



STANDARDIZATION AND ORGANOLEPTIC EVALUATION OF RECIPES PREPARED FROM BOVINE COLOSTRUM

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ABSTRACT

Colostrum is mother's nature very first life sustaining superfood. Present study deals with standardization & palatability evaluation of recipes prepared with bovine colostrum. Two sweet & two savoury experimental recipes (porridge, halwa, kofta curry & paratha) were prepared using bovine colostrum & compared with the control recipes for sensory & nutritional quality. Sensory testing was conducted by six human panelists. All recipes prepared using bovine colostrum were well accepted for their sensory attributes. In comparison with control, experimental kofta curry & paratha were very well accepted for appearance, colour, doneness, texture, mouthfeel, flavour, taste & acceptability ($t=0.00$ to 1.30 , $p>0.05$). Experimental porridge & halwa prepared from bovine colostrum were well accepted. All experimental recipes were found to be good in energy & protein content. It is concluded that products prepared from bovine colostrum were energy dense & rich source of high biological value protein & well accepted for their sensory attributes. Being a very good source of protein, energy as well as immune and health factors, natural bovine colostrum can be incorporated in different food products. Naturally available surplus bovine colostrum can be explored commercially.

Key words: Bovine colostrum, palatability, sensory attributes, protein, energy.

INTRODUCTION

Milk is the normal secretion of the mammary glands of mammals. It's purpose in nature is to provide good nourishment for the young of the particular species producing it. Milk is one of the most complete single foods

available in nature for health and promotion of growth. Man has learnt the art of using milk and milk products as a food for his well being and has increased the milk-producing function of the animals best adapted as a source of milk for him.



Colostrum is the thick, sticky and yellowish pre-milk liquid produced from the mammary glands of the female during the first 24 to 14 hours after giving birth to the young ones. Bovine colostrum also known as cow milk colostrum is the pre-milk fluid produced from mammary glands during the first 2 to 4 days after giving birth to calf. It is a rich natural source of nutrients, antibodies, and growth factors for the newborn. While humans produce small amounts of colostrum, a cow produces approximately nine gallons during the first the 36 hours after giving birth (Playford, et al., 1999).

Bovine colostrum has many health powers. It has been used to treat diarrhea, to improve GI health & to boost the immune system. Colostrum contains immune factors, immunoglobulins, antibodies, proline-rich polypeptides (PRP), lactoferrin, glycoproteins, lactalbumins, cytokines (e.g. interleukin, and interferon), growth factors, vitamins, and minerals. There is

also a constituent isolated from bovine colostrum that is responsible for uterine and intestinal contraction, and lowering of blood pressure (<https://www.drugs.com/npc/bovine-colostrum.html>).

The immune-boosting properties of bovine colostrum have been promoted as performance enhancers and anti-aging/healing supplements. Certain Web pages, for instance, promote significant fitness gains for athletes, noting its “anabolic effects” and claiming it can “promote muscle growth”. One clinical trial finds bovine colostrum supplement to increase serum IGF-1 concentration in athletes. 29 IGF-1 is a growth factor that speeds up protein synthesis and slows catabolism (Lissner, et al., 1996).

Cattle colostrum is used as a food supplement for human consumption. Colostrum properties could be fully exploited if it's components reach as such in human gut. Colostrum ingestion contributes to the improvement of



health status and wellness in healthy humans and it assists the healing of subjects with an immune deficiency status (Li & Aluko, 2006).

Colostrum can basically be classified as a super food. Amino acids, anti-oxidants, variety of proteins, vitamins and minerals are all contained in colostrum. Another key factor is the IGF-1 and IGF-2 insulin-like growth factors that encourage growth of muscle fibers and other tissues. Some athletes have used colostrum in an attempt to improve their performance (Hofman et al., 2002), decrease recovery time and prevent sickness during peak performance levels (Buckley et al., 2002). Supplementation with bovine colostrum (20 to 60 g/d) in combination with exercise training for 8 to 9 week increases bone-free lean body mass in active men and women; also improves peak vertical jump power, peak cycle power; increases strength, power & overall exercise performance of male athletes & active young men

& women (Antonio et al., 2001, Hofman et al., 2002 & Buckley et al., 2003).

