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Processing and sensory evaluation of kharwas delicacy blend with sterile milk

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Abstract
The investigation were carried out for the preparation of Kharwas as per ancient dilution method it's found that the kharwas sample which contain colostrum, sterile milk ans sugar ratio were (73:15:12) obtain highest score in organoleptic evaluation. In the nutritional composition it is found that the selected sample in organoleptic evaluation contain ash 0.81%, Moisture 47.22%, Fat 9.69%, Total Protein 20.81%, pH 6.33, Acidity 0.46%, Lactose 4.22%, Total sugar 18.65% respectively.

Keywords: Kharwas, colostrum, gel, sensory evaluation

Introduction
India has rich tradition of dairy based sweets. In which kharwas is a indigenous delicacy. Which is made by using colostrum milk. In all over India it has different names in different regions like Kharwas, Khees, Ginnu, Junnu, Kalvandas etc. kharwas is a Maharashtrian name. It can be prepare by simply diluting colostrum with appropriate proportion of milk or water, then add sweetener like cane sugar or Jaggery and flavoring like cardamom or saffron in to it. Then by steam cooking solid mass of cake is obtain called kharwas.

Colostrum is the first secretion of the mammary gland after childbirth in mammalian animals, and its composition significantly varies from mature milk and it changes from the first days. Milk which is produce after calving is also called as beating and green milk but mostly it's called as colostrum. Bovine colostrum is lactation secretion which consist immunoglobulins, blood serum and other serum proteins in mammary gland they accumulated during prepartum period and after parturition it can be harvested.

The composition of colostrum milk is always varies during lactation period depend on the metabolic need of young one from birth to weaning (Christiansen *et al.*, 2010) [4]. Colostrum composition mainly depends upon individuality, age of the animal, time of calving, disease, breed diet, no of lactation cycle and length of dry period of animal (Widdowson, 1984) [11].

Colostrum always differ from normal milk in the condition like color taste and smell. Only for two days pungent taste and slimy appearance of colostrum seen. When milk changes from colostrum to normal milk it's viscosity decrease and this change occur within 1st three milking. Specific gravity, SNF, total protein and the albumin-globulin fraction also changes. Due to the presence of serum protein in colostrum it gives like appearance on heating of colostrum, and it require low temperature than normal milk for coagulation (Kadian, 2000) [3]. Cow colostrum require low coagulation temperature than buffalo colostrum (Anantaramiah and Iya, 1952) [20].

Colostrum has basic property, i.e. the ability to form gel on heating, is not known very much. In Western India this gelling property has been traditionally used, especially in Maharashtra state, to prepared popular sweet product kharwas. In traditionally preparation, colostrum form first to fourth milking used. The gel obtain with first milking is very hard and therefore it is common practice to dilute the colostrum appropriate proportion with milk or water to obtain gel of suitable consistency. Usually cane sugar or jaggery is added to appropriately diluted colostrum to impart the desired sweetness and flavoring agents such as saffron or cardamom are used. In a boiling water bath his mixture is kept. Within 15 min gelation occur to yield kharwas (Pushpa R. Kulkarni and Naina V. Pimpale 1988) [7].

The method of kharwas preparation different in different part of India. In the North-Eastern part of India, first day colostrum is mixed with normal milk in equal amount, sugar, saffron, cardamom powder also added and cooked in pressure cooker (direct heat should not be applied). (Rajamanickam K *et al.*, 2016) [9].

