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Multigrain Baked Masala Sev-A Complementary Therapeutic Snack for Diabetes Mellitus

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Abstract: ***Diabetes is a group of metabolic diseases characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. Many Indians prefer masala sev as their evening snack but as the Traditional masala sev is deep fried which is not healthy for a type-2 diabetic individual so to make it healthy this masala sev was modified. Modified masala sev when compared with the traditional masala sev is not only more adequate for diabetes but also more nutritious. After designing this product, sensory evaluation was conducted by 14 naive panel members and 5 expert panel members using 5 point ranking scale. The product was standardised. The product is of low GI and fat content.***

Keywords: Diabetes, Insulin, Multigrain, Nutrition, Fat

1. Introduction

Glucose is an essential nutrient that provides energy for the proper functioning of the body cells and is found in food. Carbohydrates are broken down in the small intestine and the glucose in digested food is then absorbed by the intestinal cells into the bloodstream, and is carried by the bloodstream to all the cells in the body where it is utilized. However, glucose cannot enter the cells alone and needs insulin to aid in its transport into the cells.Diabetes is a group of metabolic diseases characterized by hyperglycaemia resulting from defects in insulin secretion, insulin action, or both. Insulin is hormone produced in the pancreas by beta cells which is needed to move blood sugar (glucose) into cells.Deficient insulin action resulted from inadequate insulin secretion and/or diminished tissue responses to insulin (Insulin resistance) at one or more points in the complex pathways of hormone action. As a result blood sugar does not get into the cells to be stored for energy. Thus results in high levels of sugar in blood. Impairment of insulin secretion and defects in insulin action frequently co-exist in the same patient, and it is often unclear which abnormality, if either alone, is the primary cause of the hyperglycaemia.

Insufficient production of insulin, production of defective insulin or the inability of cells to use insulin properly, family history and genes leads to hyperglycaemia to diabetes. Low activity level, poor diet and excess body weight around the waist also increases your chance of getting the disease.

2. Literature Survey

According to WHO there are 347 million people worldwide who has diabetes.

- It was estimated that the number of diabetic subjects in India in the year 2000 was 12 million. 2006 it was 40.9 million, 2025 it would be 69.9 million and in the year 2030 it would be 80 million.
- In different parts of India, the prevalence of type 2 diabetes in the 2001, Mumbai-9.3%, Bengaluru-12.4%, Chennai-13.5%, and Kolkate-11.7%. In the year 2006, Chennai showed increase in percentage and it was 14.3%. Ernakulum in the year had 19.5%.
- The world prevalence of diabetes among adults (aged 20–79 years) will be 6.4%, affecting 285 million adults, in 2010, and will increase to 7.7%, and 439 million adults by 2030. Between 2010 and 2030, there will be a 69% increase in numbers of adults with diabetes in developing countries and a 20% increase in developed countries.

3. Methodology

Developing The Food Product: (Multigrain Baked Masala Sev)

- The traditional masala sev was modified by adding roasted green gram flour and bajra flour along with Bengal gram flour (besan).
- Curry leaves and garlic which are functional food and have anti-diabetic potential were added to enhance the nutritive value of the product.
- Red chilli powder was added to enhance the favour and taste. Hing (Asafoetida) was added to make it easy for digestion. Salt was added for taste.
- The amount of oil was according to the requirement for baking the product.

Table 1: Recipe of Traditional masala sev and multigrain baked masala sev

Traditional masala sev		Multigrain baked masala sev	
Bengal gram flour	30g	Bengal gram flour	10g
Red chilli powder	1g	Green gram flour	10g
oil	10g	Bajra flour	10g
		Curry leaves	10-12 no.
		Garlic	4-5 cloves
		Red chilli powder	1g
		Hing	A pinch
		Oil	5g

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Table 2: Nutritive value for Traditional masala sev

Ingredients	Amount (g)	Energy (Kcal)	Carbohydrate (g)	Protein (g)	Fats (g)	TDF (g)
Bengal gram flour	30	100	17.5	6.8	0.6	4.59
Oil	10	90	0	0	10	0
	Total	**190**	**17.5**	**6.8**	**10.6**	**4.59**

