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MUTHIYA FOR DIABETES – A MODIFIED FOOD PRODUCT

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ABSTRACT

A modified product Muthiya was developed for diabetic patients. Muthiya is a traditional Gujarati recipe made with bottle gourd, chana dal flour, wheat flour, rawa, sugar. The modified recipe is made with keeping main ingredients intact i.e bottle gourd, substituting chana dal flour and wheat flour with broken wheat (Dalia). Research have shown Bottle gourd reduces thirst, also its rich in fiber which helps in slow release of glucose in blood which is a beneficial property for diabetics. Flaxseeds have beneficiary effect to improve serum triglycerides, cholesterol levels and A1c hemoglobin levels. Soaked Fenugreek seeds have shown anti diabetic properties by increasing insulin sensitivity in hyperglycemic states and helps in weight loss with good fiber content. Broken wheat is rich in fiber helping diabetics, reduce hyperglycemia. Sesame seeds have anti glycemic effect and also reduce B.P. A sensory evaluation was conducted on live samples as well as panel members. Thus this product was developed.

Keywords: Broken wheat, bottle gourd, modification, diabetes, mutiya

INTRODUCTION

Muthiya is classic Gujarati dish. It's made in different pattern in different part of the state. It's made from bottlegourd, wheat flour, Bengalgram flour, semolina, sugar which is known as doodhi muthiya . Sugar and lemon are commonly added to give sweet sour taste to muthiya. They are generally steamed or deep fried. The accomplishment is green chutney or tomato sauce. It's a hot served snack commonly had with tea or as a light dinner in many families. Statistics of 2007 shows 41 million adults in India are affected with diabetes. Diabetes being an alarming condition in Indian needs a healthy and nutritious diet. Keeping the status in mind, Modified muthiya are made with bulgur or dalia substituting semolina and wheat flour in the product.

METHODOLOGY

Aim is to develop product for diabetics, which has low glycemic index and rich in fiber.

DEVELOPING FOOD PRODUCT

The recipe was modified in the year 2014-15 in MSc Clinical Nutrition and Dietetics in DR. BMN College of Home Science under guidance of Dr. Rupali Sengupta. The product was standardized and modified based on the sensory evaluation of subjects and under the guidance of panel members.

- Rawa and wheat flour was replaced by bulgur which is a low GI food and high in fiber.
- Sugar was removed to sudden hyperglycemia and empty calories.

- Salt intake was restricted to avoid further complications.
- Flaxseeds and sesame seeds were added to incorporate intake of ω omega 3 & ω omega 6 in the diet.
- Soaked Fenugreek seeds were added as it has anti-diabetic properties.

Table 1- Ingredients of Traditional and Modified recipes for 1 serving

Modified recipes		Traditional recipes	
Ingredients	Amounts		Amounts
Bottle gourd	100	Bottle gourd	100
Bengal gram flour	10	Wheat flour	25
Bulgur	20	Semolina	50
Coriander	5	Bengal gram flour	25
Mint	5	Cunin seeds	1
Lemon	2.5 ml	Lemon	1.25 ml
Chilli green	1	Sugar	2.5
Chilly powder	2.5	soda	3
Flax seeds	2	Asafetida	1
Fenugreek	2	Coriander	7.5
Sesame seeds	2	Chilli green	1
Turmeric	1	Ginger	1
Ginger	2	Sesame seeds	2
asafoetida	1	Turmeric	1
Salt	2.5	Salt	1
oil	2.5	Oil	4

Table 2 Nutritive value of modified product

Ingredients	Amount (gms)	Energy(Kcal)	Carbohydrate(gms)	Protein(gms)	Fat(gms)	TDF(gms)
Bottle gourd	100	12	2.5	0.2	0.1	2
Bengal gram flour	10	37	5.8	2.2	0.7	1.1
Broken wheat	20	52	10	2	0.6	1.3
Coriander	5	2	0.31	0.16	0.03	0.21
Mint	5	2	0.29	0.24	0.03	0.31
Lemon	2.5 ml	1	0.27	0.02	0.02	0
Chilli green	1	0	0.03	0.02	0.0	0
Chilly powder	2.5	6	0.79	0.39	0.15	0
Flax seeds	2	9	0.66	0.50	0.49	0
Fenugreek	2	7	0.88	0.52	0.01	0.97
Sesame seeds	2	11	0.5	0.36	0.86	0.34
Turmeric	1	3	0.69	0.06	0.05	0
Ginger	2	1	0.24	0.04	0.01	0.12
asafoetida	1	3	0.67	0.04	0.01	0
Salt	2.5	0	0	0	0	0
Oil	2.5	22	0	0	2.5	0
	Total	168	23.65	6.75	5.6	6.35

