

Nutritional and organoleptic evaluation of chapati incorporated with *Stevia rebaudiana*

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ABSTRACT

Stevia rebaudiana, a natural sweetener is found to have hypoglycemic property. In the present study chapati was prepared with mixture of wheat flour, oat flour, and soy flour and fenugreek seed powder. Stevia powder was incorporated at a level of 0.5%, 1% and 2% level. The proximate composition of mixed flour showed higher content of protein and fat in soy flour, fiber content was found to be higher in fenugreek seeds compared to other ingredients. No significant difference was found in mean weight and diameter of chapati at different levels. The sensory evaluation showed that there was no significant difference up to 2% incorporation of Stevia. Since, wheat, oat, soy, fenugreek seeds had health appeal, it served as value addition to the cereal based foods.

Key words : *Stevia rebaudiana*, Hypoglycemic, Fiber, Chapati, Organoleptic.

Indian diet is mainly cereal based. Grains are eaten whole, broken or in the form of flour in number of preparations and in different meals of a day. Chapati is the main preparation. Chapati is considered good for diabetics and it helps to maintain blood glucose level (Ankita and Maya, 2006). Stevia, a natural sweetener is found to have hypoglycaemic property. It contains sweet ent-kaurene glycosides, which is most intense sweetness belonging to the species of *Stevia rebaudiana* (Lewis, 2003). It is 300 times sweeter than sugar. It is considered to be a great help in weight loss because of low calories. Stevioside have therapeutic value in the treatment of patients with diabetes (Crammer, 1987). Stevia is used as a natural herbal sweetener, useful in treating the symptoms of diabetes (Leslie and Taylor, 2005). Soluble fiber especially pectin and gums control the rise of blood sugar level after a meal, soluble fibers may reduce the meal for insulin or medication (Jenkins *et al.*, 2000). Hence, the present study was undertaken to prepare chapati with mixture of cereals, pulses, spice and stevia. Venkateswara *et al.* (1986) stated that chapati, an unleavened baked flat bread, is the staple diet of a majority of the people living in the Indian subcontinent. Current recommendations by the American Diabetes Association include whole grains, legumes and non-starchy vegetables along with low-fat meats and dairy products. Whole grains provide complex carbohydrate including fiber, as well as phytochemicals that may slow digestion, increase insulin sensitivity, or modulate adipocyte metabolism. Hutapea, (1997) stated that Stevia products have been approved for use in the U.S.A. as nutrition supplements although many protagonists claim it should be granted GRAS (Generally Recognized As Safe) status in the same

manner as tea, coffee, sugar and fruits and vegetables etc. However, for the past several years, a sweet substance, based on saccharin is being used for the preparation of tea, coffee and sweets for these people. But saccharin is not good for health. However, herbal products are considered to be a substitute for this purpose, provided they are without calories. Since these products are extremely beneficial from the health point of view, nowadays, 'Stevia' is being grown in India also. In Japan, Stevia sugar is being used for the preparation of sweets extensively. So, the study was conducted to analyze the nutrient content of the selected ingredients and to formulate the traditional food incorporated with Stevia

METHODOLOGY

The primary ingredients such as wheat flour, oat flour, soy flour and fenugreek seeds were purchased from local market, Salem District, Tamil Nadu. Stevia leaves were purchased from Horticulture Research Station (HRS), Yercaud, Salem. The ingredients were checked for its purity such that they were free from insect's infestation, dust and dirt.

Raw materials were analyzed for protein by Lowry's method, Fat by Soxhlet method, Ash by laboratory method, Starch by Anthrone method, Moisture, water hydration capacity and pH were analyzed by usual method.

The ingredients (wheat flour-35g, oats flour-35g, soya flour-25g and fenugreek seed powder powder-5g) were mixed and made into dough. The ingredients were selected due to the presence of soluble fiber. The dough of small balls weighing 25g was flattened to prepare chapatis by hand-operated chapati making machine. Chapatis were cooked on both sides on a hot plate and

these chapatis were served as control. Stevia was incorporated at 0.5%, 1% and 2% level by replacing fenugreek seeds powder in the standard chapati. Prepared chapatis were subjected to sensory evaluation by selected diabetic patients.

The prepared chapatis were analyzed for its physical characteristic with various levels of incorporation of Stevia powder for its weight and diameter.

The product was organoleptically evaluated on five-point hedonic scale for appearance, colour, flavour, texture, taste and overall acceptability.

