture of the product did not differ significantly. The highest value was found in T_0 (7.98), followed by T_1 (7.68), T_2 (7.42) and T_3 (7.38). Flavour

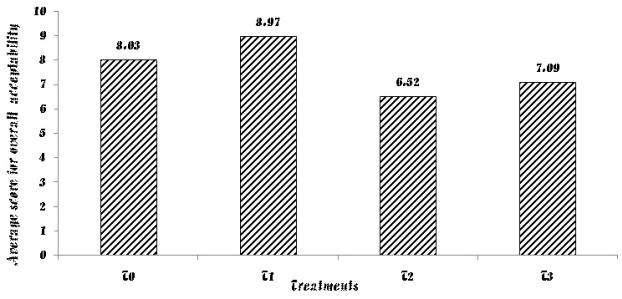

Figure : Overall acceptability

and taste of the product was found significant. The highest value was found inT_0 (8.24), followed by T_1 (7.90), T_2 (7.94) andT_3 (7.92).

There were significant differences found among the treatments for overallacceptabilityscore. The highest score was found inT_1(8.97),followed by T_0(8.03), T_3(7.09) and T2(6.52).

CONCLUSION

On the basis of the results obtained it can be concluded that the WPC powder can be successfully used for improving sensory quality of Rasgulla, without sacrificing its palatability. 0.5% WPC proved to be best among all treatments.

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