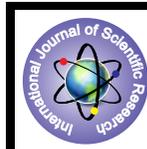


Evaluation of a Traditional South Indian Snack Prepared Using Millets and Garden Cress Seeds



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ABSTRACT

The main aim of the study was to formulate a millet-pulse based murukku with the inclusion of garden cress seeds. Millets are rich in fiber and protein and garden cress seeds are an excellent source of iron. Murukku using millets (Ragi, Jowar and Thenai) pulses (Black Gram Dhal, Red Gram Dhal, Soybean and Lentil) and 3 different proportions of garden cress seeds namely 5%, 10% and 15% were prepared. The nutritive, microbial, biochemical qualities were assessed on the 0th day and 14th day of storage. Sensory evaluation by a panel of 30 members was also done. Results showed that the samples had a high iron and calcium content besides protein. The samples showed the absence of E. Coli and fungal growth on the 0th and 14th day. Sensory evaluation of the murukku revealed that samples with 5% garden cress seeds tasted best when compared to other percentages of garden cress seeds. Hence this nutritious murukku is a better choice when compared to the normal murukku made using plain rice flour and other junk foods.

Introduction

Presently India is witnessing an astounding increase in the consumption of processed and junk food due to the influence of western culture on our society. This is predisposing our population to health problems like hypertension, obesity, micronutrient deficiencies, diabetes, atherosclerosis, gastrointestinal disorders and cancer at a relatively young age. Therefore the need of the hour is to revive the consumption of our traditional South Indian snacks that are healthier and more balanced in their nutrient content and above all free from artificial food additives.

Snacks are one of the most preferred delicacies in India. People all over the country enjoy a great culinary experience with various types of snacks. With the increase in the consumer base and the change in the food habits, especially in the urban areas, foreign companies and food chains are entering the Indian market with their food and snacks products.

Snack foods, however, can be very nutritious when made from fruits, pulses, or cereals. It should also be pointed out that the consumption of snack foods does not necessarily lead to health problems such as obesity, but the cause is rather the consumption of a snack that has excess fat, sugar and salt (Harris, J.L., Bargh, J.A., and Brownell, K.D., 2009).

Methodology

This study was undertaken to formulate a muruku recipe incorporating millets (ragi, jowar, Italian millet) pulses (soybean, black gram dhal, red gram dhal, lentils) and garden cress seeds which is an excellent source of iron ((Gopalan.C and Simopaulous, 2003), in order to improve the protein, calcium and iron content of murukku. The nutritional, microbial, and biochemical quality of the samples were analyzed. Sensory evaluation for the acceptability of murukku was also done. Garden cress seeds are excellent source of protein, iron and B vitamins. These seeds are best source of iron and hence recommended in the treatment of iron deficiency anaemia (Gopalan.C and Simopaulous, 2003).

Objectives of this study

1. Formulation, standardization and preparation of murukku incorporating millets, pulses and garden cress seeds in three different percentages namely 5%, 10% and 15%,
2. Analyzing the nutrient content (carbohydrate, protein, fat, ash, moisture, fibre, calcium and iron) of the murukku,
3. Assessing the microbial quality of murukku (total bacterial count, fungal and E. Coli) on the 0th and 14th day.
4. Assessing the biochemical quality of murukku (peroxide val-

ue and free fatty acid content) on the 0th and 14th day.

5. Evaluating the overall acceptability of the product.

Research design: The present study is a pre test, post test study design with control group.

Sampling design: Purposive sampling was adopted in the present study.

Sensory evaluation:

Sensory evaluation was conducted for the product by a panel of 30 members using a 9 point hedonic scale (Babbie, E., and Mouton, J., 2001).

Results

The present study was undertaken to compare 3 different percentages of garden cress seeds incorporated in a millet-pulse based murukku.