RESULTS AND DISCUSSION

The nutritive analysis (Table 1) of the ingredients showed higher protein (40%) and fat (19%) in soy flour. These results were similar to report presented by Solanki *et al.* (2006), moisture (11.4%) in fenugreek seeds powder, starch (7.5%) in oats flour and stevia leaves powder, with greater water hydration capacity in fenugreek seeds powder (7.9%) and pH (6.9%) in stevia leaves powder and the total fiber content was high in fenugreek seeds powder (46-48%) followed by soy (20%), oats (15-18%) and wheat (12%) and soluble fiber (20-28%), insoluble fiber (18-24%), crude fiber (8.8%) in fenugreek seeds powder (Table 1). These results were similar to Asna *et al.* (2006). The present study revealed that fenugreek seed powder contributes the higher moisture, water

Table 1 : Nutrient composition of the ingredients per 100 g

Nutrient composition	Fenugreek	Soy	Oats	Wheat
Total fibre (g)	46-48	20.0	15-18	12.0
Soluble fibre (g)	20-28	15-18	7-8	1-3
Insoluble fibre (g)	18-24	3-5	7-8	9-11
Crude fibre (g)	8.8	0.45	0.9	0.35
Protein (g)	26-30	40.0	14-19	10-12
Fat (g)	4-8	19.0	10.4	1-3
Starch (g)	5.5	2.0	7.5	7.2
Water hydration capacity (g)	7.9	3.5	2.0	2.5
pH	6.8	7.5	6.6	6.6
Moisture (%)	11.4	9.8	9.7	10.2

hydration capacity and total fiber, soluble and insoluble fiber. The presence of starch indicated that cereals like oat and wheat are good sources of carbohydrate.

Physical characteristic of chapati:

The physical characteristics of the prepared chapati incorporated with different levels of Stevia powder (0.5%, 1% and 2%) showed that there was no significant difference on mean diameter. The mean weight of the chapatis incorporated with 0.5%, 1% and 2% showed significant difference from standard mean weight among the chapatis (Table 2).

Table 2 : Mean weight and diameter of chapati

Sample No.	Criteria	Weight (g)	Diameter (cm)
1	Standard	20.0± 0.2	12.2± 0.3
2	0.5%	15.1± 0.1 a*	12.4± 0.2 ^{NS}
3	1%	15.3± 1.0 b* d ^{NS}	12.3± 0.4 ^{NS}
4	2%	15.2± 0.3 c* e ^{NS}	12.4± 0.3 ^{NS}
F-ratio		98.5*	**
C.D.		1.49*	**

* indicate significance of value at P=0.05 and NS-Non significant a – 1 vs. 2, b – 1 vs. 3, c – 1 vs. 4, d – 2 vs. 3, e – 3 vs. 4

Organoleptic evaluation:

It is evident from Table 3 that the mean organoleptic score of all the chapatis incorporated with 0.5%, 1% and 2% level of Stevia powder did not differ significantly from the standard chapati. Colour, texture, taste, appearance, flavour and overall acceptability scores of chapati were decreased with increased levels of Stevia powder incorporation. So, on the basis of sensory quality, it was observed that we could go upto 2% substitution of Stevia with chapati without adversely affecting quality attributes.

Conclusion:

It can be concluded that mixture of cereals, pulses and spice with Stevia leaves can be used as therapeutic agent in traditional food products. Stevia leaves powder can be incorporated successfully upto 2% without and

Table - 3. Mean value of sensory evaluation of chapati

Criteria	Appearance	Colour	Texture	Taste	Flavour	Overall acceptability
Control	4.6± 0.5	4.4± 0.5	4.4± 0.5	4.2± 0.4	4.0± 0.7	4.4± 0.5
0.5%	4.4± 0.8	4.4± 0.5	4.2± 0.4	3.8± 0.4	3.4± 0.5	4.0± 0.7
1%	4.2± 0.4	2.8± 0.8	4.2± 0.4	3.2± 0.4	3.2± 0.4	3.4± 0.5
2%	4.0± 0.7	3.4± 0.5	3.8± 0.8	3.0± 0.7	3.0± 0.0	3.2± 0.4
C.D.	NS	NS	NS	NS	NS	NS
Two way ANOVA				NS		

NS-Non significant

significant change in their appearance, colour, texture, taste, flavour and overall acceptability.

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