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NUTRI NACHOS – A HEALTHY SNACK FOR LIFE STYLE DISORDER

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ABSTRACT

In today's scenario, a Life style disorder is increasing due to sedentary life style, and has become a serious concern. As food, plays a vital role, efforts are continuously made to minimize these disorders. Therefore, the present study is an attempt to modify the traditional food into an innovative and healthy product. The traditional Nachos recipe has been modified specifically for type 2- diabetic individual. The modified food attempts to improve fiber and protein content with the type of carbohydrates, which are beneficial for lowering blood glucose levels. The Multigrain flour used in this product – 'Nutri nachos', improves insulin sensitivity, and reduces hyperglycemia (a condition in which elevated blood glucose level is observed). The cheese-based sauces, which are served along with traditional nachos, are also modified, with curd as base. With Garlic added to it as functional food, along with oregano and mint leaves for flavor and acts as a good source of antioxidants. Further microbial analysis and sensory evaluation by 22 naïve panels based on likert scale was conducted.

Key words: Diabetes, nachos, Nutri nachos, Cheese-based sauce and low-fat sauce.

INTRODUCTION

In today's scenario, a Life style disorder is increasing due to sedentary life style, and has become a serious concern. Efforts are continuously made to minimize the disorders. Diabetes, one of the life style disorder is a group of metabolic diseases characterized by hyperglycemia (a condition in which elevated blood glucose level is observed), resulting from defects in insulin secretion, insulin action, or both (American diabetic association, 2010). Apart from these defects, low activity level, poor diet and excess body weight also increases your chance of getting the disease (www.nlm.nih.com). The Symptoms of marked hyperglycemia include polyuria (increased urination), polydipsia (increased thirst), weight loss, sometimes with polyphagia (hunger), blurred vision, fatigue and pain or numbness in the feet or hands etc (American diabetic association, 2010). According to World Health Organization (WHO) there are 347 million people having diabetes worldwide and the increasing prevalence of diabetes in India shows that the estimated number of diabetic subjects in the year 2000 was 32 million, 2006 - 40.9 million. In the year 2025 it would be 69.9 million and in the year 2030 it would be 80 million (icmr.nic.in/march 2007).

Nutri nachos are the modified product of traditional nachos which are fried and made up of Maize flour and Refined flour. The Nutri nachos are made up from flours of maize, whole wheat and Sorghum. Pepper powder, chilli powder, and salt were added to enhance the flavor. The nutri nachos were baked instead of fried.

Nachos are generally served along with cheese dips. Therefore, a dip was made that is suitable for diabetic patients and palatable along with the modified product. The dip consists of curd, mint leaves, garlic, oregano, and salt.

AIM

Aim of the study is to develop a food product for Life style disorder especially for Diabetes mellitus patients.

OBJECTIVES

- To modify a traditional food product and develop a modified product suitable for Diabetes mellitus patients
- To analyze acceptability using sensory evaluation of the product and to do microbial analysis.
- To standardize the product.

METHODOLOGY

DEVELOPING THE FOOD PRODUCT

- The Refined flour in the traditional nachos was replaced by whole-wheat flour, Sorghum flour. Other flour did not replace maize flour.
- Black pepper powder which has anti diabetic potential was been added and chili powder to enhance the flavor. Salt was added for taste.
- The amount of oil was according to the requirement for baking the product.

Table no 1:- Recipes of Nutri nachos and traditional nachos

Nutri nachos		Traditional nachos	
Wheat flour	10g	Maize flour	25g
Maize flour	10g	Refined flour	5g
Sorghum flour	10g	Salt	1g
Chilli powder	1g	Oil	10g
Black pepper	1g		
Salt	1g		
Oil	5g		

METHOD OF PREPARATION

Take all the flours



Add black pepper powder, chili powder and salt



Knead it like dough



Roll it like thin roti and cut into triangle shape

Place it on a greased baking tray and pre heat the oven at 200° C for 5min



Grease the left over oil over the nachos and bake the nachos at 150°C for 20min



Table no 2: Traditional nachos serving size 1

Ingredients	Amount(g)	Energy(Kcal)	Carbohydrate(g)	Protein(g)	Fat(g)	TDF(g)
Maize flour	25	85	16.55	2.75	0.9	2.9
Refined flour	5	17	3.7	0.55	0.1	0
salt	1	0	0	0	0	0
oil	10	90	0	0	10	0
	Total	192	20.25	3.3	11	2.9

