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To develop ladoos from the different ratios of Ragi and khus flour

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Abstract

Khus has anti-inflammatory and antiseptic effects known very well. So a product developed from khus can be beneficial to many people. Ragi flour is also known to have many nutritional properties which could be easily eaten in form of ladoos. The sensory evaluation was carried out by twenty panel of experts from the field of Nutrition. The sensory parameters were color, texture, taste and overall acceptability. The present study was done to develop ladoos from variations of 60:40, 70:30, 80:20, 50:50 ratios and Sample D was rated best by the expert panelists in terms of Taste, Color, Texture and Overall acceptability.

Keywords: develop ladoos, Ragi, khus flour, nutritional properties

1. Introduction

Chrysopogon zizanioids, commonly known as vetiver is a perennial bunchgrass of the Poaceae Family, native to India. In Northern India it is popularly known as Khus. Vetiver has favourable qualities for animal feed. From its roots oil is extracted and is used for cosmetics, herbal skincare, ayurvedic soap. Oil obtained from Khus is known to be safe, non-toxic, non-irritant. The oil obtained from khus has sedative effect and helps in the treatment of emotional outbursts, such as anger, anxiety, epileptic and hysteric attacks, restlessness, nervousness, etc. It is beneficial for individuals suffering from rheumatism, arthritis, gout, muscular aches, dryness and cracking of skin etc. It has anti-inflammatory and antiseptic effects that provide relief from inflammations in circulatory system and nervous system. The oil is used for the treatment of colic. Vetiver can grow upto 150cm high and form array as wide. The stems are tall and leaves are long, thin and rigid. The flowers are brownish-purple in color. Vetiver's roots grow downward, 2-4 metres in depth. The vetiver bunch grass has a gregarious habit and grows in tufts. Vetiver is used for the treatment of muscular pain and joint pain. It is also used for a gastrointestinal disorder. It reduces blood sugar in case of diabetics. It cures insomnia and gives good sleep. It reduces tiredness, adds strength and vigor to the body. It is also helpful for the treatment of paralysis.

Eleusine coracana is an annual plant widely grown as a cereal in the arid areas of Africa and Asia. It is commonly known as finger millet, African finger millet, caracan millet. It is very adaptable to higher elevations and is grown in the Himalaya upto 2,300metres in elevation. Millet is very important crop for following reasons such as it is a drought-resistant crop, is resistant to pest and diseases. Finger millet is especially valuable as it contains the amino acid methionine, which is lacking in the diets of hundreds of millions of poor who live on starchy staples. It is a good combination of all the required amino acids. This helps in tissue repair, improves the metabolic rate of the body, relieves migrains, aids optimal muscle coordination and helps in reducing bad cholesterol. Millets are rich in proteins, calcium, dietary fiber and polyphenols. Millets is gluten free food. Millets are tiny sized, round shaped and the minor cereals of small seeded grass family known as Poaceae. Ragi is an annual cereal plant growing upto 0.3m (1ft) in height in India and Africa. It is a nutritionally rich plant with a number of medicinal properties. Eleusine coracana-as the herb is botanically known-is called finger millet, African millet, kurakkan, goose grass. Finger millet flour is commonly used as food and it is prepared by grinding the seeds in a mill or food processor.

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Ragi is considered to be of Indian or African origin. It helps in weight loss, increase bone strength, controls diabetes, reduce cholesterol, aids relaxation, treats anemia, helps in digestion, increase lactation, reverts skin aging. It is also a good source of protein and amino acids. Studies have also proved that ragi can be used for treating pneumonia, smallpox, measles, liver disease, leprosy and pleurisy.

Khus khus (vetiver) has been harvested for 3000 years for its medicinal and economical use. The perennial grass grows in drier regions of Northern and Western part of the country. The root of the plant is aromatic and has a characteristic fragrance. It has long, thin and rigid leaves.

