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SHELF LIFE STUDY OF CHEWY NUTRITIOUS SNACK BAR

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A healthy snack bar was developed and standardized as a meal replacer for obese population and for anyone who is conscious of their Calories. The base ingredient used in the bar was Oats with various nuts, brown sugar and honey to make it nutritious. Muskmelon seeds, poppy seeds and sunflower seeds were added as functional foods and choco chips for increasing the flavor and overall acceptability. The bar apart from giving energy, protein and fats contains enough fiber, B-complex and vitamins A, C, E, iron, minerals, etc. Sensory evaluation using scoring test was done for shelf life studies and other aspects studied were Packaging, labeling, budgeting and marketing.

Keywords: Snack bar, Oats, Muskmelon seeds, Sunflower seeds

INTRODUCTION

A snack bar 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. Studies have shown that snacking has various benefits. Research suggests that nutritious snack that fit the calorie requirements may control overweight and improve overall health, however wrong snacks tend to increase weight (Didier Chapelot *et al.*, 2011). Study using data from NHANES- found that snacking was associated with more nutrient dense diet as measured by USDA healthy eating index scores and also improved intake of micro-nutrients (Zizza *et al.*, 2012). The bar that was made in the present study had shown similar benefits of a good snack. Considering the importance of high fiber and low glycaemic index, oats were selected as the main ingredient of the bar. Many researchers suggest B-Glucan present in oats can improve blood glucose control, insulin resistance and cholesterol level (Oats Nutrition and Technology - UK Jan Ville) B-Glucan also has beneficial role in lowering the

risk of obesity and increasing immunity to fight cancer (Thompson *et al.*, 2010; El Khourry *et al.*, 2012; and Daou *et al.*, 2012). Studies have shown that people who eat nuts experience a reduced risk of death due to all causes. They are delicious way, to consume heart healthy nutrients, such as unsaturated fats, fiber, vitamin E, Potassium, L-arginine, polysterol and reservatol (Bao *et al.*, 2013). Considering this Almonds and peanuts were added. Also in an article 'Power house Peanuts' RD David Ghetto says peanut contains antioxidants similar to wine and chocolate. Apricot gives Vitamin A and Vitamin C. Poppy seeds, Muskmelon Seeds and Sunflower seeds were added as they have functional benefit. These ingredients enriched the bar with Iron, B-Complex vitamins, Vitamin C & E (Ninindia.org). Brown sugar and honey were used for sweetening purpose. Overall the bar gives satiety due to fibre, energy, good biological value protein, vitamins and minerals.

OBJECTIVES

- 1) To standardize a healthy snack bar.

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- 2) To study the shelf life of the product by sensory evaluation.
- 3) To understand the marketing and budgeting aspects of the product.
- 4) To design a nutritional label.
- 5) To identify a cost effective packaging material.
- 6) To learn the various entrepreneurship skills.

METHODOLOGY

Many products were thought off out of which 'chewy snack bar' was finalized based on sensory evaluation scores and acceptability. 'Chewy Snack Bar' is a healthy snack alternative rich in fiber, protein, omega 3 fatty acids, vital mineral, B-Complex

MATERIALS

Materials used to prepare this product are: Oats, rice Flakes, Corn flakes, Almond, Groundnut, Sunflower seeds, Poppy

| Ingredients | Amount (g) |
|-----------------|------------|
| Oats | 15 |
| Rice Flakes | 2 |
| Corn Flakes | 2 |
| Almond | 2 |
| Cashew Nut | 2 |
| Sunflower Seeds | 2 |
| Muskmelon Seeds | 2 |
| Poppy Seeds | 1 |
| Dried Dates | 2 |
| Apricot | 2 |
| Black Grapes | 1 |
| Red Grapes | 1 |
| Raisins | 1 |
| Honey | 6 |
| Brown Sugar | 6 |
| Butter | 3 |
| Choco Chips | Sprinkled |

Seeds, Dried dates, Apricot, Black grapes, Raisins, Brown sugar, Honey, Butter, Choco Chips.

After conducting sensory evaluation and feedback given, Red grapes were removed to decrease the fruity taste. Ghee was replaced by butter during greasing as it gave an after taste. Amount of Oats were increased by 5 grams to maintain the net weight.

| Ingredients | Amount (g) |
|-----------------|------------|
| Oats | 20 |
| Rice Flakes | 2 |
| Corn Flakes | 2 |
| Almond | 2 |
| Groundnuts | 2 |
| Sunflower Seeds | 2 |
| Muskmelon Seeds | 2 |
| Poppy Seeds | 1 |
| Dried Dates | 2 |
| Apricot | 2 |
| Black Grapes | 1 |
| Raisins | 1 |
| Honey | 6 |
| Brown Sugar | 6 |
| Butter | 3 |
| Choco Chips | Sprinkled |

Method of Preparation

Roast the Oats, Rice Flakes, Corn Flakes, Almonds, Ground Nut, sunflower seeds, muskmelon seeds and poppy seeds separately

↓

Mix them well and add dried dates, apricot, black grapes and raisins.

