

Development of Nachos using *Cucurbita* (Pumpkin) Seed Powder, *Sorghum* (Jowar) Flour, *Zea Mays* (Maize) Flour, and *Cicer Arietunum* (Besan)

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ABSTRACT

The study of Nachos was carried out at the Department of Food Technology, Parul Institute of Applied Sciences, Parul University, Vadodara, Gujarat. This research shows the health benefits of pumpkin seeds and the major goal was to develop Nachos that could be enjoyed by all age groups by using the same as Pumpkin seed have an Antimicrobial and Antioxidant property and are rich in protein content as well. Three formulations with control sample were formulated for the preparation of Nachos. Nachos was developed by using pumpkin seeds, which was first roasted and ground into powder and combined with jowar flour, maize flour, and Chickpea flour. Roasting enhances the flavour and gives an aroma to the food products. The treated pumpkin flour was mixed with jowar flour, Maize flour and Chickpea flour. Spices like Chili powder, turmeric, amchur powder, Ginger powder Coriander powder, Chili flakes and Oregano were also used for seasoning Nachos for better taste and flavour. Pumpkin seed powder was added in different variations (10%, 20%, 30%) during dough preparation. Tortillas were firstly prepared from the dough and further it was it was fried. Difference formulation were formed to make Nachos; Maize flour was added in 40%, 30% and 20%. The developed nachos were further analyzed for its sensory evaluation, physio-chemical parameters, and microbiological analysis. Dry heat treatments were given to pumpkin seeds prior to use in preparation of Nachos. The nachos had a 4.84% of moisture content and 3.87% of ash content in addition it was found to have 26.01% of protein content 37.23% of carbohydrates content and 28.02% of fat content and energy 505.14kcal.

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KEYWORDS: Pumpkin seed, Maize flour, Sorghum flour, Chickpea

1. INTRODUCTION

Nachos are the tortilla chips which are made by using corn flour or wheat flour. Tortilla chips is another name for Nachos. It is a Mexican dish consist of fried tortilla. Nachos can be fried or baked. It is the most important food in Mexico, America, and Colombia. Nachos comes in different sizes and shapes of the stripes. Shapes like Square, Round, Triangular, Rhombus etc. Nachos can be served with or without sauces and spices as per persons requirement. It is a snack which have good sensory and Nutritional characteristics due to their high Carbohydrates, Protein and Fats. In recent year, consumption of food habits such as Potato chips, corn flour nachos are some of the products available in the market cannot meet the requirement. The balance between health

and disease is influenced by social, cultural, environmental, and economic factors, influences which need to be kept in mind when defining and developing public health advice for health promotion. (L. Marletta et.al., 2010).

Family Cucurbitaceae Pumpkin belongs to the genus *Cucurbita* is a versatile fruit that is used for various food processing applications. Ranging not only in agricultural purposes but also commercial and ornamental sales, pumpkins are grown all over the world for a variety of reasons with versatile uses as to the seeds, even the flowers, cooking from the fleshy shell most parts of which are edible. The pumpkin seeds are by-product in the food industry. Pumpkin

fruits bear numerous seeds like members of Cucurbitaceae. They are variable in size, shape, colour, and weight. Depending upon the polyphenolic pigments present in it, the colour of pumpkins ranges from golden-yellow to orange flesh (Ningthoujam Manda Devi et.al., August 2018).

Maize or corn (*Zea mays* L.) belonging to family Poaceae is known as an important annual cereal crop of the world. Maize kernel is an edible and nutritive part of the plant which contains vitamin C, vitamin E, vitamin K, vitamin (thiamine) B1, vitamin (niacin) B2, vitamin (riboflavin) B3, vitamin (pantothenic acid) B5, vitamin (pyridoxine) B6, folic acid, selenium, and tryptamine. Potassium is a major nutrient present which has a good significance because an average human diet is deficient in it (Tajamul Rouf Shah et.al., Kumar & Jhariya et.al. 2013)