Disease causing bacteria, viruses and other invaders are easily destroyed when the body is in its proper balance. The body can once again heal itself, avoid “normal” fitnesses, and return to a state of peak health. For this reason, many users rely on this product to reinforce their body during cold and flu season; building up immune system in times of stress. (<http://www.articlesbase.com/health-articles/an-introduction-to-colostrum-2801803.html>).

Bovine colostrum is a difficult preparation to standardize because its antibody content may vary widely. Some clinical studies have been performed with hyper immune colostrum, which may have a specific antibody titer; however, most products do not meet this criterion. Studies administering 25 to 125 ml of liquid formulations or 10 to 20 g of dry powder have been reported (Playford et al., 1999). Bovine



colostrum can be consumed in any form either natural or preserved in the forms of pills, tablets, powder or liquid. Being a very good source of protein, energy, micronutrients as well as immune and health factors, natural bovine colostrum can be incorporated in different recipes.

Present study is an attempt to develop recipes by incorporating steamed cake of bovine colostrum.

METHODOLOGY

Recipes were prepared using bovine colostrum steamed cake and compared with the control recipes prepared using paneer.

Selection of Recipes: For the present study, porridge, halwa, kofta curry and paratha were standardized. Experimental recipes were compared for their sensory attributes & nutritional quality with control recipes prepared using paneer. Standard procedures were followed for preparation of recipes. Tables 1, 2, 3 & 4 show composition of ingredients for porridge, halwa, kofta curry & paratha, respectively.

Sensory Evaluation: The sensory evaluation was carried out by six judges in three trials. Various sensory attributes were judged by human panelists. The assessment involved appearance, colour, doneness, mouthfeel, consistency, texture, flavor, taste and acceptability. Score cards with keys were developed for all recipes. Tables 5 presents sample score card. Scoring was done for maximum score of 10 to a minimum score of 4 for all sensory attributes (10-very good, 8-good, 6-fair and 4-poor).

Nutritive Value of Control & Experimental Recipes: Nutritive value of each recipe was calculated using food composition tables (Gopalan, et al., 2012). Nutritive value of bovine colostrum was referred from Kehol, et al. (2007).

Statistical Analysis: Scores were tabulated & means were derived. Comparisons were done using student's 't' test. A level of significance at both 5 % and 1 % level was considered to draw conclusions.



RESULTS AND DISCUSSION

Porridge: Control porridge was prepared using paneer. Experimental porridge was prepared using steamed cake of bovine colostrum and compared with control porridge for its palatability. Results of palatability evaluation of porridge are presented in Table 6. There was no significant difference between control and experimental porridge for appearance, colour, consistence, mouthfeel, flavour, taste & acceptability ($t=1.00, 0.00, 1.00, 1.40, 1.00, 1.00$ & 1.00 , respectively, $p>0.05$). Experimental porridge was equally accepted for its palatability (Table 6).

Halwa: The word halwa is Arabic in origin. Halwa, also known as 'sheera' is a semisweet, mild tasting dish consisting of semolina generally, cooked to a soft solid pudding like texture with milk, almonds, sugar, ghee/butter and cardamom. Table 7 shows mean palatability evaluation scores for control & experimental halwa. It is observed that there was no significant difference occurred

between control and experimental halwa for appearance, colour, texture, mouthfeel, flavour, taste & acceptability ($t=1.40, 0.50, 0.70, 1.40, 1.09, 1.70$ & 1.00 , respectively, $p>0.05$). Mean scores obtained for experimental halwa were found to be slightly lower than those of control halwa. The colour of the halwa can further be enhanced by adding food colour or more saffron. The acceptability of experimental halwa was high and hence, it can mark its place in menus of happy and festive occasions.

