

Sensory acceptability of millets and fenugreek powder based roti for diabetic patients

RASHMI SINGH* AND TANUSREE SAHA

Department of Food Science and Nutrition, College of Home Science,
C.S.A. University of Agriculture and Technology, Kanpur (U.P.) India

ABSTRACT

Diabetes mellitus is a chronic disorder of glucose intolerance. Indians are generally more susceptible to diabetes than other ethnic groups. There is no disease which provokes greater thought on diet than diabetes. Any patient with diabetes mellitus needs help in planning and accepting a daily diet containing the appropriate amounts of carbohydrate, protein and fat, together with adequate amount of vitamins and minerals. Millets are rich source of fibre and minerals. Millets may have a role in the prevention of chronic disease such as diabetes, cancer, coronary heart disease. It is reported that fenugreek seeds and millets contain mucilaginous fibre and total fibre useful in lowering blood glucose level. Fenugreek powder contain trigonelline—an alkaloid known to reduce blood sugar and serum lipids such as cholesterol and triglycerides. Considering the health benefits of fenugreek seeds and millets, millets and fenugreek incorporated roti was prepared for diabetic patients. Sensory characteristics and nutrient composition of millets based roti T₀ was best and the highest fibre was observed for roti T₁. It is concluded that millets based roti prepared with incorporation of fenugreek are rich source of fibre and calcium and can be recommended to reduce the blood glucose level.

Key Words : Millets, Diabetes mellitus, Blood glucose, Sensory evaluation, Fenugreek seed.

INTRODUCTION

Diabetes mellitus is a chronic disorder of glucose intolerance. It is characterized by high blood glucose level and glycosuria resulting from dysfunction of pancreatic cells result in lack of total or partial synthesis of insulin resistance is caused by cell membrane where glucose is not transported to the cell for oxidation. As glucose is not metabolised, high amount of glucose is circulating in the blood (Srilakshmi, 2002).

There is no disease which provokes greater thought on diet than diabetes. A well managed diabetic has a good expectancy of life. Dietary control is central to success in treatment of diabetes. The diet should always provide the essentials of good nutrition and adjustments must be made according to height, weight, age, sex, level of activity, type of diagnosis, clinical sign and symptoms associated with disease, food habits, etc. Diet is the sheet anchor of treatment in non-insulin therapy in insulin dependent diabetes. Therefore, any patient with diabetes mellitus needs help in planning and accepting a daily diet containing the appropriate amounts of carbohydrate, protein and fat, together with adequate amount of vitamins and minerals (Bamji *et al.*, 1996).

Millet is actually a group of related plants that produce small pearl-like grains and not a single

plant. Millet is low in essential amino acids and higher than most grains in fat content, 75 percent of which is heart-healthy polyunsaturated fat. Millet has been shown to be potentially beneficial in the management of diabetes. Millet may make a good substitute for rice for some diabetics. Millet's high fiber content slows digestion and releases sugar into the bloodstream at a more even pace. This helps diabetics avoid dangerous spikes in blood sugar that lead to glucose spilling over into the urine, known as glucosuria. Millet also contains high quantities of methionine, an amino acid that is deficient in most grains, giving millet a valuable place in a vegetarian diet (Antia, 1996). Millet is also a good source of B vitamins which body uses to process carbohydrates. Millet contains substantial quantities of several minerals, including calcium, iron, potassium and magnesium.

METHODOLOGY

The present investigation was carried out in the Department of Food Science and nutrition, College of Home Science, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur.

For preparation of millets and fenugreek powder based roti, different millets like pearl millet (*Pennisetum typhoideum*), jowar (*Sorghum vulgare*), maize (*Zeamays*), barley (*Hordeum vulgare*), wheat (*Triticum aestivum*), bengal gram (*Cicer arietinum*) were procured from university farm and fenugreek powder was purchased from local market. The roti based on mixed flour was prepared by the using of fenugreek powder at three different levels – T₁(5%, *i.e.* 50g/kg), T₂(4%, *i.e.* 40g/kg), T₃(3%, *i.e.* 30g/kg).