↓

Take brown sugar, butter, and honey. Heat till sugar is dissolved.

↓

Add this Mixture to Fruit muesli and mix well.



Grease the mold with butter and add the mixture to it.
Bake it at 180 C for 10-15 minutes.



Cool it and then cut it in the shape of bar.
Chewy Snack Bar is ready to serve.

Sensory Evaluation Results

Sensory Evaluation was carried out by 10 semi trained panelists. Scoring test with a five point rating scale was used. Characteristics evaluated were appearance, texture, chewiness, taste and overall acceptability and scored out of 5 where 5 = Excellent, 4 = Very Good, 3 = Good, 2 = Fair, 1 = Poor. As can be seen in Fig 1.1 Sensory evaluation results before and after standardization showed that the Chewiness, Taste and Overall acceptability improved after changing

Figure 1: Result of Sensory Evaluation Before and After Standardization

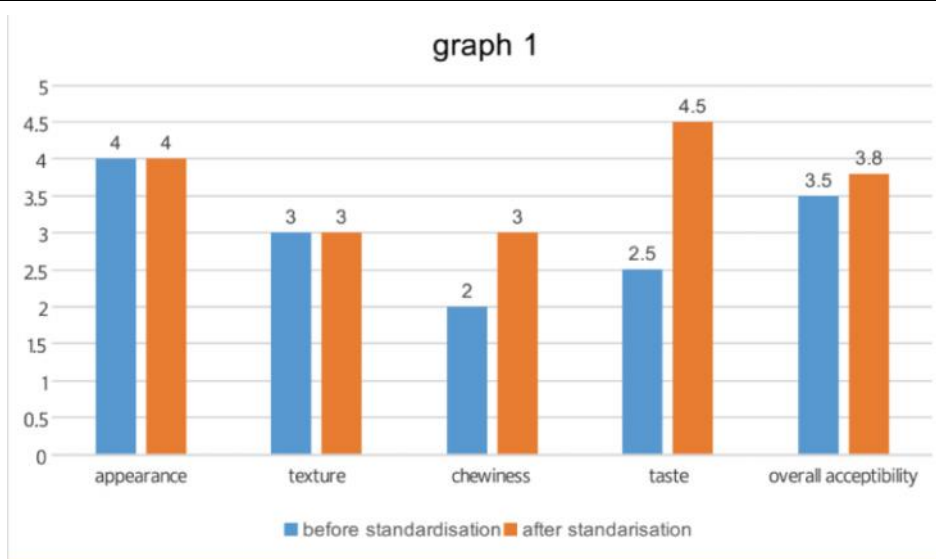
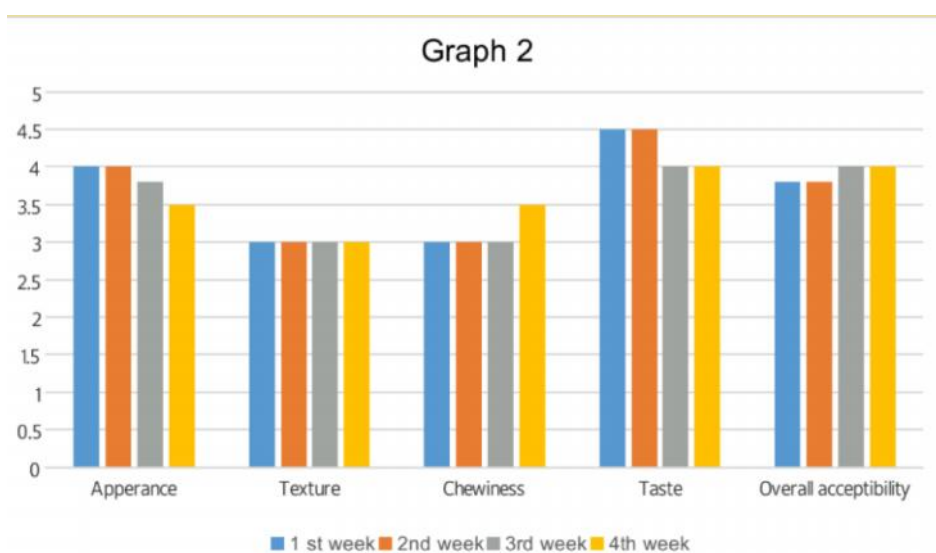


Figure 2: Results of Sensory Evaluation Done Periodically for Four Weeks



the amounts of some ingredients. Sensory evaluation was useful to make changes and prepare the final standardized product.

