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TO DEVELOP PRODUCT AND STUDY THE SHELF LIFE OF NUTRITIOUS- DOUBLE CHOCOLATE ALMOND BISCOTTI

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A healthy product (Nutritious biscotti) was designed with all health benefits for diabetic and cardio-vascular disease people. It has a high biological value of protein. Nutritious biscotti were developed with cinnamon, almond and egg as a functional food ingredients. The product provides good amount of calcium, protein and energy. Shelf life study was done for the product which included sensory evaluation by scoring test. Evaluation was done to know the characteristics of taste, appearance, texture, flavour and overall acceptability, etc. The other aspects covered in the study were budgeting, packaging, Nutritional labelling, etc.

Keywords: Nutritious Biscotti, Almond, Chocolate, Cinnamon, Biological protein, Sensory evaluation.

INTRODUCTION

Biscotti also known as Fantoccini are Italian almond biscuits that originated in the city of presto. They are also referred to as cookies, cakes. They are oblong shaped, dry, crunchy and dipped in drunk. Biscotti word originated from the Medieval Latin word Biscotto meaning “twice cooked”, which helps in improving its shelf life and it, is rich in protein.

The product was designed by using certain functional foods such as cinnamon, almond, egg and dark chocolate which helps in booting the immune system.

Cinnamon is a highly delicious spice. It is regarded as a gift. It is loaded with antioxidants such as poly-phenols (3, 4 and 5). It cuts the risk of heart diseases. It improves sensitivity to the hormone insulin, lower’s blood sugar levels and has a powerful anti-diabetes effect. It protects against cancer, helps to fight the HIV virus. Overall it has powerful medicinal properties.

A study conducted by Kowatra *et al.* (2015) observed many beneficial effects of cinnamon in Parkinson, diabetes, blood and brain. It has antioxidant, anti-inflammatory and anticancer properties.

Almonds are rich in mono saturated fat, fibre, xtocopheral, minerals such as ma, cu and photo nutrients and it is also energy dense. Almonds are also used for constipation, respiratory disorders. It is good for brain, bone health, regulation of blood pressure and boosts Energy.

Kamil *et al.* (2012) in his study observed that almonds do benefit cardio vascular diseases and reduce diabetes risk such as body weight, glucose, hemaestaiss, inflammation and oxidative stress.

Almonds also help in lowering the risk of cardiac diseases and thereby maintaining the cholesterol levels.

A study conducted by Chen *et al.* (2012) supported that almond consumption influences chronic degeneration disease risk beyond cholesterol reduction particularly in population with metabolic syndrome and type 2 Diabetes Mellitus.

The product also consisted of some basic and common ingredients such as wheat flour, besan flour, egg, cashewnut, unsweetened cocoa powder, dark chocolate.

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Wheat flour and besan flour were used and combined to improve the biological values of the protein. Egg was used to improve the protein content.

The best thing about the product is that it was modified by using dark chocolate instead of normal sweet chocolate and using unsweetened cocoa powder instead of normal sweet cocoa powder. This helped in reducing artificial sugar and calories which is healthier option.

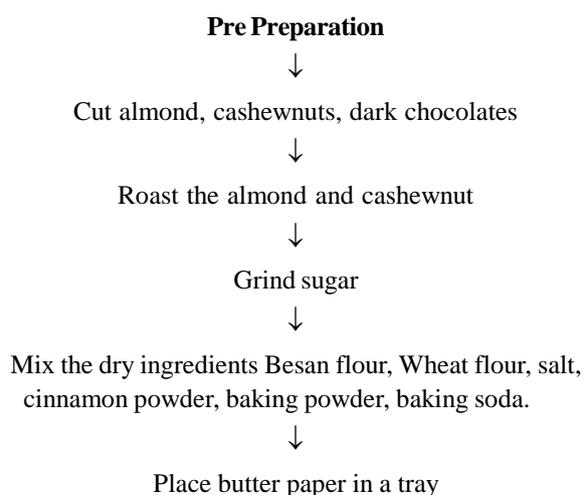
Higginbotham *et al.* (2015) in his study concluded the beneficial effect of dark chocolate on blood pressure, lipids, and inflammation. Proposed mechanisms underlying these benefits include enhanced nitric oxide bioavailability and improved mitochondrial structure/function.

The best thing about the product is it has various beneficial effects, easy to prepare and it is also cost effective. The product can be stored for a longer period of time as it has a good shelf life and can be consumed by any individual.