Table 3: Nutritive value for Multigrain baked masala sev

Ingredients	Amount (g)	Energy (Kcal)	Carbohydrate (g)	Protein (g)	Fats (g)	TDF (g)
Bengal gram flour	10	33	5.83	0.68	0.2	1.53
Green gram flour	10	33	5.83	0.68	0.2	0.82
Bajra flour	10	33	7.33	0.9	0.13	1.13
Oil	5	45	0	0	5	0
	Total	**144**	**18.99**	**2.26**	**5.53**	**3.48**

Table 4: Comparison between Traditional masala sev and Multigrain baked masala sev

Sr no.	Nutrient	Unit	Traditional masala sev	Multigrain baked masala sev	RDA for men	RDA for women
1	Energy	Kcal	190	144	2320	1900
2	Carbohydrate	Grams	17.5	18.99	-	-
3	Protein	Grams	6.8	2.26	60	55
4	Fats	Grams	10.6	5.53	25	20
5	TDF	Grams	4.59	3.48	-	-

4. Method of Preparation

Take all the three flours i.e. roasted Bengal gram flour, green gram flour and bajra flour

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In a pan roast curry leaves till they are crispy and grind it.

↓

Also grind garlic to make its paste.

↓

Add these powdered curry leaves and garlic paste in the flours.

↓

Add red chilli powder, Hing and salt to taste in it.

↓

Add water and knead the dough properly.

↓

Grease the sev making machine and add this dough in it.

↓

Grease the microwave pan with oil and spread the sev in it.

↓

Meanwhile preheat the oven at 180° C and then bake sev for 9 mins.

↓

Turn the sev in between to cook the other side of the sev.

5. Evaluation of the Product

Multigrain baked masala sev were subjected to sensory evaluation based on 5 point scale for Appearance, Colour, Texture, Taste, and Presentation. The score was based on the criteria, 5-Very Good, 4-Good, 3-Average, and 2-Poor, 1-Very Poor. This test was done by 30 naïve panel members and 3 expert panel members. The product showed a gradual improvement from week after week.

6. Results and Discussion

Certainly modified food product has lowered the total energy as compared to the Traditional masala sev. The traditional masala sev contains more amount of fat content than modified masala sev. The modified product contains good amount of low fat-protein and dietary fibre.The frying method used for the traditional recipe was replaced by baking with minimum usage of oil thereby reducing the total fat content of the recipe. In sensory evaluation the modified product was ranked “Very Good” by both the panel members. The product was acceptable. Improvements were done every week on the product and on the fourth week the product was ranked “very good” by both the panel members.

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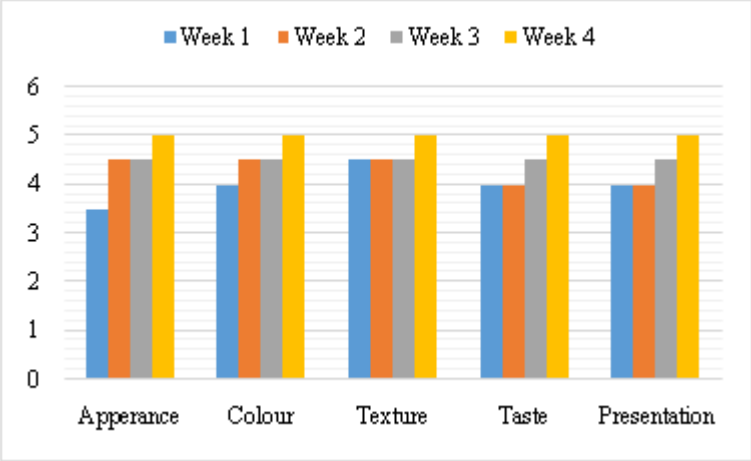

Figure 1: Sensory Evaluation

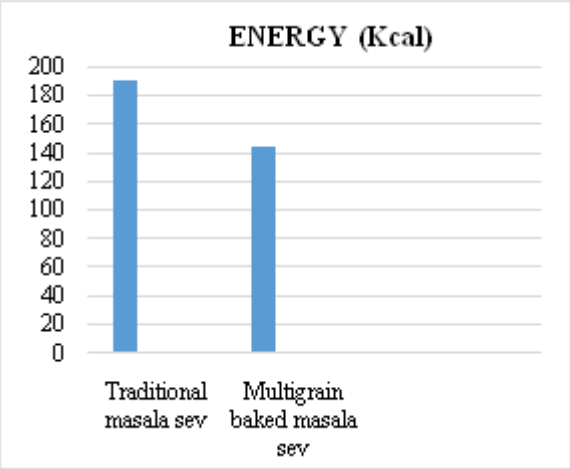

Figure 2: Graphical representation of energy between Traditional masala sev and multigrain baked masala sev