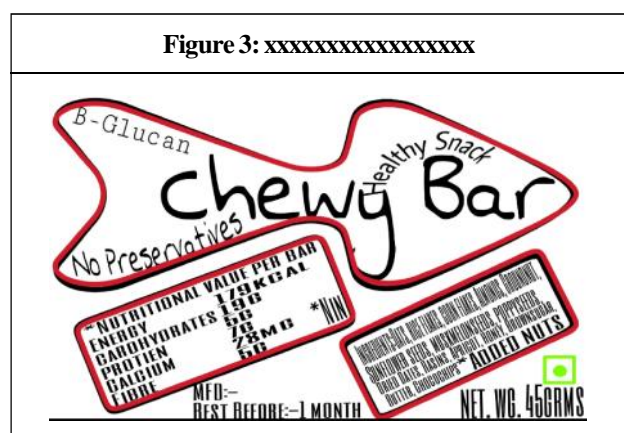
RATING CHARACTERISTICS

In order to study the shelf life of the product, the bar was packed and a five point scale method was used for sensory evaluation for 4 weeks. In the first two week the product showed no changes and got good scores. In 3rd and 4th week the score of appearance and taste went down. This may be due to some oxidative changes brought in by nuts, butter and honey. May be the product may have to be stored in better packaging systems. The scores of chewiness increases as it became soft. As there were no major changes observed, the product was labeled as edible for 30 days.

NUTRITIONAL LABEL

Nutritional Labeling is an important process in the food processing chain and label is the first point of contact between a consumer and the producer. It is used to identify one product from another and to decide over which product to purchase. Nutritional label should be attractive and eye catching and it should also be informative. It is an important marketing tool for a product.

| Nutrients | Value per Bar (NIN) |
|---------------|---------------------|
| Energy | 179 Kcal |
| Carbohydrates | 19 g |
| Proteins | 6 g |
| Calcium | 28 mg |
| Fiber | 5 g |



A nutritional label was designed for the bar. Information like NET WG. Manufacturing Date, Major Nutrients, Veg Logo And Ingredients were added. Key points like B-glucan and free from preservatives were added.

PACKAGING MATERIAL – BOPP (BI AXIALLY ORIENTED POLYPROPELYENE)

BOPP films have by far the highest moisture barrier of all plastic films. BOPP films have extremely high strength-particularly tensile strength, abrasion resistance, stiffness, tear strength, bursting strength and puncture resistance. BOPP films have good barrier to flavors and aromas, particularly at the levels of concentration normally encountered in packaged products. The basic material (polypropylene) is essentially a highly compatible with most packaged products. It is suitable for direct food contact.

BUDGETING

Budgeting is an important component to achieve financial success. It makes it easier for people with incomes and expenses of all sizes with conscious decisions about the allocation of money. For the bulk production, food ingredients were bought from the wholesale market to reduce the expenses and increase the profit.

| Ingredients | Amount |
|------------------------|----------|
| Oats (500 g) | Rs 100/- |
| Rice flakes (50 g) | Rs 10/- |
| Com flakes (50 g) | Rs 10/- |
| Almonds (50 g) | Rs 30/- |
| Groundnut (50 g) | Rs 20/- |
| Sunflower seeds (50 g) | Rs 25/- |
| Muskmelon seeds (50 g) | Rs 25/- |
| Poppy seeds (25 g) | Rs 20/- |
| Dried dates (50 g) | Rs 10/- |
| Apricot (50 g) | Rs 20/- |
| Black grapes (25 g) | Rs 15/- |
| Raisins (25 g) | Rs 10/- |
| Brown sugar (25 g) | Rs 15/- |
| Honey (150 g) | Rs 90/- |

Table 4 (Cont.)

| | |
|--------------------------|-----------------|
| Butter (75 g) | Rs 20/- |
| Choco chips | Rs 10/- |
| Plastic packets (25 nos) | Rs 35/- |
| Label (25 nos) | Rs 30/- |
| Cooking gas | Rs 20/- |
| Electricity | Rs 20/- |
| Labour | Rs 40/- |
| Total | Rs 575/- |

25 samples were prepared and sold at Rs 25/- each (total Rs 625/-). The profit made was Rs 50/- for 25 packets. 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.

MARKETING

A nutri-mela was organized in Dr BMN College of Home Science where chewy snack bar was sold. The techniques used were, giving samples to taste, approaching people and explaining them the importance of healthy snacking, explaining the advantages of Chewy bar. There was 100% sales with Rs 2/- profit per bar. Other than nutri-mela the bar was also sold at many other places.

CONCLUSION

A nutritious product was successfully developed, standardized and marketed. The shelf life was seen to be for 30 days. The important limitation of the bar was that it was chewy for those who have problem with mastication. So not recommended for very old population.

The sales were good and profit made. This project enhanced entrepreneurship skills. The bar can be made in different flavors and tried out with other ingredients. Nut less bar can also be made for those who have nut allergy.

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