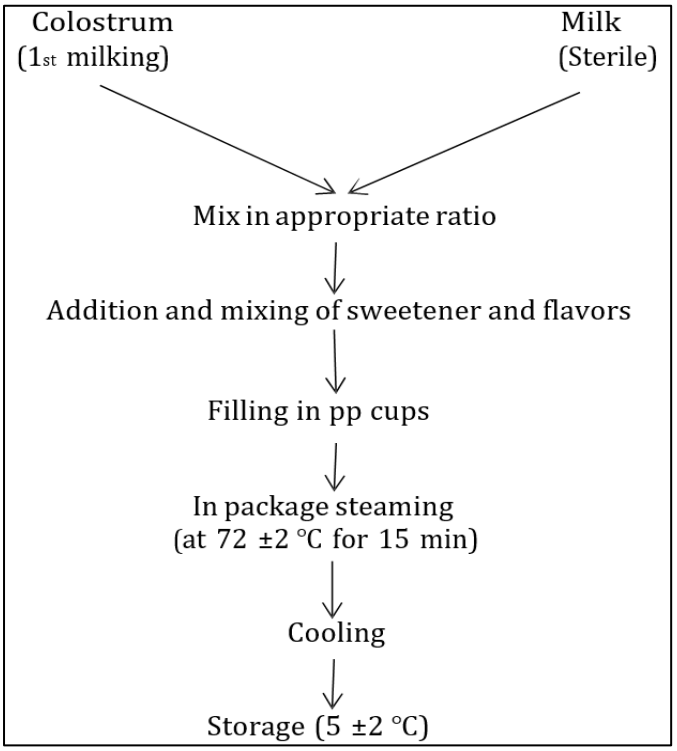
Materials and Methods

Material collection

Colostrum were harvested from1st milk of murrha breed of buffalo from the department of animal husbandry and dairy science. Then sample were stored at -5 ℃. The milk were collected from same breed of buffalo then it clarified and sterilize at college of food technology. Cardamom were procured from local market of Parbhani.

Method of kharwas manufacturing

The milk were collected, filtered then it sterilize at 135 ℃ for 15 min. Colostrum were clarified and according to ratio sterile milk and colostrum were mix then sweetener (cane sugar) 12% and flavouring agent were added in to mixture. Mixture were filled into the polypropylene cups and then in packaged steaming has been done at 72±2 ℃ for 15 min. Then stored at 5±1 ℃ for 15 hr.



Flow sheet 1: Manufacturing of kharwas

Formulations

Table 1: Standardization of recipe for kharwas preparation

Ingredients	T0	T1	T2	T3	T4
Colostrum	88	83	78	73	68
Sterile Milk	-	5	10	15	20
Sugar	12	12	12	12	12

T0= 88% colostrum
T1= 83% colostrum + 5% sterile milk+12% sugar
T2= 78% colostrum + 10 sterile milk +12% sugar
T3= 73% colostrum + 15 sterile milk+12% sugar
T4= 68% colostrum + 20 sterile milk+12% sugar (minor quantity of flavour were added so it not mentioned)

Method of sensory evaluation

The 9 point hedonic rating test is used for the sensory analysis of the sample. For that the group of five trained panel members were appointed.

Methods of nutritional evaluation

Standard analytical procedures were used to evaluation of proximate composition of the Kharwas AOAC official method used for moisture analysis , fat were determine by using Gerber method, total protein determine by using Kjeldhal method for milk as described in AOAC Official Method 991.20 (2012), lactose and total sugar evaluated by using Lane-Eynon method for milk as described in ISI: SP: 18 (Part XI) - (1981), pH were determine by using digital ph meter (Servewell Instruments, Bangalore), Ash content determine by using Gravimetric method for milk as described in ISI: SP: 18 (Part XI) - (1981), Acidity evaluated by using Titrimetric method for condensed milk as described in ISI: SP: 18 (1981).

Result and Discussion

Sensory evaluation

The kharwas were prepared from different mixer of colostrum and sterile milk and subjected to the organoleptic evaluation the score were recorded for different parameter were given in Table no. 2.

Table 2: Sensory evaluation chart of kharwas Sensory evaluation do using 9 points hedonic scale by 5 trained panel members.

Sample	Organoleptic attributes					
	Color	Taste	Texture	Flavour	Mouthfeel	Overall acceptability
T0	8	8	6.8	8	7.1	7.62
T1	8	7.8	7.3	7.5	7.3	7.58
T2	7.3	8	7.5	7.5	7.8	7.62
T3	8	8.8	8.5	8	8.1	8.28
T4	6.8	7.3	8.3	7.6	8	7.6

Color

The mean of color for the kharwas were varied from 6.8 to 8. For treatment (T3) score recorded is 8. For other 2 treatment same score were recorded.

