

Development of Milk Nuggets Prepared With Milk Coagulum & Finger Millet Flour

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Abstract—At present time, there is no other snack milk product in the market. Milk is a complete food rich in various nutrients such as protein, fat, calcium, phosphorus. So in this way regular consumption and acceptability of milk in day to day life can be achieved. Women in menopause should also increase their calcium intake due to reduce the risk of osteoporosis and calcium deficiency disease. Milk nugget especially prepare for the vegetarian people. Some people do not like drink milk. They can consume milk nuggets. The Objective of the study was to develop & standardise the coagulum based milk nuggets. Preliminary trials were done for preparing milk nuggets with incorporation of ragi flour and spices. Sensory evaluation was done in the study shows that good acceptability of milk nuggets. So, research study is proposed to be undertaken to make use of milk by women. The study will intend on the use of milk on regular basis by incorporating it in milk nuggets which is a ready to eat product which can be consumed in day-to-day basis.

Keyword (Milk nuggets, coagulum, finger millets).

1. INTRODUCTION

Milk is a complex mixture of lipids, carbohydrates, proteins, and many other organic compounds and inorganic salts dissolved or dispersed in water. The most variable component of milk is fat followed by protein. The composition of milk varies with the species, breed, diet, lactation period and interval between milking. There is individual variation also. (1) Coagulum refers to the milk solids obtained by the acid coagulation of hot whole milk and subsequent drainage of whey. The acids commonly used are lactic or citric acid in both natural and chemical forms. It can be prepared from cow or buffalo milk or a combination of there. (8) Nugget may refer to a piece of gold produced through mining and extraction. Nuggets' are small cube shaped convenience product.(7) Nuggets prepared from meat are commonly available and has very good consumer acceptability. Various research studies have been conducted on meat nuggets from chicken (2) mutton (5). Finger millet is usually pulverized and wholemeal is utilized for the preparation of traditional foods. In addition to traditional foods, it is also processed to prepare popped, malted, and fermented products. Noodles for diabetic patients were successfully developed from finger millet by

(9).Ragi or finger millet (*Eleusinecoracana* L.) is one of the common millets in several regions of India. Nutritive value of ragi is better than the wheat & rice it is rich in minerals especially calcium, phosphorus and iron. It is also rich in fiber. Traditionally in India, finger millet was processed by methods such as grinding, malting, and fermentation for products like beverages, porridges, idli (Indian fermented steamed cake), dosa (Indian fermented pan cake), and roti (unleavened flat bread) (6).The present study was conducted with an aim to developed milk nuggets with milk coagulum & finger millets flour. It was found that working women seen to be deficient in calcium, women who is wife & mother it is difficult to take care of her own health she neglect herself in taking care of others in her family some women don't like to drink milk so she can consume milk nuggets it is ready to eat snack .The specified Objectives of the study were to develop the coagulum based milk nuggets, to standardise the coagulum based milk nugget, to sensory evaluate the coagulum based milk nuggets, to check the acceptability of milk nugget among females.

2. METHODS & MATERIALS

The analysis was carried out at food & nutrition lab in home science department faculty of arts dayalbagh educational institute Agra.

Formulation of Milk Nuggets

The development of milk nuggets were categorized as: (1) Control milk nuggets which was prepare by using refined flour coagulum & spice mix. (2) Experimental milk nuggets were prepared incorporating milk coagulum and finger millet flour in the Experiment in which milk coagulum used as the main ingredient.

Standardization of milk nuggets – A standardized recipe specifically describes the exact, measurable amount of ingredients & the method of preparation needed to consistently produce a high-quality product. The exact

procedures, the type of equipment, and the quantity of ingredients are listed in the results of study.

Steps of preparing milk nuggets

Preparation of milk for coagulum

Amul Toned Milk was taken & heating of milk was done till boiling.

When milk was at normal temperature (90 degree⁰) then 5 ml. citric acid was added.

Preparation of milk coagulum

Fresh milk coagulum was taken. The coagulum was allowed to settle at least 30 minute so that whey can be separated by using muslin cloth.

Preparation of batter mix

The coagulum & salt was mixed for 5 minutes in mixer. Finger millet flour refined flour & spices were added in coagulum mix. Then mixing flour for 5 minutes.

Preparation of molding and shaping

Prepared mixture was taken in a bowl.

Then dough was prepared from mixture.

And then square shape was given through aluminium or steel molds.

Preparation of cooking

Steaming Method

Milk nuggets were cooked for 30 minutes through steaming.

Baking

Milk nuggets were baked for 5 minutes on 90 degree temperature.

Microwave for 5minute in convection mode at 180 degree.

Serving

Milk nuggets were served hot.

Sensory evaluation

Sensory evaluation has been defined as a scientific discipline used to evoke, measure, analyze and interpret those responses to products as perceived through the senses of sight, smell, touch, taste and hearing (4). The most widely used scale 9 point hedonic scale was used for the study. Total 50 members including teachers & students were selected for evaluation of Milk nuggets Sensory evaluation was done with the corporation of staff & students in home science department faculty of arts Dayalbagh educational institute Agra. The evaluation was based on appearance flavour, texture, crispiness, after taste & overall acceptability to determine the acceptability of milk nuggets.