Kofta Curry: Kofta curry is a classic dish of Moghlai origin. It has deep fried tangy tiny patties or balls or kofta as one can call them which are served on rich creamy bed of tomato puree jazzed up with spicy masala gravy. This decadent cuisine is always the center of attraction in the menus of special occasions of marriages n celebrations. Control kofta curry was prepared using paneer. Experimental kofta curry was prepared using bovine colostrum cake and was compared to control



kofta curry for sensory characteristics. The scores of the palatability evaluation are shown in Table 8. There was no significant difference found between control and experimental kofta curry for appearance, colour, doneness, texture, flavour, taste & acceptability ($t=0.00, 0.00, 0.00, 1.09, 1.09, 0.00, 1.09$ & 1.09 , respectively, $p>0.05$). Mean scores obtained for experimental kofta curry were highest for all sensory attributes than control kofta curry. This popular dish prepared with the twist of bovine colostrum can mark its place in the top favorite dishes of foodies.

Paratha: Paratha is whole wheat flat bread that originated in the north of Indian subcontinent. It is the most liked breakfast recipe all over the country. It tastes delicious with fresh thick cream or a knob of unsalted home-made butter. Control paratha was prepared using paneer. Experimental paratha was prepared using bovine colostrum cake and was compared to control paratha. The scores of the palatability evaluation are

presented in Table 9. Experimental paratha was very well accepted for appearance, colour, doneness, texture, flavour, taste & acceptability. Insignificant differences were noted between control and experimental paratha for appearance, colour, doneness, texture, flavour, taste & acceptability ($t=1.09, 1.09, 1.30, 1.09, 1.09, 1.09, \& 0.00$, respectively, $p>0.05$, Table 9). The acceptability of control and experimental paratha was similar which means that the normal everyday vegetable paratha can be successfully replaced with bovine colostrum stuffed paratha.

Nutritive Values of Control & Experimental Recipes: Nutritive values per 100 g of control and experimental recipes are shown in Table 10. Nutritive values of control and experimental recipes were calculated ingredient wise. Basic difference in nutritive value of control and experimental recipes was due to the difference in nutritive value of paneer and bovine colostrum. Energy content of all experimental recipes



prepared using bovine colostrum was found to be lower than control recipes prepared using paneer. Savoury recipes-kofta curry & paratha were more energy dense than sweet recipes-porridge & halwa which was because of addition of oil, oil seeds & nuts, cream etc. Carbohydrate & fat content of all bovine colostrum recipes was found to be less than control recipes. In contrast to this, protein content of bovine colostrum recipes was higher than control recipes as bovine colostrum is a rich source of energy.

CONCLUSION

From the results of the present study, it is said that recipes prepared using bovine colostrum were well accepted for their sensory attributes. The savory recipes especially kofta curry and paratha were highly acceptable. Sweet recipes were also well accepted.

Being highly nutritious, bovine colostrum can be

incorporated in other recipes as well, and certain flavoring agents like cardamom, gulkand, saffron, fennel, ginger, garlic, and various essences can be used to enhance the flavour and aroma and to mask the typical flavour of bovine colostrum for better acceptability.

Since olden days till now, bovine colostrum has not been used by majority of the masses due to ignorance and lack of information about its benefits and the premium quality of nutrition it provides. Till date there is no practice of selling bovine colostrum by dairies or local milkmen, rather it is distributed free of cost. And due to its low shelf life and heat soluble immunoglobulins, there are no bovine colostrum drinks or products in Indian market. Bovine colostrum is a birth right of calf. But due to taboos & believes milkmen throw this nutritious nature's gift. Instead it can be utilized for making nutritious food products.

**Table 1: Composition of ingredients for porridge**

Sr. No.	Ingredients	Quantity in grams	
		Control	Experimental
1	Paneer	35	-
2	Colostrum	-	35
3	Buffalo's wholesome milk	400	400
4	Khoa	10	10
5	Ghee	5	5
6	Almond	5	5
7	Cashew nut	5	5
8	Cardamom powder	0.5	0.5
9	Saffron	5 strands	5 strands

Table 2: Composition of ingredients for halwa

Sr. No.	Ingredients	Quantity in grams	
		Control	Experimental
1	Paneer	35	-
2	Colostrum	-	35
3	Semolina	30	30
4	Sugar	15	15
5	Milk	350	350
6	Ghee	15	15
7	Almonds	5	5
8	Cashew nuts	5	5
9	Cardamom powder	0.5	0.5