Millets based roti incorporated with fenugreek seed were assessed for their sensory characteristics and nutritional composition. Sensory evaluation of millets based roti incorporated with fenugreek was done by nine point Hedonic scale and proximate analysis was done by AOAC method (A.O.A.C., 1980). Carbohydrate was calculated by different method. Protein was estimated through kjeldahl method, whereas energy was calculated from fat, protein and carbohydrate of products. Iron was estimated by Spectrophotometric method and anal method was used to analysis of calcium in products.

RESULTS AND DISCUSSION

Sensory scores of roti enriched with 5,4, and 3 percent fenugreek seed powder showed that flavour, body and texture, sweetness, taste, colour and appearance and overall acceptability of treatment T₀ *i.e.*, control was acceptable more than T₁(5%), T₂(4%), and T₃(3%) (Table 1). Pathak *et al.* (2000) reported that the bitter taste of fenugreek seeds and coarse nature of millets have been limitation in using them in daily dietaries.

Nutrient analysis of prepared roti revealed that the content of moisture, fat, crude fibre and calcium is low in T₀(*i.e.* control) and high in T₁(5%) (Table 2). Nutrient content was found to increase with the increase of incorporation of fenugreek powder. The content of ash, protein, carbohydrate and

| Table 1 : Mean of sensory acceptability of roti | | | | | | |
|---|---------|------------------|-----------------------|-----------|-------|-----------------------|
| Treatment | Flavour | Body and texture | Colour and appearance | Sweetness | Taste | Overall acceptability |
| T ₀ | 8.4 | 8.2 | 8.0 | 8.2 | 8.8 | 8.8 |
| T ₁ | 7.6 | 7.0 | 7.2 | 7.0 | 7.6 | 7.6 |
| T ₂ | 7.6 | 7.6 | 7.4 | 7.8 | 7.2 | 8.0 |
| T ₃ | 7.6 | 7.4 | 7.4 | 7.2 | 7.6 | 7.6 |
| C.D. | 0 | 0.76 | 0.60 | 0.51 | 0.67 | 0.60 |
| S.E (m) | 0.24 | 0.25 | 0.20 | 0.17 | 0.22 | 0.20 |

Table 2 : Mean of Proximate nutrient composition of roti per 100g

| Treatments | Moisture % | Fat (g) | Crude fibre (g) | Crude protein (g) | Total ash (g) | CHO (g) | Energy (g) | Ca (mg) | Fe (mg) |
|----------------|---------------|------------|-----------------------|-------------------------|---------------------|------------|---------------|------------|------------|
| T ₀ | 7.66 | 1.26 | 1.14 | 9.11 | 2.13 | 78.70 | 362 | 31.70 | 2.73 |
| T ₁ | 12.30 | 2.46 | 1.28 | 8.01 | 1.24 | 74.10 | 350 | 66.80 | 2.70 |
| T ₂ | 12.20 | 2.47 | 1.26 | 8.01 | 1.32 | 74.75 | 353 | 67.70 | 2.70 |
| T ₃ | 12.16 | 2.33 | 1.24 | 10.20 | 1.61 | 72.36 | 351 | 69.50 | 2.94 |
| C.D. | 0.71 | 0.21 | 0.15 | 1.10 | 0.13 | 1.5 | 10.8 | 3.00 | 1.14 |
| S.E. (m) | 0.21 | 0.06 | 0.04 | 0.36 | 0.03 | 0.48 | 3.30 | 0.92 | 0.04 |

energy is high in T₀ and are becoming low with the increases of fenugreek powder level. T₁ was found to contain lowest content of protein, ash, carbohydrate and energy. In the case of iron T₃ (3%) contains highest amount of iron more than control product and others *i.e.*, T₁ and T₂.

Conclusion:

As the millets based product namely roti prepared by incorporating fenugreek at different level that is 5, 4 and 3 per cent levels are rich source of fibre and calcium. Fibre is recommended to reduce the blood glucose level. Products made by incorporation of fenugreek are bitter in taste and less accepted than control products.

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