

Development of Fibre Rich Millet Mix Cookies and its Sensory and Nutrient Analysis

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Abstract: India is the leading producer of small millets namely, finger millet (*ragi*), kodo millet (*kodo*), foxtail millet (*kangni*), barnyard millet (*sawan*), proso millet (*cheema*) and little millet (*kutki*). In the present study have been made to develop fibre rich millet mix cookies by addition of four millets in optimized proportion. The fibre rich millets was selected and cleaned, washed, sun dried and powdered individually. The standard procedure for cookies was followed and the millet mix powder ((foxtail millet: 15 g kodo millet-15 g barnyard millet -15g, and little millet: 15g)) was standardized and replaced with refined wheat flour in preparation of fibre rich millet mix cookies. Sensory analysis was done for consumer acceptability where the acceptability was more in fibre rich millet mix cookies was near to the standard cookies. Followed by nutrient analysis was carried over which showed enriched level of fibre, calcium and protein which can give beneficial effect on health especially to elderly and reduce the risk chronic disease.

Key word: Fiber, Sensory.

INTRODUCTION:

Millets are small seeded annual cereal grains. These are very crops grown successfully in infertility lands and are less prone to diseases and pests. Millets are particularly low in phytic acid and rich in dietary fibre, iron, calcium and B- vitamins and contains higher proportion of unavailable carbohydrates and release of sugar from millet is low (Karuppasamy, 2015). India is the leading producer of small millets namely, finger millet (*ragi*), kodo millet (*kodo*), foxtailmillet (*kangni*), barnyard millet (*sawan*), proso millet (*cheema*) and little millet (*kutki*). Annual planting area under them is around 2.5 million hectares; and nearly 1.5 million hectares is under finger millet comprising about 40-50% of crop's global area. During the last three decades, area under finger millet has declined but with the significant improvement in the productivity (1,500 kg/ha), its annual production is maintained at around 2.4 million tonnes. At present, small millets account for less than 1% of food grains produced in the world (ICAR, 2010). The term millet is employed for several related genera, some used to produce grain, or forage or both. Millets are cereal species growing in an equally broad range of environments. The most widely cultivated millets are finger millet (*Eleusinecoracona*), foxtail millet (*Setariaitallica*), pearl millet (*Pennisetumtyphoideum*), proso millet (*Panicummiliaceum*), barnyard millet (*Echinochooacolona*) etc. Millets are considered the least important of cereals, with annual production less than 2% of the world's grain. However they are of great local importance as staples and as reserve crops in marginal areas (Ronzio 2004).

Types of Millets:

Pearl millet is very rich in Calcium, Protein, and Iron & Magnesium. It helps to reduce the bad cholesterol level in our body which also helps to improve the digestion, bowel movements & prevents constipation.

Finger millet a well-known millet and consumed widely by the people all over the world. It has the highest mineral and calcium content when compared to all whole grains & minerals. It is a powerhouse of protein and amino acids also help to heal ulcers & anemia.

Foxtail millet (Thinai) is the first millet variety which was used in ancient days. Which is high in carbohydrates, rich in dietary fiber and minerals such as copper & iron. Improves immunity and also helps to control blood glucose and cholesterol level.

Kodo millet (Varagu) is rich in phytochemicals, Phytate that helps in reduction of cancer risks also helps in weight reduction also reduce knee and joint pains.

Barnyard millet (Kuthiravali) is 6 times high fiber content when compared with wheat. It's a gluten free millet with high calcium, phosphorous & fiber.

Little millet (Saamai) is suitable for people of all age group. It helps to prevent constipation & heals all the problems related to stomach. It is high fiber and help to reduce the cholesterol levels.

NEED FOR THE STUDY:

Millets are rich sources of bioactive phytochemicals which are powerful antioxidants, which help to promote optimal health and to reduce the risk of chronic diseases. Millets have great potential for being utilized in different food systems by virtue of their nutritional quality and economic importance. There is a wide scope of their exploitation in different food products including baked goods like breads, biscuits, cakes, cookies, breakfast cereals, muffins, pies, pancakes and, snacks. The increasing importance of

snack foods such as cookies in today's eating habit has not been fully exploited. Cookies can serve as a vehicle for important nutrients if made readily available to the population. Hence, the present study entitled "**DEVELOPMENT OF FIBRE RICH MILLET MIX COOKIES AND ITS SENSORY AND NUTRIENT ANALYSIS**" was carried out with the following objectives:

1. To identify and group of millets rich in fibre;
2. To develop instant millet mix cookies flour rich in fibre;
3. To standardize the instant millet mix cookies rich in fibre;
4. To evaluate the sensory attribute of cookies; and
5. To analyse the nutrient content of the cookies.