Vetiver zizanioids (Family: Poaceae), root (intact and spent) extracts and fractions were evaluated for antimycobacterial activity against *Mycobacterium tuberculosis* H (37) RV and H(37)Ra strains using radiometric BACTEC 460 TB system. The ethanolic extract of intact as well as spent root were showed potent anti-tuberculosis activity at a maximum concentration of 500 microgm/mL. The hexane fraction also showed antibacterial action by recording continuous decline in growth index (GI) of *M. tuberculosis* at 50 microgm/mL. It was further more observed that root extract and hexane fraction showed activity even after the extraction of essential oil by hydro-distillation. The results suggested that ethanolic extract and hexane fraction exhibited potent antimycobacterial activity. The observed potential inhibitory characteristics not only supports the traditional medicinal uses of vetiver but also signify a promising candidature of root extract and hexane fraction of *V. zizanioids* as an anti-tuberculosis agent.

Finger millet (ragi) belongs to small millets, meaning small grained cereals it is the staple food of the millions inhabiting the arid and semi-arid tropics of the world. The grains of finger millet, being nutritionally superior to rice and wheat provide cheap proteins, minerals and vitamins to the poorest of the poor where the need for such ingredients is the maximum. Finger millet is also known as Ragi, Nagli in India and Birds foot millet, Coracana millet and African millet in Africa (Seetharam *et al.*, 1986)^[4]. Among the millets of the world, finger millet ranks after pearl millet, foxtail millet and proso millet. Finger millet is an age old tropical cereal still widely grown in East Africa and South Asia accounting nearly 75% of its world total population (Rachie, 1975)^[5].

Finger millet malt and milk based beverage formulations are very popular in South India. The beneficial effects of malting are reflected in terms of increased bioavailability of nutrients, lowering of anti-nutrient concentration and in improving the texture, which was successfully exploited in the development of finger millet malt based human health foods (Malleshi, 1997)^[3].

Origin-The finger millet known as ragi was developed in Africa from *Eleusine coracana* sub species, viz., *Africana* and was introduced to India during pre-Aryan times.

The chemical composition of finger millet is influenced by cultivars, climatic conditions, stage of maturity and many agro climatic conditions (Kurien *et al.*, 1960)^[2]. The white varieties have a higher protein content than the brown varieties of the finger millet (Virupaksha *et al.*, 1975; Srilatha Rani, 1995)^[8, 6]. Vadivoo *et al.* (1978) reported higher protein content in endosperm proportions compared to husk and embryo. Kamat and Belavady (1980)^[1] observed that the finger millet contained slightly higher levels of total unavailable carbohydrates (18.6%) when compared to wheat (17.3%) or sorghum (14.3%).

Materials & methods

Procurement of raw materials

My recipe is ragi ladoo and the ingredients are ragi flour, khus, sugar powder, elaichi powder, ghee. The main ingredient khus was procured from my hometown Sonipat, sector-14. I bought the khus in whole form and then roast it. Other main ingredient ragi flour which I got from the departmental store near my home. Other ingredients was also bought from the departmental store.

Panel selection & training

Food product development and their acceptability appraisal through hedonic rating test carried out by a semi trained panel comprising 20 panelists from the departmental store of Dietetics and Applied Nutrition, Amity University. They were pre-selected on the basis of good health conditions, time availability, no allergy products, any aversion to khus and willingness to participate.

Outcome measures

The panelists performed organoleptic appraisal by 7 point hedonic test to access the overall products preferences. In scale the points made were Evaluation of taste, colour, texture, firmness, stickiness, acceptability and overall. 4 samples were made in the variations are 40 gms in Sample "A", 50 gms in Sample "B", 30 gms in Sample "C", 20 gms in Sample "D".

Quality control

Panelist should be fit. While evaluating, drink water after tasting every sample. The area should be odour free. There should be proper lightning system where the products are been kept. There should be proper ventilation. The instructions given to the panelists should be proper and they should understand the instructions carefully. The raw materials used in cooking should be properly measured and weighed.