OBJECTIVE

- To standardize an innovative nutritious product for consumer acceptance.
- To understand every step of entrepreneurship.
- To study the shelf life of the product using sensory evaluation.
- To design a nutritional label.
- To make a cost effective product by better budgeting.
- To select a packaging material.
- To market the product in an effective way.

METHODOLOGY



Procedure

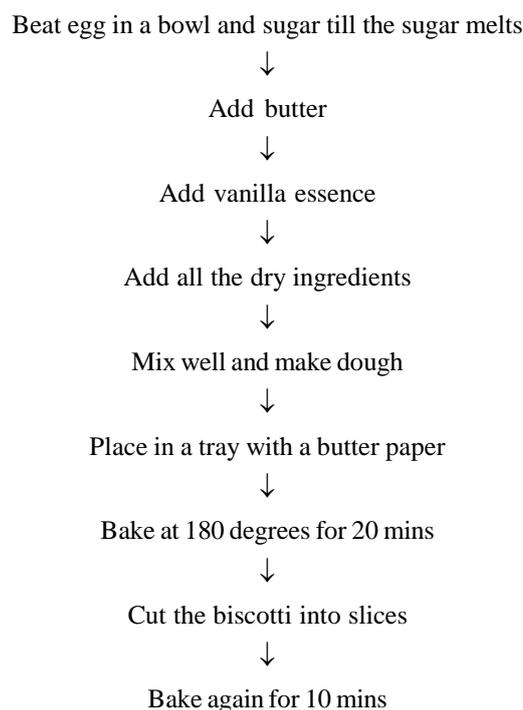


Figure 1: Pre Preparation and Procedure



Standardization

Materials used to prepare this product (ingredients) are:

Besan flour, wheat flour, dark chocolate, cocoa powder unsweetened, egg, cinnamon, almond, cashewnut, butter, sugar, vanilla extract, salt, baking powder and baking soda.

RESULTS AND DISCUSSION

It was observed that the use of Maida was giving an off flavor and taste in the product and as Maida is not

Table 1: Raw Ingredients

Ingredients	Amount
Maida flour	15 gram
besan flour	15 gram
Dark chocolate	1 cube
Unsweetened cocoa powder	1 tsp
Egg	1
Almond	7 gram
Cashewnut	7 gram
Cinnamon powder	½ tsp
Butter	5 gram
Sugar	5 gram

Table 2: Raw Ingredientd After Standardization

Ingredients	Amount
Wheat flour	15 gram
Besan flour	15 gram
Dark chocolate	1 cube
Unsweetened cocoa powder	1 tsp
Egg	1
Almond	7 gram
Cashewnut	7 gram
Cinnamon powder	½ tsp
Butter	5 gram
Sugar	5 gram

considered good for health, we decided to remove Maida and replace it with wheat flour. It was therefore standardized again by adding wheat flour for better flavor taste and color.

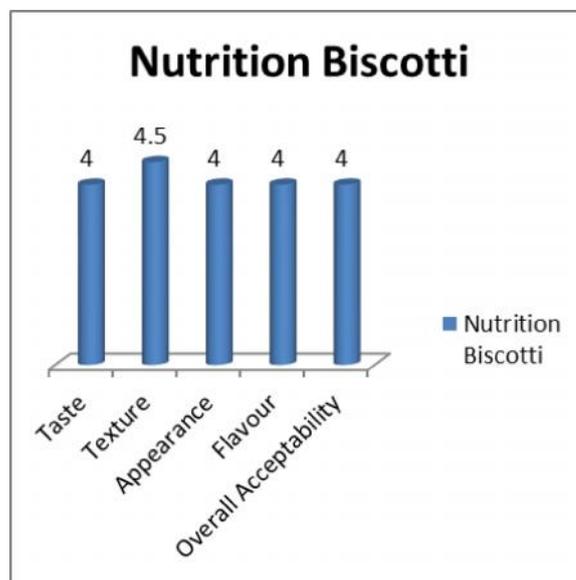
Sensory Evaluation for Standardized Recipe

Scoring test was done with the help of semi trained panelists. Attributes to be considered were Taste, Texture, Appearance, Flavor and Overall Acceptability which were scored on a 5 point scale, where - 5 = Excellent, 4 = Very good, 3 = Good, 2 = Fair, 1 = Poor.

