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## Research Paper

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## STANDARDIZATION OF BEETROOT KHAKHRA (B CRUNCHY) AND ITS SHELF LIFE

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A Shelf life study was done to standardize and innovative product for consumer acceptance which is nutritious. A healthy nutritious recipe was developed as in today's lifestyle everyone is opting to eat healthy and are looking for various options and are ready to buy them if delivered. So a healthy snack, was developed- BEETROOT KHAKARA (*B crunchy*) which is one of the most famous traditional Gujarati dish {snack}. The base ingredient used in this product was Beetroot along with wheat flour, Bengal gram flour (Besan), masala oats, flax seeds, ground nut powder were added as functional foods and Beetroot juice for increasing the flavor and overall acceptability. The *B Crunchy* apart from giving energy, protein and fats contains enough Calcium, Phosphorus and iron. Shelf life study included Sensory evaluation using scoring test with a 5 point scale was the attributes used were taste, texture, sweetness and overall acceptability. The other aspects covered in the shelf life study were Packaging, labeling, budgeting and marketing.

**Keywords:** Healthy snack, Traditional Gujarati snack, Beetroot, Sensory evaluation

## INTRODUCTION

*B Crunchy* (Modified Khakhra) was finalized after a lot of deliberations for a food product development project which was part of undergraduate syllabus in the last year of B.Sc course in food science and nutrition.

The objective of the study is

- To develop a food product suitable for any age group.
- To innovate traditional recipe with slightly modification.
- To standardize and innovate healthy snacks.
- To understand the product well & do research based study on the ingredients.

A healthy *B crunchy* was developed and standardized as a healthy option for all age groups. The main ingredients used for this innovative food product was beetroot along with other base ingredients such as Wheat flour, Besan, groundnut powder, flaxseeds. Studies have shown that

beetroot has many benefits which includes one of the example for physiological effects that improved diseases such as hypertension, atherosclerosis, type 2 diabetes and dementia (Clifford *et al.*, 2015). It contain dietary nitrate which helps in improving vascular function in hypercholesterolemic patients (Shanti Velmurugan *et al.*, 2015).

Flaxseed have many health benefits that include anti-cancer, cardio-protective, anti-diabetic, anti-inflammatory properties (Dikshit *et al.*, 2016). Oats contain protein, lipids, vitamins, etc. It is a functional food along with this it also has some physiological benefits like hypoglycemic and hypocholesterolemic effect, It also effect on reduction of cancer and hypertension (Wani *et al.*, 2014).

To enhance the taste and aroma kasuri methi and other spices were added. As Khakra is a Gujrati dish (Snack) and is generally eaten as a snack , the product made will add to the variety, is more nutrition dense and has a better flavor

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and taste with natural color added. The ingredients used in this enriched modified product *B crunchy* has good amounts of Iron, Protein, energy, Phosphorus, fiber and gives a feeling of satiety.

## MATERIALS

Khakhra is also referred as crispy snack item served during breakfast or snack time. It is easy to prepare and It is made from whole wheat flour adding other ingredients and spices. It can be made in different varieties such as methi, jeera, bajri, masala flavors, etc.

Materials used to prepare this product are Beetroot, Beetroot juice, Wheat & Bangle gram flour, Ground nuts powder, Masala oats, Flax seeds, Salt, Chili powder, Cumin seeds powder, Oil. After conducting sensory evaluation and feedback given, Cumin seeds was replaced by Cumin seeds powder as it gave an after taste.

Dehydrated beetroot (by roasting on Flat tawa) used to remove the moisture content of beetroot because low moisture content khakhras are generally safer from microbiological spoilage and have long shelf-life. It is one of the traditional method to preserve food (Sarah Finn *et al.*, 2013).

Ingredients	Amount
Crushed Beetroot	30 g
Beetroot Juice	3 tsp
Wheat flour	20 g
Bengal gram flour	10 g
Ground nut powder	15 g
Masala Oats	15 g
Flax seeds	½ tsp
Cumin seeds powder	¼ tsp
Chilli powder	¼ tsp
Salt	1 tsp
Oli	1 tsp (5 g)

## METHOD OF PREPARATION

Wheat flour + Bangle gram flour + Masala Oats + Ground nuts powder + Flaxseeds + Cumin seeds powder + Salt + Chilli powder + Oil



Add Crushed Beetroot (Dehydrate it by roasting on Flat tawa) and beetroot juice



Mix well and make dough (equal size balls)



Rolling in round shape (wafer thin)