Table no 3: Nutri nachos serving size 1

Ingredients	Amount(g)	Energy(Kcal)	Carbohydrate(g)	Protein(g)	Fat(g)	TDF(g)
Wheat flour	10	34	6.9	1.2	0.17	1.3
Maize flour	10	34	6.6	1.1	0.36	1.2
Sorghum flour	10	34	7.2	1	0.18	1
Chilli powder	5	2	0.3	0.1	0.06	0
Black pepper	1	3	0.4	0.1	0.06	0.3
Salt	1	0	0	0	0	0
oil	5	45	0	0	5	0
	Total	152	21.4	3.5	5.83	3.8

Table no 4: Comparison between modified and traditional nachos

Sr.no	Nutrient	Unit	Nutri nachos	Traditional nachos	RDA for men	RDA for women
1	Energy	Kcal	152	192	2320	1900
2	Carbohydrate	Grams	21.4	20.25	-	-
3	Protein	Grams	3.5	3.3	60	55
4	Fat	Grams	5.83	11	25	20
5	TDF	Grams	3.8	2.9	-	-

RDA Reference (4)

Table no 5: Standardization of the product

Ingredients	Amounts
Wheat flour	10g
Maize flour	10g
Sorghum flour	10g
Chilli powder	1g
Black pepper	1g
Salt	1g
Oil	5g

Table no 6: Recipes of low fat dip and Cheese dip

Low fat dip		Chesse dip	
Curd	150g	Butter	15g
Mint	5g	Refined flour	5g
Garlic	5cloves	Cow milk	100ml
Oregano	1g	Cheese	30g
Salt	1g	Salt	1.5g

Table no 7: Cheese dip (150g)

Ingredients	Amount(g)	Energy(Kcal)	Carbohydrate(g)	Protein(g)	Fat(g)	TDF(g)
Butter	15	110	0	0	12.1	0
Refined flour	5	17	3.47	0.5	0.04	0
Cow milk	100	67	4.4	3.2	4.1	0
Cheese	30	104	1.9	7	7.5	0
salt	1.5	0	0	0	0	0
	Total	298	9.7	10.7	23.74	0

Table no 8: Low fat dip (100g)

Ingredients	Amount(g)	Energy(Kcal)	Carbohydrate(g)	Protein(g)	Fat(g)	TDF(g)
Curd	150	90	4.5	4.7	6	0
Mint	5	2	0.29	0.2	0.03	0.3
Garlic	5 cloves	7	1.49	0.3	0	0.25
Oregano	1	2	0.6	0	0	0.4
Salt	1	0	0	0	0	0
	Total	101	6.9	5.2	6.03	0.95

Table no 9: Comparison between modified and traditional Dips

Sr.no	Nutrient	Unit	Low fat dip	Chesse dip	RDA for men	RDA for women
1	Energy	Kcal	101	298	2320	1900
2	Carbohydrate	Grams	6.9	9.7	-	-
3	Protein	Grams	5.2	10.7	60	55
4	Fat	Grams	6.03	23.74	25	20
5	TDF	Grams	0.95	-	-	-

RDA reference (4)

METHOD OF PREPARATION (DIP)

Hung the curd for 2hours



Minced garlic, oregano, mint leaves and salt together



Add the hung curd, minced paste together and mix thoroughly

Table no 10:- Standardization of the product (dip)

Ingredients	Amount
Curd	150g
Mint	5g
Garlic	5cloves
Oregano	1g
Salt	1g

EVALUATION OF THE PRODUCT

As the product was cereal base and baked. Thus microbial analysis was conducted to check the shelf life of the product. It was also subjected to sensory evaluation.

MICROBIAL ANALYSIS

Isolation of the food sample i.e. Nutri nachos was carried out on Sterile Nutrient Agar medium and incubated at 37°C for 24 hours. The sample was inoculated in sterile saline 30 min prior to the isolation. This was done in order to enable the growth of microbes present in the sample. The technique used was spread plate method. The following results were observed.

