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Quality Evaluation & Shelf life testing of cookies prepared by using barley flour & fenugreek seed powder

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Abstract

The objective of the research was to develop product that combines barley flour and wheat flour in an intriguing way with fenugreek seed powder in order to make it usable in daily life. The idea was to developed cookies using composite flour (fenugreek seed powder, barley flour, and wheat flour). The research study was conducted to identify most suitable blend of fenugreek seeds powder at 2.5%, 5%, and 7 % with other flour. These cookies were studied with respect to physical and sensory acceptability of cookies. The 9-point Hedonic Scale was used to determine acceptability, and the results showed that both men and women liked the cookies. All of the samples underwent the same processing; however, the judges' panel preferred the 2.5% sample over the other two samples. Costing was also done for the product there was very little difference in costing of three samples.

Keywords: - Cookies, fenugreek, wheat flour, Barley flour, sensory evaluation, shelf life.

Introduction

Baking Industry is considered as one of the major segments of food processing in India. Baked products are gaining popularity because of their availability, ready to eat convenience and reasonably for good shelf life. Cookie, a baked flour confectionery dried down to low moisture content (Bender 2006), is a commonly consumed food throughout the world, which gives more nutrients than any other single food source Cookies are ideal for nutrient availability, palatability, compactness and convenience (Kumar et al., 2013). Fenugreek seed, an annual legume mainly used as a spice crop has enjoyably bitter taste and is a good source of many nutrients (Krishnaswamy, 2008). Fenugreek is an annual plant belongs to the family Leguminosae. It is the famous spices in human food. These beneficial physiological effects including the antidiabetic and hypocholesterolemic effects of fenugreek are mainly attributable to the intrinsic dietary fibers constituent which have promising nutraceutical value (Srinivasan, 2006). Fenugreek is a good source of protein, is rich in Mg, Ca, Fe, Zn, Mn, Co, Ba, Cu and Br, and can be used as a source of natural antioxidants in food systems (Pajak et al. 2019). It is well known for its fibre, gum, other chemical constituents and volatile contents. Dietary fibre of fenugreek seed is about 25% which changes the texture of food. These days it is used as food stabilizer, adhesive and emulsifying agent due to its high fiber, protein and gum content. The protein of fenugreek is found to be more soluble at alkaline pH (Meghwal and Goswami, 2012). Wheat flour is an ideal ingredient for various food product formulations; therefore, it is widely used for the production of bakery and confectionery products (Diana, Mirela, & Jianu, 2007). As the fourth-most produced cereal worldwide, barley (Hordeum vulgare L.) grains are rich in dietary fiber, protein, minerals, and various other bioactive phytochemicals (Sullivan, Arendt, and Gallagher 2013). Diet-related chronic disease and malnutrition give rise to the concept of novel food processing techniques, of which composite flour is one of the effective solutions. Composite flour enriched with functional components like tubers, starches, legumes, cereals (Bourré et al., 2019; Noorfarahzilah et al., 2014), and multigrain premixes (Kumar et al., 2015) reduced the risk of diet-related disease and allergies (Adebowale et al., 2012; Mepba, Eboh, & Nwaojigwa, 2005). Various researchers found the suitability of composite flour for the preparation of bakery products (Gômez et al., 2008; Ribotta et al., 2005). Recent trend has also shown the utilization of processed flours or components that could enhance the nutritional quality of a product.

Methods and Material

The study was conducted in the home science department food and nutrition lab Dayalbagh Educational Institute Agra.

Procurement of raw material

Fenugreek seeds powder, Wheat flour, Barley flour was purchased from local market of Agra. Fenugreek seeds were grinded to make fine powder.

Development of cookies

The cookies were prepared with the incorporation of fenugreek seeds powder wheat flour & barley flour.