Table 1
Composition of the millet, pulse garden cress seed murukku

Ingredients	Amount in grams			
	Control	5%	10%	15%
Ragi	25	25	25	25
Jowar	25	25	25	25
Thenai	5	5	5	5
Soya bean	5	5	5	5
Black gram	25	25	25	25
Red gram	25	25	25	25
Lentil	25	25	25	25
Green cress	-	8	17	28
Butter	5	5	5	5
Oil	15	15	15	15

Nutrient composition of murukku incorporating 3 percentages of garden cress seeds.

The carbohydrate, protein, fat, ash, moisture, calcium, iron and fiber content of the control as well as the samples with 5%, 10% and 15% of garden cress seeds is presented in table 2. Results of the nutrient analysis showed that calcium content of murukku ranged between 520mg to 720 mg (Table 1). Iron content was higher in samples containing garden cress seeds compared to the control which did not have garden cress seeds.

Table 2
Nutrient composition of Murukku

Nutrients	Control	5%	10%	15%
CHO (per 100g)	62.72	65.01	63.25	65.13
Fat (per 100g)	19.09	17.29	17.68	17.44
Protein (per 100g)	7.25	8.00	9.63	7.50
Ash (per 100g)	4.62	3.61	3.40	3.87
Moisture (%)	4.69	4.25	4.64	4.37
Ca (mg)	620	520	580	720
Fe ppm	0.56	1.07	1.027	1.34
Fibre (per 100 g)	1.63	1.84	1.84	1.40

Microbial quality of murukku on the 0th and 14th day.

The samples showed the absence of E.coli and fungal growth on the 0th and 14th day of storage. The total bacterial count (TBC) ranged between 40 to 76 CFU/g which is well within the accepted range of 30 to 300 colonies /gram for food products. This showed that the product can be stored safely in either pet jars or polythene bags at room temperature for a period of 14 days without a substantial increase in the bacterial load. Women entrepreneurs who desire to take up the manufacture and sales of this product can thus safely package this product in polythene bags. At home, this product can be stored in pet jars.

Biochemical quality (Peroxide Value and Free Fatty Acid content) of murukku on the 0th and 14th day.

The Peroxide value of an oil or fat is used as a measurement of the extent to which rancidity reactions have occurred during storage. The free fatty acid (FFA) test is a simple acid base titration that will measure any acid present in the food and is extracted with the organic solvent. This will include acids that may have been added to the food or produced during storage by fermentation or microbiological spoilage, therefore the FFA of a food needs to be known.

Table 3
Peroxide Value and Free fatty acid content of murukku samples

Parameters	Control		0 th day			14 th day		
	0th	14th	5 %	10%	15%	5%	10%	15%
PV milli/ equi/1000gm	3.72	3.72	3.33	3.9	3.54	3.72	3.5	3.96
FFA as % of Oleic acid	0.32	0.38	0.44	0.36	0.27	0.28	0.32	0.22

The PV and FFA of samples showed a very marginal difference when comparing the 0th and 14th day of storage (Table 3). However they were well within the limits prescribed by CODEX Alimentarius standards (Codex committee standard, 2012).

Sensory evaluation of samples

A panel of 30 members evaluated the muruku based on appearance, colour, texture, taste and overall acceptability using a score card with a 9 point Hedonic rating scale. A 9 point hedonic rating score card (Likes Extremely, Likes Very Much, Likes Moderately, Likes Slightly, Neither Likes Nor Dislikes, Dislikes Slightly, Dislikes Moderately, Dislikes Very Much, Dislikes Extremely) was used to elicit information regarding the degree of liking. The samples prepared incorporating 5% garden cress seeds were ranked first in the order of preference by the panelists. It was also observed that the samples containing 10% and 15% garden cress seeds were ranked II and III in the order of preference. The Panelists expressed that the samples containing 5% garden cress seeds did not exhibit much bitterness. It was found that cost of preparing 150gms of murukku is around Rs.25/- which is very reasonable when compared to the nutrients that it provides.

Conclusion

From the findings of the study, it was therefore concluded that murukku prepared using ragi, jowar, thenai, soyabean, red gram dhal, black gram dhal and garden cress seeds(5%) can be strongly recommended as a nutritious snack rich in protein, iron, calcium and fibre for children, adolescents and adults.

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