Taste

For treatment T0, T1, T2, T3 and T4 score of taste recorded were 8, 7.8, 8, 8.8 and 7.7. The kharwas sample which is treated with 73% colostrum + 15 sterile milk+12% sugar were scored higher for taste sensory analysis.

Texture

The score for texture recorded from 6.8 to 8.5. T1 recorded very less score of texture because it made up of whole colostrum and which were high in protein content and give hard texture to kharwas. Due to the dilution hardness were get decreased due to decreased In protein content and the acceptable texture were obtain for sample T3. ad it scored higher than other sample and it were 8.5.

Flavour

Score for flavour were varied from 7.5 to 8 for different treatment samples. The highest score for the flavored was given to the sample T3**.**

Mouthfeel

The score for mouthfeel given for sample T0, T1, T2, T3 and T4 were 7.1, 7.3, 7.8, 8.1 and 8. The highest score were seen in sample T3 and it was 8.1. It because due to dilution hardness of sample decreased and proper consistency of sample were attained. It gives somewhat softness in mouth

that's why sample T3 recorded higher score than other. If dilution was increased it responsible for more softness and proper texture of product is also not formed. So up to 15% dilution more acceptable product were obtain.

Overall acceptability

The mean score of sample T0, T1, T2, T3 and T4 were 7.6, 7.5, 7.6, 8.2 and 7.6. The panel members gives higher rating to the sample T3 so it's mean of overall acceptability also recorded higher. So the use of 73% colostrum, 15 sterile milk, 12% sugar was more acceptable than the other treatment samples.

Nutritional Evaluation

From sensory evaluation the highest rated sample and control were evaluated for the nutritional status.

The data obtained from the table 4 revealed that the Kharws comes under the category of semi perishable food commodity as moisture content in control and T3 sample was 44.42±0.29 and 47.22±0.29 respectively. Moisture content of T3 sample get increased because addition of sterile milk. The Ash content of T3 sample get decreased from 1.68±0.16 to 0.81±0.12 because colostrum content get decreased In that sample. Fat content get deplectecd from 11.13±0.31 to 9.69±0.455 due to reduction in colostrum content in sample T3. Total protein content also reduced from 22.01±0.44 to 20.81±0.52 (Goel, 2015) [8] studied that on addition of pasteurized in the colostrum for the preparation of kharwas protein content of sample get deducted. pH content get increase in the sample because milk is amphoteric in nature having ph 6.7. So sample pH changed from 6.27 to 6.33. Acidity decrease from 0.40 to 0.46%. Lactose content in the T3 sample get increased because sterile milk has high lactose content than that of colostrum.

After addition of sterile milk the values of fat, protein, acidity and ash get decreased and values of moisture, total carbohydrates pH and lactose get increased.

Table 4: Proximate composition of prepared kharwas

Parameters	*Values	
	T0	T3
Ash (%)	1. 23±0.16	0.81±0.12
Moisture (%)	44.42±0.29	47.22±0.29
Fat (%)	11.13±0.31	9.69±0.45
Total protein (%)	22.01±0.44	20.81±0.52
PH	6.27±0.04	6.33±0.02
Acidity	0.4±0.10	0.46±0.15
Lactose	2.99±0.15	4.22±0.03
Total sugar	16.13±1.67	18.65±0.14

*Each value is average of three determinations

Conclusion

Addition of sterile milk gives the better keeping qualities and it also gives better texture and sweetness to the product. The amount of colostrum, sterile milk and sugar used in kharwas sample was 73%, 15% and 12% respectively. And it was highly rated by the panel member in organoleptic evaluation. It gives good nutritional qualities. Also found that kharwas which prepared by using colostrum and sterile milk blend the values of fat, protein, acidity and ash get decreased and values of moisture, total carbohydrates pH and lactose get increased.

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