Figure 2



Figure 3: Sensory Evaluation of Nutritious Biscotti

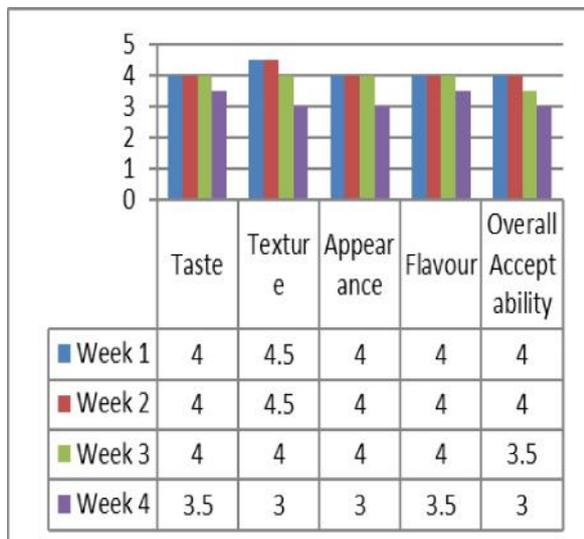


It can be observed that taste and flavor of double chocolate almond biscotti scored very well and Color and texture scored well. Thus the product had a good acceptability and was finalized to continue the shelf life study (Figure 3).

Sensory Evaluation for Shelf Life Study

To study the shelf life of Nutrition Biscotti, sensory evaluation was conducted every week which was done by semi trained panel members (total no = 20). Scoring test was done. Attributes to be considered were Taste, Texture, Appearance, Flavor and Overall Acceptability which were scored on a 5 point scale, where - 5 = Excellent, 4 = Very good, 3 = Good, 2 = Fair, 1 = Poor.

Figure 4: Shelf Life Study of Nutritious Biscotti



- It can be observed that there were many changes in the characteristics of double chocolate almond biscotti after sensory evaluation.
- During the 1st week the characteristics were highly rated.
- The product had good taste, texture, flavor, appearance and overall acceptability.
- There were no changes noticed until 3rd week which was in the texture.
- In the 4th week there were changes in taste and flavor.
- Therefore the product was finally labeled as best before 1 month from the date of packaging.

PACKAGING MATERIAL

Polypropylene

It is also known as polypropylene is a thermoplastic polymer used in a wide variety of applications including packaging and labelling. It is normally tough and flexible, often opaque. It has a good resistance to sunlight, air, relative humidity. During processing of polymer, antioxidants (Vit. E) are added to avoid degradation. The main idea to use this packaging material is because it is cost effective and is resistant to other sources. Another packaging material was used to make the product look attractive and improve the sale. This material (the box) was used as the outer covering from which the product can be seen.

Figure 5: Polypropylene



Figure 6: Attractive Design Box



Figure 7: Food Product Packaging



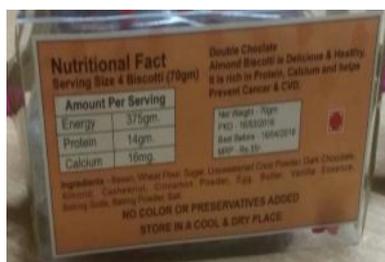
Nutritional Label

A nutritional label was designed for the product .it consist of ingredients, nutritional informational (nutrition facts), net weight of the product, packaging date, expiry date, price, health benefits of eating the product. This helps to enhance the product sell by innovation for food marketing and to attract the customers.

Table 3: Nutritional Information

Nutrients	Amount
Energy	375 Kcal
Protein	14 gram
Calcium	16 mg

Figure 8: Nutritional Information



Budgeting

All ingredients and packaging material were brought from the whole sale market to reduce the cost price. Table below shows the cost calculation for the ingredients used for making Double Chocolate Almond Biscotti.

Table 4: Budgeting

Ingredients	Price (Rs)
Almond	130
Cashewnut	120
Dark Chocolate Slab	80
Besan	150
Sugar	60
Wheat Flour	35
Butter	40
Egg	52
Unsweetened Cocoa powder	250
Baking soda	5
Baking powder	5
Cinnamon powder	10
Vanilla essence	10
Packaging	200
Label	50
Total	1187

Figure 9: Budgeting



Total 41 packets were made and all of them were sold. Total cost for production of double Chocolate Almond Biscotti was Rs. 1187/- per packet price was Rs. 35/-. After selling the product, total gain was Rs. 1435/- out of which profit was Rs. 248/-. As the ingredients and the packaging material were purchased at wholesale rate, profit was more.

CONCLUSION

Thus it can be concluded that double chocolate almond biscotti is nutritious and healthy. It is rich in calcium, energy and protein. It helps prevent cancer and CVD. It is easy to prepare and has a good shelf life. It can be consumed by any individual and we gained a good amount of profit from it.

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