Sorghum is an excellent source of starch and protein like other cereals and they are gluten-free cereal, which bears significance in the present-day scenario where the occurrence of Celiac Disease (CD), an immunological response on the rise to gluten intolerance. Grain sorghum contains phenolic compounds like flavonoids, (Shahidi et. al. 1995) which inhibit tumour development. (Huang et.al. 1992) The starches and sugars in sorghum are released more slowly than in other cereals (Klopfenstein et.al. 1995) and it could be beneficial to diabetics. (Toomey et.al. 1988) Sorghum is been consumed in various forms around the world like baked bread, porridge, tortillas, couscous, gruel, steam-cooked products, alcoholic, and non-alcoholic beverages. (Arun G. Kulamarva et. al. 2009)

Chickpea (*Cicer arietinum* L.) plant derived from the Fabaceae family (Nwokolo et al., 1996). A leading manufacturer of chickpeas is India, which provides approximately 66% of global production, (Smith, et al., 2005; Menale, et al., 2009). Chickpeas is reproduced from grains. Like all legumes leaves it in good shape and it enriches the soil with nitrogen (Biggs et al., 2007). Chickpeas occurs mainly in two varieties Kabuli and Desi (Maheri-Sis et al., 2008). Chickpea flour was added in Nachos for binding, before adding chickpea flour it was observed that the dough was not binding properly for preparation of tortilla. It also helps in maintaining the Taste of Nachos.

2. MATERIALS AND METHODS

The present study entitled “Development Pumpkin seed Nachos” was carried out in the Department of Food Technology, Parul Institute of Applied Science, Parul University, Vadodara. This section enlists the

material used and elaborates the processing techniques, organoleptic evaluation and analytical procedures following during the research.

2.1. Materials

A. Raw materials used in studies

The ingredients used in preparation of Nachos were pumpkin seed powder, Jowar flour, Maize flour, Gram flour, Spices like turmeric, Chili powder, Salt, Chili flakes, Coriander powder, Amchur powder, Ginger powder and oregano procured from a local market of Vadodara

B. Processing Equipment

Equipment required for the preparation of Nachos are: Weighing balance, Grinder, Tawa, Spatula, Bowl, and other utensils were obtained from Food Processing Lab, Department of Food Technology, Parul Institute of Applied Sciences, Parul University, Vadodara.

2.2. Methods

A. Physio-chemical Analysis

Pumpkin seed powder, Jowar flour, Maize flour, Gram flour, Spices like turmeric, Chili powder, Salt, Chili flakes, Coriander powder, Amchur powder, Ginger powder and oregano were used to prepared Nachos were analyzed for proximate composition including moisture, ash, protein, fat, carbohydrate, and calories content as per the standard procedure given by (AOAC 2005)

a. Moisture content

Moisture content was estimated by drying the empty dish and 10g of sample was weighed and grounded in the dish. The dish was then subjected to oven for drying at 135⁰C for 2hrs. It was again weighed after cooling in desiccator until constant weight. The resultant loss in weight was calculated as moisture content.

$$\text{Moisture \%} = \frac{\text{Initial weight (W1)} - \text{final weight (W2)}}{\text{Initial weight (W1)}} \times 100$$

b. Ash content

Ash content was determined using (AOAC 2005) procedure. 5g of sample was weighed into pre-weighed crucible and it was heated at low flame till all the material was completely charred (smokeless) and cooled. The sample was then kept in the muffle furnace for about 2hrs, at 700⁰C. It was cooled in desiccator and weight of a sample was taken. The procedure was repeated until two consecutive weights were constant. The percent ash was calculated by knowing the difference between the initial and final weight.

$$\text{Ash \%} = \frac{\text{Weight before heating} - \text{Weight after heating}}{\text{weight of sample}} \times 100$$

- c. Determination of Protein Carbohydrates and Fats:** The results are Protein was 26.01%, Carbohydrate was 37.23%, and Fat was 28.02%

B. Microbial Parameter

The microbial quality of prepared Nachos was determined. In the present study different microbial parameters such as Total Plate Count, Yeast and Mould were examined also the samples were examined during the storage at ambient temperature.