Standardization of cookies:

Cookies were standardized followed by mixing fenugreek powder 2.5%, wheat flour 77.5%, barley flour 20%, sugar 50%, fat 45%, water 10 ml, and baking powder 1%. Following steps was followed during preparation firstly fat was rubbed on a clean surface. Flours were sifted and baking powder was added gradually, sugar was added in it.Smooth dough was made by using water, dough was rolled to ¼ inch thickness, round shapes were cut and baked at 150 °C for 25 minutes.

Results and Discussion

Development and standardization of cookies prepared from barley flour and fenugreek seed powder

Preliminary trials were done for development of cookies with best suitable flour. Composite flour (wheat flour, barley flour fenugreek seeds flour was used for the development of cookies. Numbers of tests were conducted. In the development of cookies, ingredients and processing times such as cooking time shape were standardised.

Sample 1

Ingredients	Amount	% of biscuits
Wheat	77.5gm	77.5%
Barley	20gm	20%
Fenugreek	2.5gm	2.5%
Sugar	50gm	50%
Fat	45gm	45%
Water	10ml	10%
Baking powder	1gm	1%

Sample 2

Ingredients	Amount	% of biscuits
Wheat	75gm	75%
Barley	20gm	20%
Fenugreek	5gm	5%

Sugar	50gm	50%
Fat	45gm	45%
Water	10ml	10%
Baking powder	1gm	1%

Sample 3

Ingredients	Amount	% of biscuits
Wheat	73gm	73%
Barley	20gm	20%
Fenugreek	7gm	7%
Sugar	50gm	50%
Fat	45gm	45%
Water	10ml	10%
Baking powder	1gm	1%

Steps for the preparation of cookies

Fat was rubbed on a clean surface. Flours were sifted and baking powder was added gradually. Sugar was added in it. Smooth dough was made by using water.

Dough was rolled to ¼ inch thickness. Round shapes were cut. Baking was done in oven and baked at 150 °C for 25 minute.

Sensory evaluation of cookies

Sensory evaluation of the cookies in terms of colour, appearance, texture, flavour, crispiness, taste, and overall acceptability was done on a 9-point hedonic scale by ten trained panellists following the recommendations described in (Mc Watters et al. 2003).Total three sample were prepared in which 2.5 % sample was most acceptable as compare to other two samples.

Sample	Colour	Texture	Flavor	Crispiness	Overall acceptability
Sample 1	7.7+0.48	7.3+0.82	6.9+0.31	6.9+0.87	7.2+0.42
Sample 2	7+0.47	6.5+0.70	4.6+0.69	5.7+0.67	4.8+0.78
Sample 3	6.7+0.67	5.6+0.84	2.9+0.56	5.5+0.70	3.7+0.67

Shelf life testing

Shelf life testing was done on the basis of room temperature.

Sample number	Date of manufacturing	Storage date till in room temperature
Sample 1	01/11/2022	01/12/2022
Sample 2	01/11/2022	01/12/2022
Sample 3	01/11/2022	01/12/2022

Costing of cookies

The costs of the cookies were calculated of all three samples. The rates of the cookies were almost same.

Particulars	Rate(Rs/Kg)	Quantity(g)	Cost (Rs.)
Fenugreek	100	2.5gm	0.25
Wheat flour	25	77.5gm	2.5
Barley flour	30	20gm	0.6
Sugar	40	50gm	2
Fat	450	45gm	20.25
Baking powder	-------	1gm	------
Water	-------	10ml	------
Overhead	25	--------	25
Total yield/ No. of cookies	-------	12	50
Cost/ per cookies	-------	1 cookies	4

Conclusions of the study

The results indicated that the use of fenugreek seeds barely flour improve the nutritional quality of cookies. Fenugreek seeds were added at percentages of 2.5%, 5%, and 7% with various flours. 2.5% level of cookies was liked by the panel of judges. Fenugreek seed contains functional qualities that directly impact health and lifestyle diseases and it can be consumed every day. Shelf life testing was also done for period of one month. The developed cookies was high in protein it can combat the malnutrition problems in children's.

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Conflict of interest

The authors declare that they have no conflict of interest and that this article does not contain any studies with human or animal subjects.

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