

# Organoleptic evaluation of germinated fenugreek seed flour incorporated recipes: *Chapatti* and *Idli*

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■ **ABSTRACT** : Fenugreek contains balance of both soluble ( $\beta$ -glucan) and insoluble fibre. The objective of the present study was development of high fibre germinated fenugreek seed flour and its incorporation in some homemade recipes viz., *chapatti* and *idli*. Nutritional quality of germinated fenugreek seed flour was evaluated. Nutritional analysis revealed that moisture (5.5 %), protein (41.2 %), crude fat (3.7 %) soluble fibre (11.3 %) and insoluble fibre (19.9%) content were higher whereas fat (3.7 %) content was low in germinated fenugreek seed flour. Sensory evaluation showed that chapatti was acceptable up to 20 per cent level of incorporation, whereas, idli was acceptable up to 30 per cent level of incorporation by panelists.

■ **KEY WORDS**: Fenugreek, Insoluble fibre, *Idli*, *Chapatti*, Sensory evaluation

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Observational and epidemiological studies have substantiated beyond doubt that the food rich in fruits and vegetables have a vital role to play in maintaining ones good health conditions. Subsequent scientific query on various fruits, vegetables, spices and herbs for the active principles responsible for their wonderful efficacy resulted in the discovery of many phytochemicals. Presently, attempts have been going on in both academia and industries to derive such novel phytonutrients or so-called nutraceuticals, with sufficient efficacy data and toxicological information to enable one to supplement them in appropriate levels to keep up the normal cellular functions and hence to prevent diseases.

*Chapatti* and *idli* are very popular food products among populations of India, because they can be easily prepared at home. Fenugreek seed flour has a great potential, due to its high and good quality protein (20–25%), lysine (5–6%), soluble (20%) and insoluble dietary

fibre and it also possesses hypocholesterolemic (Khosla *et al.*, 1995 and Sharma, 1986) and hypoglycemic (Neeraja and Rajyalakshmi, 1996) properties. Hence, development and consumption of such therapeutic products at home would help to raise the nutritional status of the population. Information on incorporation of germinated fenugreek seed flour in products is scanty. Therefore, this study was designed to evaluate the effects of germinated fenugreek seed flour on sensory characteristics of homemade recipes. Having 20-30 g fenugreek seed as such in diet is not acceptable due to the distinct bitter taste; therefore, inclusion of fenugreek seed flour in such recipes that mask the bitter taste of fenugreek seed is a simple way to consume it.

## ■ RESEARCH METHODS

### Procurement of material :

Fenugreek seeds (Pusa early bunching) were

procured from Vegetable Research Centre, G.B. Pant University of Agriculture and Technology, Pantnagar. Other ingredients used in making products such as wheat flour, rice, blackgram were purchased from the local market, Pantnagar. All the grains were cleaned, made free of dust and other foreign material. The grain samples of wheat and fenugreek were ground in a flour mill to pass through a 60 mesh sieve and stored in an air tight container until used.

### Processing method :

#### Germination :

The cleaned fenugreek seeds were soaked in tap water at the ratio of 1:5 (w/v) at room temperature for 12 hr. The water was changed after 6 hr. The soaked seeds were tied in a muslin cloth for germination in the dark at ambient temperature for 24 hr till the length of the rootlets was about 1 cm. The germinated seeds were oven dried at 40°C in aluminum trays for 6 hr. Flour was prepared by grinding dried germinated fenugreek seeds in grinder. Flour was sieved with a metal sieve of 60 mesh size.

### Preparation of products :

The germinated fenugreek seed flour was incorporated in recipes at 0, 5, 10, 20 and 30 per cent level. The recipes *viz.*, *chapatti* and *idli* were formulated using traditional method. *Chapatti* was prepared using whole wheat flour and *idli* was prepared from rice and blackgram.

#### Chapattis :

*Chapattis* were prepared by incorporation of germinated fenugreek seed flour (GFSF) at the levels of 0, 5, 10, 20 and 30 per cent, respectively in 100 g of

wheat flour separately. Dough was made by mixing wheat flour with fenugreek seed flour consecutively with the addition of sufficient water.

As the level of incorporation of fenugreek seed flour was increased, the amount of water required increased as well. Equal portion of dough was divided and flattened on the rolling board with the help of rolling pin and then chapattis were prepared on hot griddle (Table A and B).

#### Idli :

The rice and dal were washed and soaked separately for 8 hr. The dal was ground and a thick, fluffy batter was made with sufficient cold water. Rice was also ground into fine paste. Rice paste was mixed into dal and beaten well adding salt. It was kept overnight for 8 hr for fermentation. *Idli* moulds were greased and batter was poured into them. It was steamed for 5 min. till cooked (*i.e.* until the tooth picks/knife came out clean when pricked). It was slightly cooled and removed from mould.