a. Determination of Total Plate Count

- Preparation of nutrient agar medium: 25g of nutrient agar was added in 550ml of distilled water and it was heated till it dissolved properly. Its mouth was plugged with cotton and it was sterilized in an autoclave for 20min at 121° C
- Preparation of sample solution (serial dilution): Four sterilized test tubes were taken and numbered. In each tube 9ml of distilled water was poured. The test tubes were plugged with cotton plugs and were sterilized in an autoclave at 121°C for 15min. In 9 ml distilled water of sterile test tube 1 ml of sample was added serially
- Preparation of plates: Petri plates and pipettes were sterilized by hot air oven (dry heat treatment) or by autoclave (moist heat treatment). Sterilized petri dishes were taken to the laminar airflow cabinet and ultraviolet light was switched on for 30min. After 30min UV light was switched off and then blower was switched on, and the working surface was cleaned by 70% 1ml sample was poured into the plates and marked. 15-20ml of molten media was poured into each plate. This was done near a flame to prevent contamination of the plate by microbes. The Plates were kept for the solidification after swirling. The plates were then placed into the incubator for 48hrs at 37° C and then observed for the colonies on the plates.

b. Determination of Yeast and Mould

- Preparation of potato dextrose agar medium: 11g of Potato dextrose agar medium was added in 250ml of distilled water and it was heated to dissolve properly. Using cotton plug the mouth was plugged and it was sterilized in an autoclave at 121° C for 15min.
- Preparation of sample solution (serial dilution): 4 sterilized test tube were taken and numbered accordingly. 9ml distilled water was poured in each tube. The test tubes were closed with cotton plugs and were sterilized inn an autoclave at 121°C for 15min. 1ml of sample was added in 9ml distilled water of sterile test tube serially.

- Preparation of plates: Petri plates and pipettes were sterilized in hot air oven (dry heat treatment) or by autoclave (moist heat treatment). Sterilized petri dishes were taken to laminar air flow cabinet and ultraviolet light was switched on for 30min. After 30min UV light was switched off and then blower was switched on, and the working surface was cleaned by 70% alcohol. Plates were properly marked and then 1ml of samples were poured into the plates. 15-20ml of molten media was poured into each plate. This was done near a flame to prevent the contamination of the plate by microbes. The Plates were kept for the solidification after swirling. Then the plates were kept into the incubator for 48hrs at 37°C and the colonies were observed on the plates. The former colonies were counted on the plate.

3. Preparation of Nachos

Formulation	Jowar Flour	Pumpkin seed Powder	Maize flour	Chickpea Flour
C1	5	10	40	45
C2	5	20	20	45
C3	5	30	30	45

Table 4.1: Formulation of Nachos

The various ingredients used for the standardization of recipe for the preparation of pumpkin seed nachos consist of 100. Nachos were prepared in three formulations C1; C2; C3. The amount (in grams) of C1 Formulation was 5g of Jowar flour, 10g of Pumpkin seed powder, 40g Maize flour, 45g Gram flour. C2 Formulation was 5g of Jowar flour, 20g of Pumpkin seed powder, 30g of Maize flour, 45g of Gram flour. C3 Formulation was 5g of Jowar flour, 30g of Pumpkin seed powder, 20g of Maize flour, 45g of Gram flour. 2-3g of spices like chili powder, pinch of salt, ginger powder, coriander powder, Amchur powder, Chili flakes and Oregano. The above ingredient required for making 3 formulations weight 100g to 120g. Gram flour was used as binding in dough preparation. The dry spices were added for taste. Dough was prepared and tortilla was made by using tawa for 105°C for 2 mins. The baked tortilla was cut into Triangular strips and fried at 120°C for 5 minutes. The Fried tortilla was kept in Parchment paper to remove excess of oil. Chili flakes and Oregano were added as a seasoning after frying. The Prepared Nachos was kept in Low Density Polyethylene (LDPE) Zip bags. Nachos can be stored at normal room temperature for shelf-life

3. RESULT AND DISCUSSION



Figure 1: Developed Nachos

The result obtained during the investigation “Development of Nachos using Pumpkin seeds” is discussed here. The final product was analysed for physio-chemical analysis, microbial-analysis sensory evaluation and stored at room temperature. Research experiments undertaken to standardized the method for manufacturing of Nutri-bar have been discussed under heading

Characteristics	Values
Moisture content (%)	4.84%
Ash content (%)	3.84%
Protein (%)	26.01%
Carbohydrate (%)	37.23%
Fat (%)	28.02%
Calorific value (%)	505.14 Kcal

Table 3.1.1: Proximate composition of Nachos

The moisture content in Nachos was 4.84%. Ash content was 3.87%, Protein was 26.01%, Carbohydrate was 37.23%, Fat was 28.02% and calories found was 505.14 Kcal