Table no 11:- Microbial analysis

Dilution	No OF CFU	No OF CFU/.1ml	No OF CFU/ml	Average CFU/ml
10 ⁻¹	133	1.33*10 ³	1.33*10 ⁴	1.41*10 ⁵
10 ⁻²	82	8.2*10 ³	8.2*10 ⁴	
10 ⁻³	33	3.3*10 ⁴	3.3*10 ⁵	
10 ⁻⁴	TLTC	-	-	
10 ⁻⁵	TLTC	-	-	



RESULTS

Two types of colonies were seen. Gross colony characteristic of the sample was circular, cream colored colonies, opaque with entire margin. Contamination was also seen which indicates poor technique. The shelf life of the product was 7 days at room temperature in an airtight container.

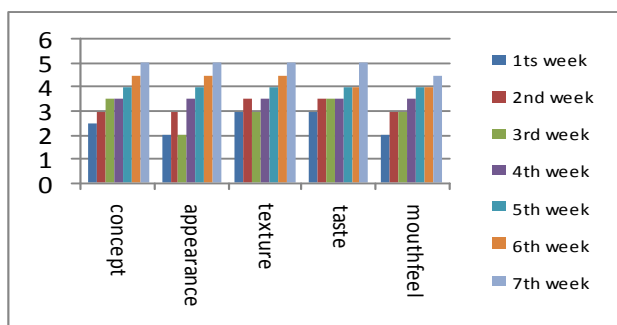
INTERPRETATION

According by FDA Standards

Food description	Test/microorganism Reference criteria	n	c	m	M
Cereals/cereal grains	YMC, cfu/g	5	2	10 ²	10 ⁴
	SPCA/APC, cfu/g	5	2	10 ²	10 ⁶
	Coliform, cfu/g	5	2	10 ²	10 ⁴
	E.coli,MPN/g	5	2	10 ²	10 ⁴
Corn meal	Molds, cfu/g	5	2	10 ²	10 ⁴
	Yeast and yeast like fungi, cfu/g	5	2	10	10 ²
	Coliform, cfu/g	5	2	10	10 ²
	Bacillus subtilis, cfu/g	5	2	10	10 ²
		5	2	10	10 ²

SENSORY EVALUATION

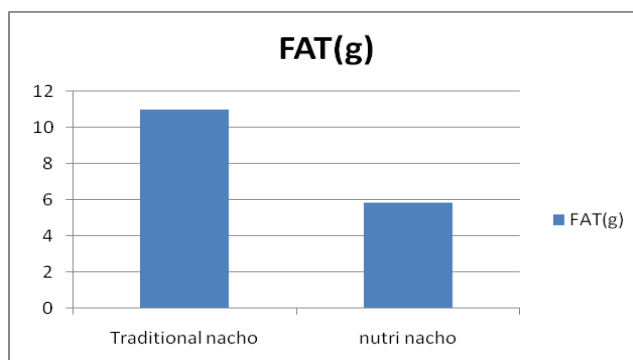
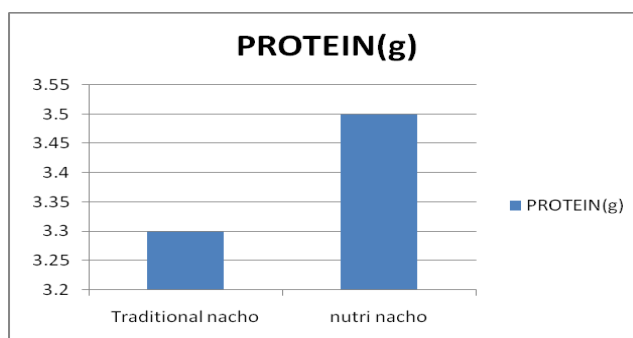
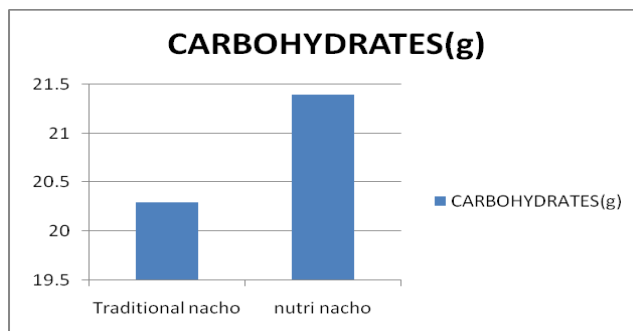
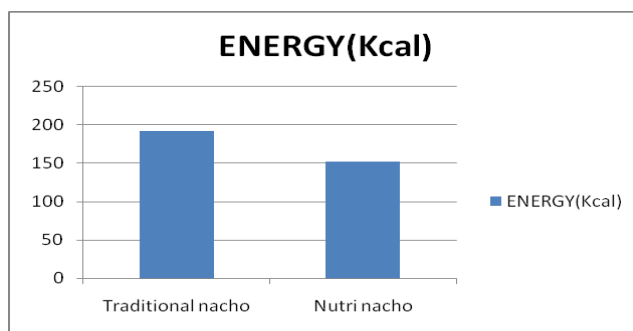
Nutri nachos was subjected to sensory evaluation based on 5 point scale for concept, appearance, texture, taste and mouth feel using 22 panel members. The score were based on the criteria, 5-Verygood, 4-good, 3-average, 2-poor, 1-very poor. There was a gradual improvement from week after week. At the last week all the panels rated the product as "good".



