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ENRICHMENT OF TRADITIONAL RECIPIES WITH FRESH AND DEHYDRATED FENUGREEK LEAVES AND ASSESSMENT OF NUTRITIONAL QUALITY

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Green leafy vegetables are the micronutrient wealth of India and form an important component of balanced diet. Traditional recipes when modified like mathari when incorporated with vegetables. This study was undertaken with three objective-to standardize the method mathari incorporated with fresh and dried green fenugreek leaf powder, to assess organoleptic quality of mathari, to determine the nutritional composition. Organoleptic evaluation of mathari was done by a panel of ten judges using 9 point hedonic scale. Nutritional composition of mathari were analyzed for proximate constituents and minerals using standard procedure of AOAC (2005) Levels of incorporation of fresh fenugreek was 5% and dry fenugreek powder was 10%. Results showed that the fresh fenugreek mathari shows the highest overall acceptability nutritional analysis showed that protein and iron content of fried fenugreek mathari, i.e., 6 and 14.25 mg was higher as compared to fresh vegetable mathari. Thus it can be concluded that dry fenugreek powder mathari being good source of proteins, and iron and may be incorporated with traditional recipes to fight various forms of malnutrition.

Keywords: Fenugreek leaf incorporation, Nutritional composition, Organoleptic acceptability

INTRODUCTION

Balanced diet is not accessible to a large population of the world, particularly of developing countries. In India malnutrition is a major health problem, which is responsible for about 40-50% of infant death (Rai *et al.*, 1999). Micronutrient malnutrition poses a serious threat to the health of vulnerable groups of population. Dietary approaches are needed to replace supplementation programme, ensuring sustainability and adequate coverage. In the recent years there is growing concern regarding the nutritive value of foods and to nourish the ever increasing population and the inadequacy of essential nutrients can be improved through fortifications and enrichment of food vehicles. Traditional preparations when modified like mathari when incorporated with vegetables could serve a means of enhancing nutritive value of food. Mathari is popular deep

fat fried Indian snack traditionally prepared from refined wheat flour (Arya, 1998). The food based approach for combating micronutrient malnutrition, is difficult and of a long duration, although its effect is predicted to be long lasting. Green Leafy Vegetables (GLV) are micronutrient dense nature's gift to mankind that provides more vitamins per mouthful than any other food. GLV are known to be rich sources of micronutrients such as vitamin A, iron, total carotene, etc. and utilizing them is one way of ensuring the micronutrient intake (Allen, 2006). It is the dry demand that locally available materials which are inexpensive but highly nutritious be used as a vehicle to improve the nutritional status (Negi and Roy, 2004). The basic idea is to find novel methods by which consumption of greens can be increased.

Methi leaves are being consumed almost all around the world owing to its several uses. Major medicinal uses of

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methi include its anti-diabetic, lowering blood sugar and cholesterol level, anti-cancer, anti-microbial activities

Micronutrient malnutrition poses a serious threat to the health of vulnerable groups of population. In the present study was observed that underutilized green leafy vegetables which are equally nutritious to any other traditional green leafy vegetables can be incorporated in daily dietaries (Gupta *et al.*, 2010).

METHODOLOGY

The investigation was conducted in the Department of Foods and Nutrition, Ethelind School of Home Science, Sam Higginbottom Institute of Agriculture, Technology and Sciences (SHIATS), Allahabad. The details of the materials, experimental procedure and techniques to be adopted during the course of the investigation were as follows:

Experimental Site: The present investigation was carried out in the Nutrition Research Laboratory, Foods and Nutrition, Ethelind School of Home Science, SHIATS, Allahabad.

Procurement of Raw Materials: Fenugreek leaves were procured from the field of villages nearby the Sam Higginbottom Institute of Agriculture, Technology and Sciences, Allahabad. The raw materials for the recipe development were purchased from the local market of Allahabad district. Only the fresh and sound leaves were collected. These leaves were washed with the help of clean water so as to remove the dirt and other disease causing organisms.

Processing of the Sample: The leaves were thoroughly washed in water 2-3 times to remove the adhering dust and impurities and were dried in tray drying at 60-65 °C for 15 hours, powdered and stored in airtight containers and storage at ambient temperature in dry place (Srivastava and Kumar, 2009).

Standardization of Mathari Recipe: Mathari is a refined wheat flour based deep fat fried product, which is generally eaten as a snack was selected for the study. A common method of preparing mathari was standardized for one serving. Refined wheat flour (65 g) salt 2.5 (2 g), and ajwain (1 g), were all mixed together. Water (30ml) was added and kneaded well to make stiff dough. The dough was rolled to about 4.8 mm thick and cut in circular shape mathari was deep fried in oil (150 g) for 5 min until they were golden brown in colour.