Table 3 Nutritive value of traditional recipe per serving

Ingredients	Amount(gms)	Energy(Kcal)	Carbohydrate(gms)	Protein(gms)	Fat(gms)	TDF(gms)
Bottle gourd	100	12	2.5	0.2	0.1	2
Wheat flour	25	85	17.3	3.02	0.42	0
Semolina	50	174	37.4	5.2	0.4	0
Bengal gram flour	25	97	14.5	5.5	1.75	2.75
Cumin seeds	1	3	0.36	0.18	0.15	0.3
Lemon	1.25 ml	1	0.13	0.01	0.01	0
Sugar	2.5	10	2.48	0	0	0
soda	3	0	0	0	0	0
Asafetida	1	3	0.67	0.04	0.01	0
Coriander	7.5	3	0.47	0.24	0.04	0.32
Chilli green	1	0	0.03	0.02	0	0
Ginger	1	1	0.03	0.02	0	0.06
Sesame seeds	2	11	0.5	0.36	0.86	0.3
Turmeric	1	3	0.69	0.06	0.05	
Salt	1	0	0	0	0	0
Oil	4	36	0	0	4	0
	Total	440	77.23	14.89	7.82	5.96

Calculation of product was done with reference to C.Gopalan NIN and was compared with the modified product. The difference in the nutritive value was observed.

Table 5 Standardization of modified product

Ingredients	Amount(gms)
Bottlegourd	100
Besan	10
Broken wheat	20
Coriander	5
Mint	5
Lemon	2.5 ml
Chilli green	1
Chilly powder	2.5
Flax seeds	2
Fenugreek	2
Sesame seeds	2
Turmeric	1
ginger	2
asafoetida	1
Salt	2.5
oil	2.5

METHODS OF PREPARATION

Grind flaxseeds, fenugreek seeds and bulgur coarsely

↓

Grate the bottle gourd

↓

Add the mixture of flaxseeds, fenugreek seeds and bulgur

↓

Add Bengal gram flour

↓

Now add chopped coriander, mint

↓

Also add finely cut green chilly and ginger

↓

Now add chilli powder, turmeric, salt and asafoetida

↓

Mix all ingredients thoroughly

↓

Form sausages of small size of the mixture

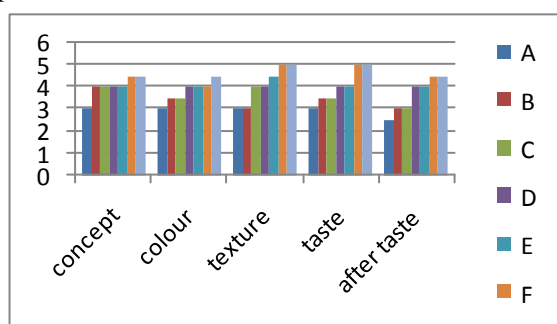
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Boil water in a steamer

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Place the sausages on the plate of steamer
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Allow it to cook for 15-18 mins on medium flame
↓
Check with toothpick for complete cooking and cut into pieces
↓
Take oil in a pan
↓
Add mustard seeds, sesame seeds
↓
Add muthiya and allow it to cook.
↓
Serve it with chutney.

SENSORY EVALUATION OF THE PRODUCT

Sensory evaluation of the product was done on 5 point hedonic scale.



