

Organoleptic and sensory evaluation of recipes from indigenous foods rich in calcium

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ABSTRACT

Calcium is one of the most essential minerals in the body, available through diet. Dairy products are the richest source of calcium but not liked by everyone. Therefore, there is need to explore more calcium rich indigenous foods and their use in diet. The present study was undertaken with the objective of formulation of recipes rich in calcium. Three recipes of calcium rich Ladoos namely Khus khus coconut laddoo, Til laddoo and Paushtik laddoos were formulated. Sensory evaluation of these recipes was also done. Among the formulated recipes khus khus coconut laddoos were having highest calcium content. The overall acceptability of khus khus coconut laddoos was highest (8.5 ± 0.527) followed by til (7.8 ± 0.632) and paushtik laddoos (7.7 ± 0.483). These recipes ascertain better availability of essential mineral like calcium from sources besides dairy products and help to meet the RDA.

KEY WORDS : Indigenous food, Calcium, Sensory evaluation

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Calcium is one of the most essential minerals in the body, available through diet as human body cannot produce it. Loss of calcium from the body occurs daily through urine, faeces as well as insensible losses (Bhatia 2008). Insensible loss includes losses from skin, nails and hairs, which account about 40-80 mg calcium loss per day (Charles *et al.*, 1983). In adults, the minimum urinary loss is up to 140mg/day (Bhatia, 2008). These losses are unavoidable therefore, a constant supply of calcium through diet is necessary.

Inadequate intake of dietary calcium from food or supplements even for short term results in hypocalcaemia. Symptoms of hypocalcaemia include numbness and tingling in the fingers, muscle cramps, convulsions, lethargy, and poor appetite and abnormal heart rhythm (Weaver and Heaney, 2006). Insufficiency of calcium over a long period can lead to porous and fragile bones as well as tooth decay.

When dietary calcium is inadequate, calcium is drawn from the bones, which serve as a reservoir for calcium. The importance of adequate dietary calcium becomes obvious to prevent this constant withdrawal from the skeleton, which leads to osteoporosis (Halevy *et al.*, 1957).

Dairy products are among the most desirable foods to meet daily calcium requirements (The American Dietetic Association, 1996). But there are individuals who cannot afford and others are intolerable to dairy products. Due to this, they suffer from insufficiency of calcium.

Also, there are people who dislike dairy products.

Keeping this in mind, the present study was undertaken with the objective to develop commonly consumed food preparations by incorporating calcium rich sources.

RESEARCH METHODS

Material:

Khus- khus, dessicated coconut powder, sugar, gingelly seeds, jaggery, chickpea and raisins were used to prepare these recipes.

Processing of samples:

All the ingredients of the recipes were procured from the local market of district Kurukshetra. The ingredients were sorted out first and then only edible portions were selected to prepare the recipes.

Development of recipes:

The recipes were evolved using the locally and commonly consumed foods. The method adopted was similar to the one used by local north Indian families. Recipes were formulated from the calcium rich ingredients in such a way that one serving of the recipe provides approximately 500mg of calcium after consumption. The ingredients, method of preparation, weight of the recipes are indicated in Table a.

| Recipe | Weight (g) | Weight (%) | No. of servings |
|-----------|------------|------------|-----------------|
| Khus khus | 30 | 60 | |
| Coconut | 10 | | |
| Sugar | 30 | | |
| Til | 25 | 71 | |
| Paushtik | 25 | | |
| Jaggery | 25 | | |
| Khus khus | 2 | | |
| Til | 15 | 90 | |
| Khus khus | 15 | | |
| Paushtik | 10 | | |
| Coconut | 10 | | |
| Jaggery | 10 | | |
| Jaggery | 30 | | |

Calcium content:

Total calcium content of the recipes was calculated from the values per 100g of edible portions by using nutritive value of Indian foods. The calculated values of ladoos prepared are depicted in Table 2.