MATERIALS AND METHODS:

The study was experimental and was carried out with the following phase:

Phase I: Purchasing of Ingredients

Based on the nutrients (computed values) from Nutritive Value of Indian foods (Gopalan et al, 2009), millets rich in fiber: Foxtail millet, Kodo millet, Barnyard and Little millet as whole grain was hulled and available in prepackaged form and the other ingredients like butter, sugar, baking powder; vanilla essence and cardamom were purchased from the local departmental store. .

Phase II: Processing of Millets

The raw purchased millets were placed in a tray and the damaged grains, stone / pebbles together with all other extraneous matter were removed by hand and discarded. The cleaned millet was washed and water was drained fully by spreading it over a white cloth and was sun dried for five hours/day and powdered in the mix-jar separately and was stored in an air tight container.

TABLE 1 Weight of the Millets before and after Processing

Millets	Before processing - Weight (Raw ingredients) in Kg	After processing - Weight (Millet mix) in g
Foxtail millet	1	900
Kodo millet	1	900
Barnyard millet	1	900
Little millet	1	900

Phase III: Development of Millet Mix and Standardization of Millet Mix Cookies

Equal proportion of millet mix (foxtail millet: 15 g kodo millet-15 g barnyard millet -15g, and little millet: 15g) rich in fibre was mixed and replaced in the place of refined wheat flour. Standard procedure for cookies was adopted in development and standardization of fibre rich millet mix cookies. During preparation accurate weights, equal measure of ingredients, maintenance of temperature and time control was followed.

Sensory Evaluation of the Millets Mix cookies

Standard and fiber rich millet mix cookies were evaluated organoleptic ally for different quality attributes and overall acceptability. Using Five-point Hedonic scale sensory attributes like color, flavor, taste and smell, flavor and texture was done with 30 semi trained panelist.

The mean and standard deviation was calculated and tabulated for each attributes of the standard and the standardized Millet Mix Cookies.

PLATE NO 1 Fibre Rich Millet Mix Cookies



Nutrient Analysis of the Fibre Rich Millet Mix cookies

Nutrients are substances derived from food during the process of digestion. Moisture, Ash, Fibre (AQAC), Calcium (titration method), and Protein (Lowry's method) was determined for the Standardized fibre millet mix cookies in the department laboratory.

RESULT AND DISCUSSION:

TABLE 2 Sensory Attributes of Fibre Rich Millet Mix Cookies and Standard Cookies

Parameters	Standard Cookies	Fibre Rich Millet Mix	
		Mean	S.D
Appearance	4.16	3.9	0.90
Texture	3.84	3.8	0.90
Color	4.12	3.8	1.1
Flavor	4.04	3.8	0.9
Taste	4.48	3.9	1.0
Over all acceptability	20.64	19.3	4.0

Table 2 show the sensory attribute of fibre rich millet mix cookies. The overall acceptability was good near to the standard cookies with mean score of 20.64 and foxtail millet, kodo millet, barnyard millet and finger millet flour with mean score of 19.3.

Table 3 Nutrient composition of standardized Fibre Rich Millet Mix Cookies

Nutrient Analysis	Fibre Rich Millet Mix Cookies (100g)
Moisture (g)	8.5
Ash (g)	2.4
Protein (g)	20.4
Calcium (mg)	164.0
Iron (mg)	2.2
Fibre (g)	18.8

Table 3 show the nutrient composition of standardized fibre rich millet mix cookies. The Standardized Fibre Rich Millet Mix Cookies was high in fibre in 18.8g, protein 20.4g, calcium 164 mg and iron 2.2mg.

CONCLUSION:

It can be concluded from this study that, the overall acceptability was of millet mix cookies made with fiber rich kodo millet, barnyard millet, foxtail millet and little millet was good and the score was very near to the standard cookies. It also showed that the presence of protein, calcium, iron and fibre.

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