Scores poor=1, average=2, good=3, very good= 4, excellent=5

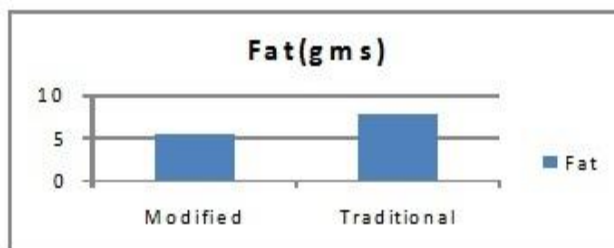
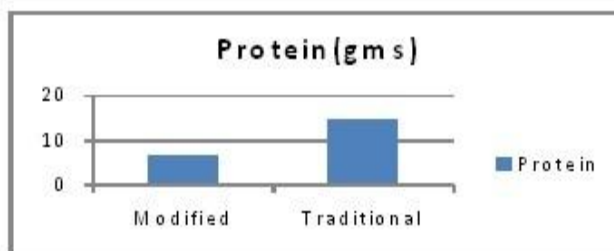
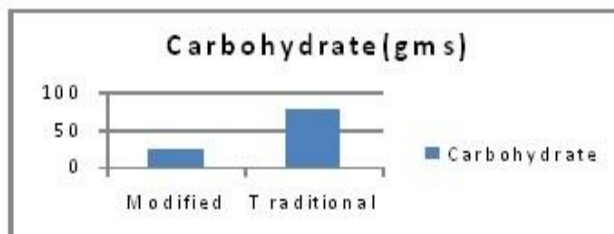
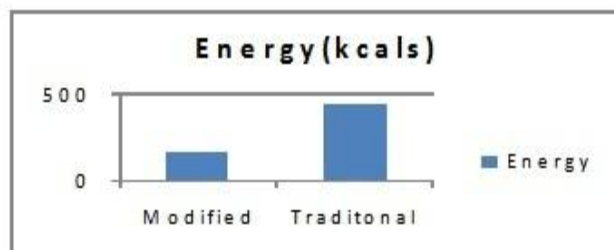
The product was evaluated and marked “good” at start for various parameters. Later the product was marked “EXCELLENT” with further modification and standardization in sensory evaluation naïve panel members and other subjects standardized the sample taken for study.



RESULT

The modified product has fewer calories and has less carbohydrate in product. Also contains less fat but good amounts of dietary fiber (TDF). Sources of carbohydrate are of complex form. Fats in product contain ω 3 and ω 6 and less of SFA which will prevent complications. Whereas in traditional it contains high calorie and carbohydrate content.

COMPARISON OF NUTRITIVE VALUE



DISCUSSION

Modified recipe is a low glycemic product which was developed with low GI foods like bulgur, bottle gourd. The product provides 6.35 gms of fiber which is 22% of fiber recommended dietary fiber for diabetics. According to Harvard medical school fiber helps in slow release of blood glucose in the blood. Fiber also lowers blood cholesterol levels and also improves blood glucose control. Bulgur is made of crushed wheat kernel, rich in vitamins, minerals like iron, zinc. American dietetic association states bulgur as healthy food for diabetics 1 serving is recommended to be consumed daily. Bottle gourd it is rich in vitamins, minerals like zinc iron, magnesium. Bottle gourd is traditional ayurvedic weight loss remedy. It helps in easy digestion and relieves constipation. Bottle gourd relieves thirst which is beneficial function for diabetic. Due to high fiber content it helps in slow release of blood

glucose levels. Soaked Fenugreek seeds were observed to reduce FBS, TG and VLDL-C decreased significantly (25 %, 30 % and 30.6 % respectively) after taking fenugreek seed soaked in hot water (Kassaian N et al, 2009). It also contains good amount of fiber which help in slow release of glucose in the blood. (Campbell et al 2010). Fenugreek seeds contain alkaloids, including trigonelline, gentianine and carpapine compounds. The seeds also contain fiber, 4-hydroxyisoleucine and fenugreekine, a compound that may have hypoglycemic activity. The mechanisms thought to delay gastric emptying, slow carbohydrate absorption and inhibit glucose transport. Fenugreek may also increase the number of insulin receptors in red blood cells and improve glucose utilization in peripheral tissues, thus demonstrating potential anti-diabetes effects both in the pancreas and other sites. The amino acid 4-hydroxyisoleucine, contained in the seeds, may also directly stimulate insulin secretion. It also shows and average decrease in A1C hemoglobin level (Diabetic Health; Rashid A. et al). Flaxseeds have shown to improve fasting blood sugars, triglycerides, cholesterol, and hemoglobin A1c levels in diabetics patients. American Diabetic Association recommends intake of moderate amounts of flaxseeds in diet. Flaxseeds are rich in Omega 3 which help increase good fat and also had antioxidant property. The lignans in flaxseeds improve blood glucose levels. It also protects from CVD which is common complication in diabetic patients. Sesame seeds have beneficial effect in reducing blood glucose, HbA1C levels, lipid peroxidation, and antioxidant level in diabetic rats (Ramesh *et al* 2005). 35g od sesame oil per day showed anti hyperglycemic effect with 36% reduction in glucose levels (D. Sankar 2011). The same was reported by Durgadevi and Nazni, 2012, Nazni and Ravinder Singh, 2014 and Nazni and Ramya, 2012.

CONCLUSION

The product muthiya was developed with main ingredient bottle gourd bulgur which is fiber rich and a low glycemic food sources. It is being enhanced with addition of functional foods like flaxseeds, soaked fenugreek seeds, sesame seeds. The modified muthiya is better option the deep fried muthiyas.

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