Sensory evaluation:

The recipes were evaluated thrice by the panel of 10 judges selected at random among the faculty and students of Foods and Nutrition Department, Kurukshetra University, Kurukshetra. The recipes were evaluated for colour, appearance, aroma, texture, taste and overall acceptability. The judges were instructed to sip water before and after testing each product. Quality characteristics of each sample was recorded on nine point Hedonic Rating Scale ranging between 1-9. The scale represented extremely liked, liked very much, liked moderately, liked slightly, neither liked nor disliked, disliked slightly, disliked moderately, disliked very much, disliked extremely. Results are shown in Table 3.

Statistical analysis:

The data obtained were analyzed statistically. Mean and standard deviation were calculated for each studied variable.

RESEARCH FINDINGS AND DISCUSSION

Table 1 reveals the calcium content of different ladoos. Among these ladoos the maximum calcium content was depicted in Khus khus coconut ladoo *i.e.* 518.8 mg/100g. The calcium content of til and paushtik ladoo was found out to be 514.18 and 517.6 mg/100g, respectively. Keeping in view the RDA of calcium for different age groups, it was observed that one serving of each recipe will provide 50-100 per cent of the recommended calcium. Moreover, the persons who dislike dairy products would conveniently get the recommended amount.

The data of Table 2 revealed the results of sensory evaluation of different recipes of ladoos developed. The products developed were organoleptically acceptable. The scores of appearance, colour, texture, taste and aroma of all the recipes were quite good according to the panel of judges. The overall acceptability of Khus khus coconut ladoos was maximum *i.e.* 8.5±0.527. Til and paushtik ladoos were having overall acceptability 7.8±0.632 and 7.7±0.483, respectively. The appearance and taste grading of Khus khus coconut ladoo surpassed the colour, texture and aroma values. In sensory evaluation of til ladoos aroma and taste grades were higher than appearance, colour and texture. However, paushtik ladoos got the highest grading in taste as compared to other

Table 1: Calcium content of the recipes

| Name of the recipe | Ingredients | Amount (g) | Calcium content (mg) |
|--------------------------|--------------------|------------|----------------------|
| Khus khus coconut laddoo | Khus Khus | 30 | 475.2 |
| | Dessicated coconut | 10 | 40 |
| | Sugar | 30 | 3.6 |
| | Total | 60 | 518.8 |
| Til laddoo | Til | 25 | 362.5 |
| | Dessicated coconut | 25 | 100 |
| | Jaggery | 25 | 20 |
| | Khus khus | 2 | 31.68 |
| | Total | 77 | 514.18 |
| Paushtik laddoo | Til | 15 | 217.5 |
| | Khus khus | 15 | 237.5 |
| | Dessicated coconut | 10 | 40 |
| | Bengol gram | 10 | 5.8 |
| | Raisin | 10 | 8.7 |
| | Jaggery | 30 | 8 |
| | Total | 90 | 517.6 |

Table 2: Scores of sensory evaluation of different calcium rich food preparations

| Food preparation | Appearance | Color | Texture | Taste | Aroma | Overall acceptability |
|--------------------------|------------|-----------|-----------|-----------|-----------|-----------------------|
| Khus khus coconut laddoo | 8.3±0.675 | 7.8±0.789 | 7.9±0.738 | 8.6±0.516 | 7.5±0.527 | 8.5 ±0.527 |
| Til laddoo | 7.7±0.675 | 7.4±0.516 | 7.4±0.516 | 7.9±0.568 | 8±0.667 | 7.8±0.632 |
| Paushtik laddoo | 7.6±0.700 | 7.6±0.516 | 7.5±0.527 | 7.7±0.483 | 7.6±0.516 | 7.7±0.483 |

features. The overall taste and appearance grading of khus khus coconut laddoo was found to be of the highest value while comparing all three laddoos.

Conclusion:

It may be concluded from the present study that for better availability of important mineral like calcium these recipes were instrumental. The recipes formulated not only edged over dairy products but also helped a person to get RDA of calcium in one instance. Further if these recipes are consumed daily, will better handle the calcium deficiency in different physiological states.

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