Organoleptic Evaluation: Sensory evaluation of the food

products for their acceptability was done by a panel of 5 judges. The panel members were instructed about the product and its characteristics. Panel members were selected based on their performance in initial evaluation trials. Sensory descriptors of the samples were colour and appearance, taste and flavour, body and texture and overall acceptability. There are ten numbers of judges for the sensory evaluation. The nine point hedonic scale was used for sensory evaluation (Srilakshmi, 2007).

Proximate Analysis of Developed Products: Prepared products were analyzed for moisture, crude protein, crude fat, crude fiber, ash, contents along with total carbohydrate and energy contents (AOAC, 2005). The soxhlet method was used for total fat determination using ether for oil extraction. Crude fiber was obtained after samples digestion with diluted acid, alkali and alcohol. Moisture was determined from sample weight loss after drying at 105° C in dehydrator until constant weight. Protein content was determined by Lowry's method and Carbohydrate was calculated by difference method and energy was calculated. Iron was estimated by using Spectrophotometer. All samples were analyzed in triplicate

Statistical Analysis: Analysis of variance technique (ANOVA) and critical difference were used to analyze the data (Gupta *et al.*, 2002).

RESULTS AND DISCUSSION

Standardization of Mathari: A common recipe of mathari was standardized as shown in Table 1 and Figure 1. Mathari without incorporation green leafy fenugreek (dried and fresh) served as control recipe and further, incorporation of fresh and dried vegetables was done in the standardization recipe of mathari. Fresh fenugreek powder was prepared as described earlier and 10 gm powder was added in the standardized recipe. Dried powder was procured from local market of SHIATS, and 5 gm of powder was added in standardized and incorporated mathari was evaluated for sensory quality by a 10 panel members

Organoleptic Evaluation of Mathari: In case of *mathari*, T₁ (5 percent) scores the best with regard to all sensory characteristics viz. colour and appearance (8.3), body and texture (8.1), taste and flavour (8.1) and overall acceptability (8.13) (Table 1). Similar study was done by Swati *et al.* (2012) developed traditional mathari with fresh and dehydrated vegetables. It has also been noticed that when the level of incorporation beyond the accepted levels in preparations,

Food Preparation	Control Mathari
Weight of dough	80
Thickness of chapatti	6
Thickness of mathari (raw)	5.29
Thickness of mathari (cooked)	6.52
Cooked weight	63

Sensory Attributes	Control Mathari	Fresh Fenugreek Mathari	Dry Fenugreek Mathari
Colour	6.29	8.9	7.9
Flavor	7.9	8.4	7.1
Texture	6.5	8.2	7.23
Overall acceptability	7.2	8.6	7.12

Nutrients	Control Mathari	Fresh Fenugreek Mathari	Dry Fenugreek Mathari
Moisture (g)	29.23	30.33	19.21
Protein g	4.12	5.23	6.45
Fat (g)	9.87	11.25	5.34
Crude fibre (g)	2.2	3.3	4.98
Ash (g)	1.98	2.23	1.39
Carbohydrate (g)	56.12	57.23	59.54
Energy (Kcal)	240.12	268	270.12
Iron (mg)	8.23	12.23	14.82

the mean scores for the organoleptic evaluation for appearance, colour, texture, taste, flavor, and overall acceptability decreased. The result is supported by Goel *et al.* (2011) also developed recipes by using dehydrated gudmar leaves namely *biscuit*, The average sensory scores

of different parameters in control treated sample of *biscuit* incorporated with dehydrated gudmar leaves, clearly indicate that 4% level of gudmar leaves in *biscuit* is acceptable.

Nutritional Composition: the proximate composition of control, fresh fenugreek leaf and dried vegetable mathari were presented in Table 3. Were varied significantly and ranged from 29.12% to 30.30%. Iron content was found to be highest in dehydrated fenugreek mathari (14.82%) followed by fresh fenugreek mathari (12.23%) and control mathari (8.23%) Fat content of mathari varied significantly and ranged from 5.34%, 11.25% to 9.87% for dried, fresh, and control respectively. Sadhana *et al.* (2001) reported 12.99% fat in spinach parathas on dry matter basis. mathari prepared with dried fenugreek powder contain high protein 6.45 gm as compared to fresh mathari, which bind with other nutrient and make them unavailable. The carbohydrate content of control, dried and fresh vegetables mathari were found to be 56.12, 59.54, 57.23 g respectively. Similar study was also done by Shanthala *et al.* (2005) on acceptability of curry leaves powder. The same study on the content of carbohydrate was also reported by Gupta *et al.* (2009) on many types of underutilized green leafy vegetables. Protein content was found in biscuit (10.0 g/100 g) with the incorporation of dehydrated curry leaves powder. Similar study was also carried by Nath *et al.* (2005) on utilization of underutilized of dehydrated anise greens. Energy content was found in laddoo (320 kcal/100 g) with the incorporation of dehydrated anise greens powder.

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