### Nutritional and sensory analysis :

Moisture, crude fibre, ash, crude fat and crude protein content in germinated fenugreek seed flour was determined as per AOAC (1995) procedures. Carbohydrates were calculated by difference. Dietary fibre was determined by the method of Asp *et al.* (1983). Germinated fenugreek seed flour incorporated recipes *viz.*, *chapatti* and *idli* were evaluated for sensory characteristics using nine point hedonic scale and sensory score card as described by Amerine *et al.* (1965). Sensory evaluation was done by a panel consisting of 10 members from the Department of Foods and Nutrition.

### Statistical analysis :

Each experiment was replicated three times. The

Ingredients	Control	5 per cent	10 per cent	20 per cent	30 per cent
Wheat flour	100 g	100 g	100 g	100 g	100g
Germinated fenugreek seed flour	-	5 g	10 g	20 g	30g
Water	65 ml	75 ml	75 ml	80 ml	90 ml

Ingredients	Control	5 per cent	10 per cent	20 per cent	30 per cent
Rice	60 g	60 g	60 g	60 g	60 g
Blackgram dal (Dehusked)	20 g	20 g	20 g	20 g	20 g
Salt	¼ tsp	¼ tsp	¼ tsp	¼ tsp	¼ tsp
Germinated fenugreek seed flour	-	6.25 g	12.5 g	25 g	37.5 g

results were expressed as mean. The mean organoleptic scores of the products were analyzed using one way analysis of variance (ANOVA).

## ■ RESEARCH FINDINGS AND DISCUSSION

The results of nutritional quality of germinated fenugreek seed flour are presented in Table 1. Germinated fenugreek seed flour contained 5.5 per cent moisture, 41.2 per cent crude protein, 3.7 per cent crude fat, 4.6 per cent ash and 8.8 per cent crude fibre.

Soluble fibre content was 11.3 per cent and insoluble fibre content was 19.9 per cent in germinated fenugreek seed flour.

Mean sensory scores of germinated fenugreek seed flour incorporated *chapatti* and *idli* are presented in Table 2 and 3, respectively. No significant difference was found between control and 10 per cent germinated fenugreek

seed flour incorporated *chapatti* for overall acceptability. Significant difference in mean sensory score for overall acceptability was found among control, 5, 10, 20 per cent and 30 per cent GFSF incorporated *idli*. Sensory evaluation of recipes revealed that up to 20 per cent in *chapatti* and up to 30 per cent in *idli* incorporation of germinated fenugreek seed flour were accepted by the panel members.

Hooda and Jood (2005) reported that fenugreek seed flour (raw, soaked and germinated) can be incorporated at 5-20 per cent in making products like maggi, noodles, bread and biscuits. Maximum 10 per cent fenugreek seed flour can be incorporated to prepare acceptable quality biscuits as reported by Ibrahim and Hegazy (2009). Sulieman and Ali (2000) evaluated the change in bread after incorporation of fenugreek flour at different levels and found that there were no significant differences

**Table 1 : Nutritional composition of germinated fenugreek seed flour**

Parameters	Values
Moisture %	5.5
Crude protein %	41.2
Crude fat %	3.7
Ash %	4.6
Crude fibre %	8.8
Carbohydrates by difference %	35.7
Total dietary fibre (TDF) %	31.3
Insoluble dietary fibre (IDF) %	19.9
Soluble dietary fibre (SDF) %	11.3

**Table 2 : Sensory characteristics of germinated fenugreek seed flour incorporated *chapatti***

% level of incorporation	Colour	Flavour	Texture	Taste	Appearance	Overall acceptability
Control	8.88	8.77	8.22	9.00	9.00	9.11
5%	7.11	7.11	7.53	6.88	7.11	7.22
10%	7.55	7.44	7.44	7.77	7.66	8.00
20 %	6.55	5.66	7.33	5.77	6.22	5.88
30 %	5.77	4.44	6.66	4.22	5.55	4.44
C.D. (P = 0.05)	1.14	1.32	1.62	1.25	1.19	1.23

\*Values are mean of 10 observations

**Table 3 : Sensory characteristics of germinated fenugreek seed flour incorporated *idli***

% level of incorporation	Colour	Flavour	Texture	Taste	Appearance	Overall acceptability
Control	8.70	8.77	8.66	9.00	8.88	9.11
5 %	7.22	6.88	7.33	6.55	7.22	7.44
10 %	6.33	6.33	6.55	5.77	6.55	6.60
20%	5.33	5.66	5.11	5.22	5.22	6.11
30%	4.88	5.00	4.66	5.22	4.77	5.11
C.D. (P = 0.05)	0.52	1.00	0.62	1.23	0.66	0.88

\*Values are mean of 10 observations

between the control sample and the sample supplemented with 5 per cent fenugreek seed flour with regard to the sensory attributes. More or less similar results were obtained by Priya and Verma (2010) on maize flour, Patil *et al.* (2011) on jackfruit and Neog and Baruah (2012) on home based recipes.

### Conclusion :

This study was an effort in the direction of producing low cost value added homemade recipes by using nutraceutical (germinated fenugreek seed flour). It might be concluded that germinated fenugreek seed flour incorporated recipes will be low in fat and rich in fibre and can be best suited for diabetics.

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