RESULTS AND DISCUSSION

The product, which was modified for Diabetic patients, was accepted not just by diabetic patients but also by healthy subjects. The modified product had fiber and protein. The carbohydrates in the product came from low to moderate GI food items, which is essential for individuals with diabetes. The product is also low in fat,

which is essential in diabetes condition. The traditional nacho is high in fat due to frying and has carbohydrates, which come from high GI food, which is not advisable for diabetic patients. It is also low in fiber. The low fat dip, which was also modified, was not only enhancing the taste and palatability of the product but also benefits the diabetic patients. It contains low fat, fiber and some anti diabetic properties due to the presence of garlic, oregano, and mint leaves. The cheese dip, which is served along with nachos, is high in fat with no fiber. Hence, making low fat dip a suitable side item for the modified nutri nachos. Nutri nacho has a longer shelf life as it is baked. Thus, the combination of Nutri nacho and low fat is a better option than the traditional nacho served along with cheese dip for a diabetic individual.



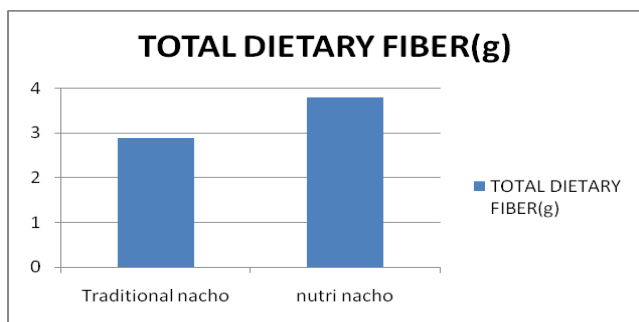


Figure no 1:- Nutrient values of traditional nachos and nutri nacho

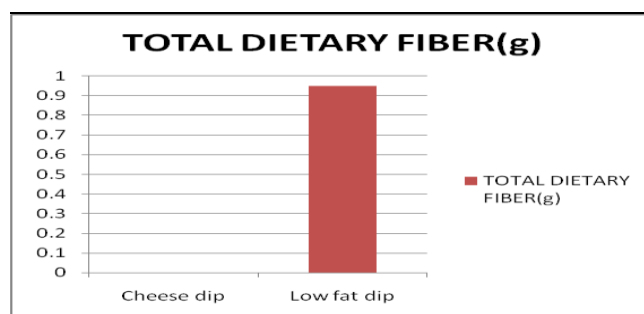
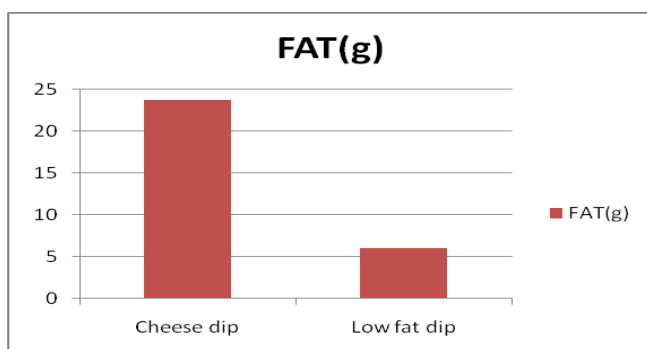
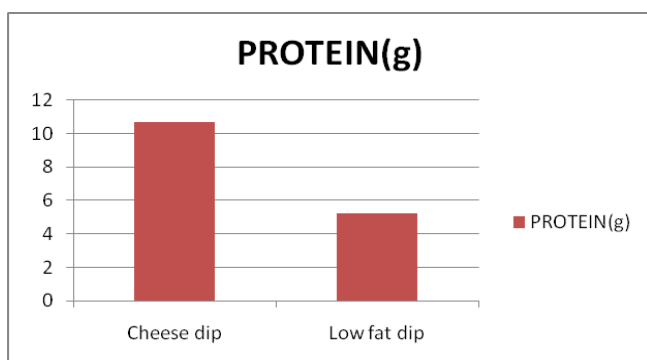
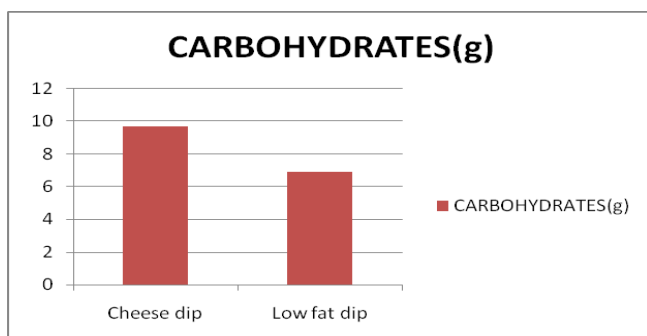
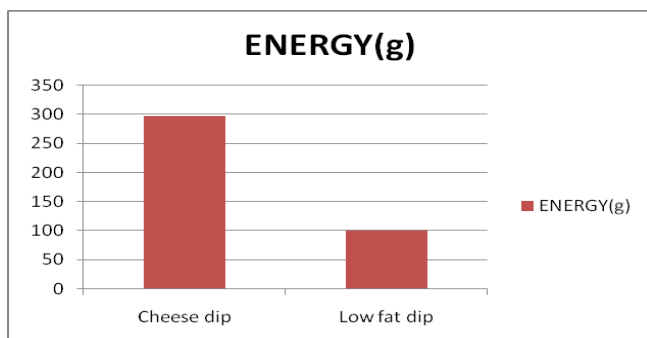


Figure no 2:- Nutrient value of cheese dip and low fat dip

DISCUSSION

The waist circumference (WC) is the major obesity indicator, and is associated with hypertension and diabetes mellitus. (L Grievink, *et al*, 2004). Refined carbohydrates have been suggested to deteriorate glucose metabolism and there was a significant association between rice intake and an increased risk of type 2 diabetes in women. (Akiko Nanri, *et al*, 2010).