Statistical Analysis

For the satisfactory result the selection of proper statistical techniques is required which make the evaluation and finding more powerful. Data were analysed by using mean standard deviation & student t test.

3. RESULTS & DISCUSSIONS

Milk nuggets recipe

No of serving (2) pc

Serving size (25) g

Table no 1. Ingredients of milk nuggets sample 1 (refined flour based milk nuggets)

Ingredients	Amount (g)
Milk coagulum	30g.
Refined flour	10g.
Salt	3 g.
Red chill	3 g
Cumin seeds powder	4 g

Procedure

Mix the coagulum & salt for 2.3 minute in mixer grinder.

Include refined flour & spices in coagulum mix.

Mixing of milk nuggets for 5 minute.

Give them shape like square cube.

Cooking of milk nuggets by steaming.

Then bake them in medium temperature for 15 minute.



Table 2. Recipe of Milk Nuggets (Sample 2) (Finger millets based milk nuggets)

Ingredients	Amount (g)
Milk coagulum	50g.
Refined flour	30g.
Finger millets	20g
Salt	3 g.
Red chill	3 g
Cumin seeds powder	4 g

Ingredients of (sample 2) finger millet based milk nugget

Procedure

Mix the coagulum & salt for 2.3 minute in mixer grinder.

Include refined flour & finger millets flour spices in coagulum mix.

Mixing of milk nuggets for 5 minute.

Give them shape like square cube.

Cooking of milk nuggets by steaming.

Then bake them in medium temperature for 15 minute.

Table no 3. Sensory evaluation using 9. Hedonic scale

Characteristic	Sample 1 (n=50)		Sample 2 (n=50)		*t-value
	Mean	SD	Mean	SD	
Appearance/color	16.3	2.4	16.0	2.0	0.51
Flavour	15.3	2.7	14.4	2.5	1.83
Texture	15.4	2.5	15.4	2.0	0.02
Crispiness	14.4	2.0	14.2	1.9	0.44
After taste	15.0	1.9	14.4	2.2	1.53
Overall acceptability	76.0	11.7	74.7	10.8	0.80

Mean±SD values of both samples.

Appearance/colour - The mean Appearance of milk nuggets (sample 1) was 16.31 ± 2.4 and the mean appearance of milk nuggets (sample 2) was 16.0 ± 2.0 . There was no significant difference between the appearances of sample 1 and sample 2 of milk nuggets.

Flavour - The mean flavour of milk nuggets (sample 1) was 15.3 ± 2.7 and the milk nuggets (sample 2) mean flavour was 14.4 ± 2.5 . There was no significant difference between the flavour of sample 1 and sample 2 of milk nuggets.

Texture - The mean texture of milk nuggets (sample 1) obtained mean score of 15.4 ± 2.5 and the milk nuggets (sample 2) obtained a mean score 15.4 ± 2.0 . There was no significant difference between the texture of sample 1 and sample 2 of milk nuggets.

Crispiness - The mean crispiness of milk nuggets (sample 1) obtained mean score of 14.4 ± 2.0 and the milk nuggets (sample 2) obtained a mean score 14.2 ± 1.9 . There was no significant difference obtained between the crispiness of sample 1 & sample 2 of milk nuggets.

Taste - The milk nuggets of (sample 1) obtained mean score of 15.0 ± 1.9 and the milk nuggets (sample 2) obtained a mean score 14.4 ± 2.2 . There was no significant difference obtained between the taste of sample 1 and sample 2 of milk nuggets.

In terms of **overall acceptability** milk nuggets (sample 1) obtain a mean score of 76.0 ± 11.7 and milk nuggets (sample 2) obtain a mean score of 74.7 ± 10.8 . There was no significant difference between their overall acceptability.

There was no significant difference obtained in the various characteristics like Texture, Taste, Appearance, Flavour, colour of milk nuggets. Sample 1 was liked 98% & sample 2 was liked 92%.

4. CONCLUSION

The objective of the present study was to develop milk nuggets incorporating milk coagulum and finger millet flour and find out their acceptability amongst females. The developed milk nuggets were accepted by students and teachers of dayalbagh educational institute Agra). There was no significant difference obtained between various characteristics Texture, Taste, Appearance/color, Flavor, and Crispiness of experimental milk nuggets. Milk nuggets (sample 1) were 98% liked by the judges. Milk nuggets (sample 2) were 92% liked by the judges. Similarly by mean of Hedonic Score Technique, it was concluded that the experimental milk nuggets were show great acceptability among females. So in this way milk can be made to consume by females and can be of benefit to them. And it can also be used as regular ready to eat snack & it can be eaten regularly. Further in study some others flours can also be incorporated with coagulum & finger millet flour.

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