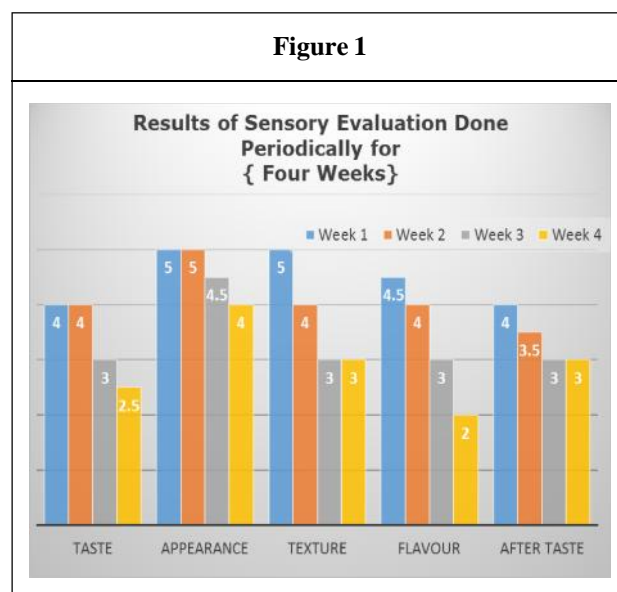
Roasting on flat tawa.

Khakhra is ready to serve.

## SENSORY EVALUATION RESULTS

In order to study the shelf life of the product in order to study the shelf life of the product, Sensory Evaluation done Periodically for Four Weeks. Scoring test with a five point rating scale was used. Characteristics evaluated were appearance, texture, after taste, flavor, taste and overall acceptability and scored out of 5 where 5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor. The result of evaluation is shown in Figure 1.

**Figure 1**



## NUTRITIONAL LABEL

Nutrition labels helps the consumers in selection of food, it also describe the foods nutrients and its content. It properly guide the consumer in selection of foods, along with this labelling regulation should provide incentives to manufactures to develop products that helps in public health and also in following dietary recommendations (Van den Wijngaart *et al.*, 2002).

**Figure 2**

Nutrition Value	Per Pack(25gms)
Energy (kcal)	53.1
Protein(g)	10.4
Carbohydrate(g)	27.1
Fat(g)	5.9
Calcium(mg)	3.3
Phosphorus(mg)	143

100 % veg  
Net weight: 25gms  
MRP: 20-/  
MFD: February 2017  
Best before: 1 month from packaging  
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A nutritional label was designed for *B Crunchy*. Information like NET WG. Manufacturing Date, Veg status, Major Nutrients and Contact information's were added (Figure 2).

**B Crunchy**

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**B Crunchy**

100% veg  
Net weight: 25 gms  
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MFD:

Best before: 1 month from packing

**PACKAGING MATERIAL**

Packaging material BOPP was used (Figure 3) BOPP films have excellent gloss and high transparency that give it an excellent look and fine finish. It has excellent clarity. It acts as good barrier to water vapor, hence increase the shelf life of the Product ([www.cosmofilms.com](http://www.cosmofilms.com)).

**Figure 3**



**BUDGETING AND MARKETING**

Budgeting helped us to know how to improve upon the next product sales in terms of feedback collected from the target population about the pricing and other aspects. Budgeting also helps to make the seller to sell their products in their financial way and also to the consumer in they are budget. For the bulk production Ingredients for *B Crunchy* has been brought form the wholesale market to increase the profit.

Cost Calculation for the Ingredients of 60 Khakhra's is given below.

Ingredients	Cost (RS)
Beetroot (250 g)	35
Wheat flour (250 g)	25
Bengal gram flour (150)	35

Ground nut powder (150 g)	30
Masala oats (40 g)	15
Flax seeds (10 g)	5
Cumin seeds powder (5 g)	5
Chilli powder (5 g)	5
Salt (5 g)	2
Oil (25 ml)	20
Label (20 nos)	30
Cooking gas	20
Plastic packets (20 nos)	28
Total =	255 rs

20 samples (Each sample contain 3 khakhra) were prepared and sold at Rs 20/- each (total Rs 255/-). The profit made was Rs 145/- for 20 packets (per packet 7.25 Rs. profit).

Quantity (Set of 3 Khakhra)	Cost Involved	Sold at	Benefit
20	Rs. 255/-	Rs. 400/-	Rs. 145/-

#### CONCLUSION

A nutritious product was successfully developed, standardized and marketed. The shelf life was seen to be for 30 days. The *B Crunchy* was Tasty, crunchy and loved by every age group people. The sales were good and profit made. This project enhanced entrepreneurship skills. The Khakhra (*B Crunchy*) can be made in different flavors and tried out with other ingredients like with Carrot, Chilli, Palak, etc.

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