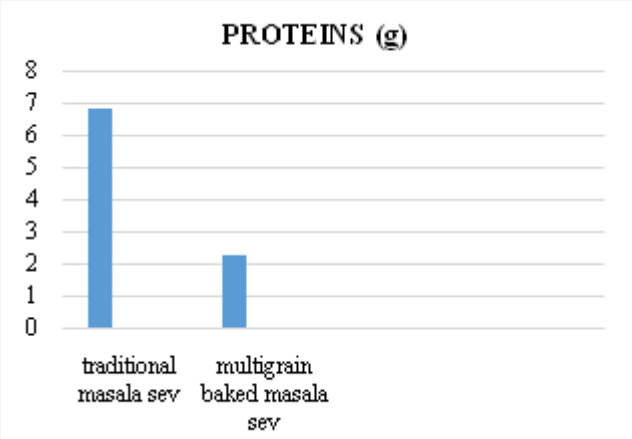

Figure 4: Graphical representation of protein between Traditional masala sev and Multigrain baked masala sev

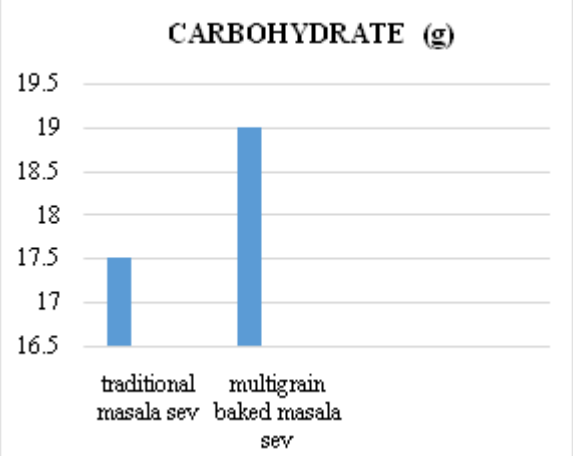

Figure 3: Graphical representation of carbohydrates between Traditional masala sev and Multigrain baked masala sev

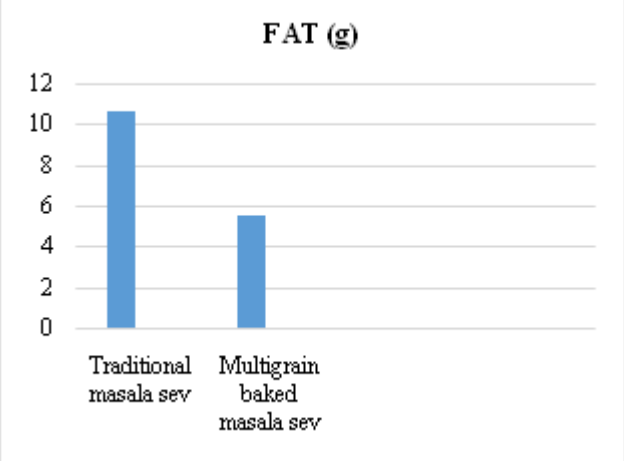

Figure 5: Graphical representation of fats between Traditional masala sev and Multigrain baked masala sev

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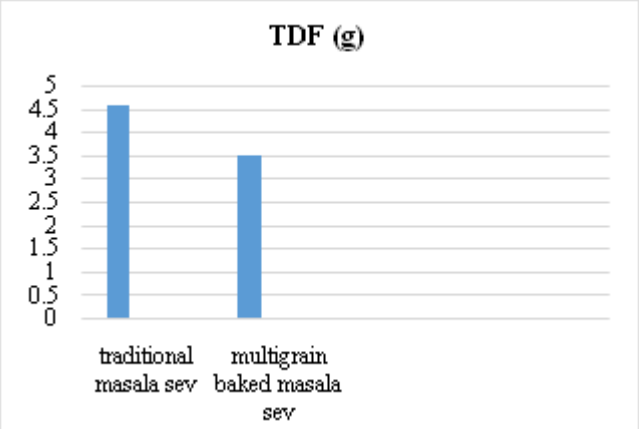