Standardization of cookie recipe

The cookies were prepared with a standardized a recipe as follow

Ingredients

1 cup ragi (finger millet) flour
6 tbsp ghee
5 tbsp powdered sugar
¼ tsp cardamom (elaichi) powder

Method

Heat the ghee in a broad non-stick pan, add the ragi flour and cook on a slow flame for 4 to 5 minutes or till it turns golden brown in color, while stirring continuously. Remove from the flame, add the sugar and mix well. Add the cardamom powder and mix well. Transfer the mixture into a greased plate, spread it evenly and keep aside to cool completely for 10 to 15 minutes. Refrigerate for 15 minutes and keep at room temperature for another 5 minutes. Scrape the ladoo mixture using a spoon, and divide it into equal portions and roll each portion into a round ball. Serve or store in an air-tight container.

Development of the product

Ingredients

1 cup ragi (finger millet) flour
6 tbsp ghee

- 5 tbsp powdered sugar
- ¼ tsp cardamom (elaichi) powder
- 8 tbsp khus

Methods

Heat the ghee in a broad non-stick pan, add the ragi flour and cook on a slow flame for 4 to 5 minutes or till it turns golden brown in colour, while stirring continuously. Remove from the flame, add the sugar and mix well. Add the cardamom powder and mix well. Now roast the khus in a non-stick pan for 3 to 4 minutes. Add the khus in the ragi flour mixture and mix well. Transfer the mixture into a greased plate, spread it

evenly and keep aside to cool completely for 10 to 15 minutes. Refrigerate for 15 minutes and keep at room temperature for another 5 minutes. Scrape the laddoo mixture using a spoon, divide it into equal portions and roll each portion into a round ball. Serve or store in an air-tight container.

Results & discussion

Statistical analysis

After the sensory evaluation conducted by 20 semi trained panel of judges the mean scores and standard deviation was calculated.

Table 1: Sensory attributes of the different variations of the food product

Attributes	Product (a)	Product (b)	Product (c)	Product (d)
Taste	8.25+ _{1.030042}	8.5+ _{1.192079}	8.75+ _{1.292692}	8.95+ _{0.944513}
Colour	8.75+ _{1.292692}	8.75+ _{1.292692}	8.55+ _{0.887041}	8.45+ _{1.050063}
Texture	8.8+ _{1.192079}	8.7+ _{1.031095}	8.45+ _{1.050063}	8.55+ _{0.887041}
Firmness	8.75+ _{1.292692}	8.65+ _{1.089423}	8.65+ _{1.089423}	8.75+ _{1.292692}
Stickiness	8.45+ _{1.050063}	8.7+ _{1.174286}	8.45+ _{1.050063}	8.75+ _{1.292692}
Acceptability	8.5+ _{1.192079}	8.45+ _{1.050063}	8.65+ _{1.089423}	8.95+ _{0.944513}
Overall	8.6+ _{1.231174}	8.7+ _{1.095445}	8.55+ _{0.887041}	8.75+ _{1.292692}

Product A

In product A, the ratio of ragi: khus was 60: 40. The amount of sugar was less in product A. It was liked many people as some people eat the products containing less sugar and some people doesn't like it much due the low content of sugar in it.

Product B

In product B, the ratio of ragi: khus was 50: 50. Product B was having a coarse taste and was not pleasant to the panelists. They doesn't like eating product B that much.

Product C

In product C, the ratio of ragi: khus was 70: 30. Product C was liked by many panellists. It was given a good ratings in the Hedonic Rating Test.

Product D

In product D, the ratio of ragi: khus was 80: 20. Product D was liked by every panelists a lot. It was given good ratings in the Hedonic Rating Test.

It was observed that the concentration of khus in the ragi laddoo was accepted by the people.

Nutrient values per laddoo

Energy	125 kcal
Protein	0.7 gm
Carbohydrate	13.5 gm
Fat	7.6 gm
Fibre	1.1 gm
Iron	0.4 mg
Vitamin B1	0.1 mg
Vitamin B3	0.3 mg

Conclusion

The scores of standard were more acceptable than all the variations made at different concentrations. It was also observed that the concentration of khus, in the samples was inversely proportional to the acceptability scores. 20gm khus incorporated in the food product developed was found to be more acceptable by the panellists. Amongst the incorporated food preparation, the mean scores for overall acceptability were highest for sample D and lowest for sample B. Thus, this

holds great promise for future research for the formulation of potent.

Product A



Product B



Product C



Product D



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