Table 3: Composition of ingredients for kofta curry

Sr. No.	Ingredients	Quantity in grams	
		Control	Experimental
1	Paneer	35	-
2	Colostrum	-	35
3	Cashew nuts	30	30
4	Onion	40	40
5	Tomato	60	60
6	Potato	40	40
7	Cream	10	10
8	Ginger	2	2
9	Garlic	2	2
10	Sugar	5	5
11	Kasoori methi	3	3
12	Cumin seeds	1	1
13	Cumin seeds powder	1	1
14	Turmeric powder	0.5	0.5
15	Red chilli powder	1	1
16	Corn flour	10	10
17	Oil	35	35
18	Water	20	20

**Table 4: Composition of ingredients for paratha**

Sr. No.	Ingredients	Quantity in grams	
		Control	Experimental
1	Paneer	70	-
2	Colostrum	-	70
3	Whole wheat flour	60	60
4	Curd	20	20
5	Coriander leaves	5	5
6	Green chillies	5	5
7	Omum	2	2
8	Oil	10	10
9	Water	50	50

Table 5: Score card for control and experimental recipes

Trials	Appearance	Colour	Consistency	Mouthfeel	Texture	Doneness	Flavor	Taste	Acceptability
Trial I									
Trial II									
Trial III									

Table 6: Mean Palatability Scores for Control & Experimental Porridge

Sr. No.	Sensory Characteristics	Porridge		“t” Values
		Control	Experimental	
1	Appearance	10	9.88	1.00
2	Colour	10	10	0.00
3	Consistency	10	9.88	1.00
4	Mouthfeel	10	9.77	1.40
5	Flavor	10	9.88	1.00
6	Taste	10	9.88	1.00
7	Acceptability	10	9.88	1.00

“t” values show insignificant difference at both 5% & 1% levels ($p>0.05$).

Table 7: Mean Palatability Scores for Control & Experimental Halwa

Sr. No.	Sensory Characteristics	Halwa		“t” Values
		Control	Experimental	
1	Appearance	10	9.77	1.40
2	Colour	9.88	9.77	0.50
3	Texture	9.88	9.77	0.70
4	Mouthfeel	10	9.77	1.40
5	Flavor	10	9.88	1.09
6	Taste	10	9.66	1.70
7	Acceptability	10	9.55	1.70

“t” values show insignificant difference at both 5% & 1% levels ($p>0.05$).

**Table 8: Mean Palatability Scores for Control & Experimental Kofta Curry**

Sr. No.	Sensory Characteristics	Kofta Curry		“t” Values
		Control	Experimental	
1	Appearance	10	10	0.00
2	Colour	10	10	0.00
3	Doneness	10	10	0.00
4	Texture	9.88	10	1.09
5	Mouthfeel	9.88	10	1.09
6	Flavor	10	10	0.00
7	Taste	9.88	10	1.09
8	Acceptability	9.88	10	1.09

“t” values show insignificant difference at both 5% & 1% levels ($p>0.05$).

Table 9: Mean Palatability Scores for Control & Experimental Paratha

Sr. No.	Sensory Characteristics	Paratha		“t” Values
		Control	Experimental	
1	Appearance	10	9.88	1.09
2	Colour	10	9.88	1.09
3	Doneness	10	9.83	1.30
4	Texture	10	9.88	1.09
5	Mouthfeel	10	9.88	1.09
6	Flavor	9.88	10	1.09
7	Taste	10	10	0.00
8	Acceptability	10	9.88	1.09

“t” values show insignificant difference at both 5% & 1% levels ($p>0.05$).

Table 10: Nutritive Value of Control & Experimental Recipes (per 100 g)

Nutrients	Porridge		Halwa		Kofta Curry		Paratha	
	C	E	C	E	C	E	C	E
Energy (kcal)	171	160	168	155	248	244	241	236
Carbohydrates (g)	15.6	12.1	17.8	12.74	14.6	11.65	19.55	15.2
Proteins (g)	5.2	8.8	5.65	9.5	6.4	9.1	10.8	19.5
Fat (g)	9.6	8.5	8.24	7.3	18.2	17.98	13.26	10.8

C-Control & E-Experimental

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