3.1. Microbial analysis of Nacho

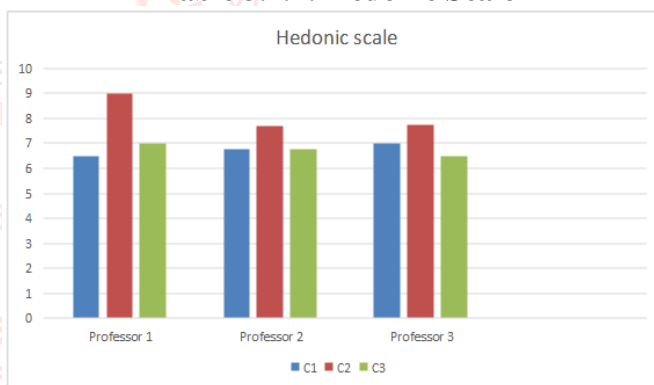
- **Total plate count (TPC) of Nachos:** The mean values for TPC of Nachos samples is 2.6×10^2 Log₁₀ cfu/g.
- **Total yeast and mould count of Nachos:** The mean values for mould count of Nachos sample is 2×10^2 Log₁₀ cfu/g.

Table 3.1.1: Sensory evaluation of produced Nachos

Sample code	C1	C2	C3
Appearance	6	9	7
Color	8	9	8
Texture	6	8	7
Taste	6	9	6
Overall Acceptability	6.5	9	7

The quality of Nachos was greatly influenced by their flavour, texture, and taste. There were significant changes in texture and taste of Nachos due to different concentration Maize flour and Pumpkin seeds. The Nachos with F1 formulation got 6 hedonic score appearance, 8 hedonic score on Color, 8 hedonic score on Texture, 6 hedonic score on taste and its overall acceptability was 6.5. The bar with F1 formulation got 6.5 for overall acceptability which indicates that the nachos is Liked slightly according to 9-point hedonic scale. It can be because of dull taste, poor texture and appearance and taste. F2 formulation got 9 hedonic score appearance, 9 hedonic score on Color, 8 hedonic score on Texture, 9 hedonic score on taste and its overall acceptability was 9. The bar with F2 formulation got 9 for overall acceptability which indicates Like extremely. The F3 formulation got 7 hedonic score appearance, 8 hedonic score on Color, 7 hedonic score on Texture, 7 hedonic score on taste and its overall acceptability was 7. The bar with F3 formulation got 7 for overall acceptability which indicates the nachos to be like moderately. Therefore, Nutri-bar with F2 formulation was selected as the best Nachos.

Table 3.1.2: Hedonic Scale



3.2. Packaging and Storage

The Nachos were packed in Low Density Poly-Ethylene (LDPE) bags and can be stored in room temperature for 3 to 4 months.

Table 3.5 Cost Estimation of per 100g Nachos

Ingredients	Grams	Cost
Pumpkin seeds	20g	20/-
Jowar	5g	2.5/-
Maize	30g	15/-
Besan	45g	13.5/-
Spices		5/-
TOTAL	100g	56/-

Per packet contains 20g of developed Pumpkin seed Nachos. Hence, per 100g Nachos will produce 5 Packets out of it. Total cost estimation for 100g Nachos is 56/-. Therefore, Nachos were sold for 20 grams at 12/-. Hence, per 100g Nacho gives 7% profit.

4. Conclusion

It can be concluded from above research that from all the formulation containing different concentration of Maize and Pumpkin seeds, F2 was found to be the best among all the different treatments. Nachos with F2 formulation contains 4.84% moisture, 3.87% Ash, 26.01% Protein, 37.23% Carbohydrate, 28.02% Fat and 505.14 Kcal of Energy. The prepared nachos can provide enough energy and protein to the body. The prepared Nachos can be eaten with or without sauce and toppings. Nachos can be consumed by all age groups. Nachos is called as snacks and can have anytime while consuming meal. The ingredients for Nachos were chosen with the intention to utilize the waste product and develop a healthy snack. Nachos can be stored in Low Density Poly-Ethylene (LDPE) and can be kept in the room temperature for 3 to 4 months. The cost of the product is 12/- rupees for 20 grams per packet.

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