Hence a modified product which low in fat and low to moderate GI food was made. A diet high in whole grains is associated with reduced risk of type 2 diabetes and may be mediated by cereal fiber. (Teresa T Fung, *et al*, 2002). Lower dietary GI is related to lower Hb A_{1c} concentrations, independently of fiber intake (Annette, *et al*, 2001). According to the new revised table the GI of maize-59, Rice-69±7 and wheat-30±9. (Kaye Foster-Powell, *et al*, 2002). Maize has phenolic phytochemical which play an important role in health benefits because of their highly antioxidant capacity. Thus preventing from diabetes mellitus (Van Hung P, 2014) Arabinoxylan (AX) is the major component of dietary fiber in the cereal grains that make up a large proportion of our diet. It improves the postprandial glucose and insulin responses (Zhong X Lu, *et al*, 2000). A Lowfat dairy product has a significant inverse association with the risk of type 2 diabetes. (Dagfinn Aune, *et al*, 2013). The beneficial effects of garlic are mainly attributed to the presence of volatile sulfur compounds like alliin, allicin, diallyl disulfide, diallyl trisulfide, diallyl sulfide, S-allyl cysteine, ajoene and allyl mercaptan. These shows to be effective in reducing insulin resistance. (Padiya, Raju, *etal*, 2013). Spices used in the recipes like garlic, ginger, oregano, and others play a role in lowering 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 that helps in lowering blood glucose level (Abigail kelbl, 2005).

CONCLUSION

It is a product, which can be eaten by all age groups. It has a longer shelf life as it is baked. It is a modified product keeping Diabetic patients in mind and the aim fulfilled. Hence, a healthy and nutritious food

product is modified. The microbial analysis was done to determine the count of microorganisms in the product. The count of the microorganism was within the range. Hence it has a long shelf life and is edible.

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