Figure 6: Graphical representation of TDF between Traditional masala sev and Multigrain baked masala sev

7. Discussion

High carbohydrate diets rich in dietary fibre were fed to 13 hyperglycaemic diabetic men; five men required 15 to 28 units of insulin per day, five men required sulfonylureas, and three men required 40 to 55 units of insulin. All 13 men were fed weight maintaining American Diabetic Association diets containing 43% of calories as carbohydrate for 1 week and then were fed 75% carbohydrate diets with 15 g of crude dietary fibre for approximately 2 weeks. After 2 weeks on the 75% carbohydrate diet, sulfonylureas were discontinued in all five men, insulin was discontinued in four men and decreased from 28 to 15 units in 1 man from the group requiring less than 30 units per day. (T G Kiehm, 2014)

In a randomised cross-over study 18 noninsulin-dependent (NIDDM) and 9 insulin dependent (IDDM) diabetics were put on to a high carbohydrate diet containing leguminous fibre (HL) for 6 weeks, and also a standard low carbohydrate diet (LC) for 6 weeks. During two identical 24 h r. metabolic profiles mean pre-prandial and mean 2 hour postprandial blood glucoses were significantly lower on HL in both groups, as were also several overall measures of diabetic control, including the degree of glycosuria. Total cholesterol was reduced significantly on HL in both groups, and the HDL/LDL cholesterol ratio increased significantly on HL in the NIDDM group. A diet high in complex carbohydrate and leguminous fibre improves all aspects of diabetic control, and continued use of a low carbohydrate diet no longer appears justified.(H.C.R Simpson, September,2003).

In a study, oral administration of garlic extract (0.1, 0.25 and 0.5 g/kg body wt.) for 14 days on the level of serum glucose, total cholesterol, triglycerides, urea, uric acid, creatinine, aspartate amino transferase (AST) and alanine amino transferase (ALT) in normal and streptozotocin-induced diabetic rats were evaluated. Oral administrations of the garlic extract significantly decreased serum glucose, total cholesterol, triglycerides, urea, uric acid, creatinine, AST and ALT levels, while increased serum insulin in diabetic rats but not in normal rats ($p<0.05$). A comparison was made between the action of garlic extract and glibenclamide (600 µg/kg), the known antidiabetic drug. The antidiabetic effect of the extract was more effective than that observed with glibenclamide.(A. Eidia, 24 November, 2006)

In a study, it was found that spices like garlic, curry leaves, allspice and others play a role in lowering of blood glucose, increasing insulin sensitivity, and increasing glucose synthesis in response to food intake. In addition, these spices may improve blood circulation, decrease platelet aggregation, lower blood pressure, and act as blood vessel protectants, ameliorating the cardiovascular disease often associated with type 2 diabetes. These spices contain phytochemicals which helps in lowering blood glucose level. (Abigail Kelbl, 2005).

8. Conclusion

The product, which was modified for diabetic patients, was accepted not just by diabetic patients but also by healthy subjects. The modified product had fibre and protein. The carbohydrates in the product came from low to moderate GI food items, which is essential for individuals with diabetes. The traditional masala sev is high in fat due to deep frying. The multigrain baked masala sev is low in fat, which is essential in diabetes condition. Multigrain baked masala sev has a longer shelf life as it is baked. Thus, multigrain baked masala sev is a better option than the traditional masala sev for a diabetic individual.

References

[1] Eidia, M. E. (24 November, 2006). Antidiabetic effect of garlic (Allium sativum L.) in normal and streptozotocin-induced diabetic rats. International Journal of Phytotherapy and Phytopharmacology, 624-629.
[2] H.C.R Simpson, S. L. (September,2003). A HIGH CARBOHYDRATE LEGUMINOUS FIBRE DIET IMPROVES ALL ASPECTS OF DIABETIC CONTROL. THE LANCET, 1-5.
[3] J.E.Shaw, R. ,. (January, 2010). Global estimates of the prevalence of diabetes for 2010 and 2030. international journal of diabetes federation, 4-14.
[4] T G Kiehm, J. W. (2014). Beneficial effects of a high carbohydrate, high fiber diet on hyperglycemic diabetic men. The American Journal of Clinical Nutrition, 895-899.

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