



INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

SHELF LIFE STUDY OF GLUTEN FREE CHOCO CHESTNUT BALLS

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Abstract:

Gluten Free Chocochestnut Balls are best for someone who wants to have a chocolate but in a healthier way. These balls were developed from water chest nut flour (Shingada), homemade malted ragi flour, oats flour, chana sattu flour, choco powder and dark chocolate. The shelf life study was done on the food product, focusing on the attributes of taste, texture, appearance, flavor and mouthfeel, using 5 point hedonic scoring test. The product suggested good nutritional facts like- energy, protein, calcium, phosphorus, potassium, folic acid. The other aspects studied were nutritional labeling, packaging, budgeting, also marketing aspects which was done via digital platform.

Keywords: Gluten free, Choco chest nut, snack option, calcium rich, sensory evaluation

Introduction:

Chocochestnut balls is a healthy snacking option and has good dietary fiber, essential minerals and amino acids, and a Gluten-Free crown;[1] which makes it high in nutrition composition. Since it contains bioactive elements, with antioxidant and anti-inflammatory properties makes it a great choice which contributes greater health benefits. [2] This product can be consumed by general population. It also makes a better post workout snack, and contributes to reduced risk of diabetes mellitus, high blood pressure and GI- track disorders.[1] this also makes for a brain food for school going children as it has dark chocolate and finger millet making it nutritious chocolate option for them. Dark chocolate containing biologically active compounds affects CVD functions, improving blood pressure, platelet aggregation and endothelial function.[7]

The three main ingredients dominating this food product is Ragi (finger millet), Oats and water-chestnut flour making it rich in phenolic, flavonoid and mineral contents (Zinc, Magnesium, Potassium, Copper) [3] [4]; ragi adding for its carbohydrate, protein, dietary fibre and mineral content, essential amino acids and a source of Tryptophan.[5] And oats containing soluble fibre, beta- glucans aiding to good effects on satiety levels.[6]

Taking these points into account the study was taken up to design a healthy nutritious product with the following objectives:

1. To design a Nutritious Food product.
2. To study the shelf life of the product.
3. To design a Nutritional Label.
4. To select a packaging material.
5. To understand and evaluate marketing and budgeting aspects of a food product.

Methodology:

Functional foods for well-being and healthy lifestyle are now becoming a vital component. Oats is one of those, also possessing property of gluten-free which make it more susceptible for people with celiac diseases. Also, oats are considered as immunomodulating nutritious grain directly and indirectly modulating innate and adaptive immunity by changing gut microbiota composition and other related metabolites.[4] Eventually beneficial for world for immunity and Gluten-free crown.

This product was developed as part of under-graduate program. The first thought given to this product was Gluten-free Choco cookies but due to lack resources, the idea was scratched. Using the same ingredients variations were made, with addition of "Oats", and were introduced as Gluten-Free Chocochestnut balls.

Materials:

The first trail of Gluten-Free Chocochestnut balls turned out the best. Sensory evaluation was done with 7 panel members using the scoring technique. The score card consisted of 5 point hedonic scale from did not like at all to excellent. The characteristics that were scored were taste, texture, appearance, flavor, mouthfeel. Shown in figure no. 1. The result of sensory evaluation was found to be excellent in all aspects and attributes, each characteristic was rated 5 on hedonic point scale, adding good reviews from panelist, this product was finalized. Further to, it was wrapped in foil paper, and brown paper bag was used to store in refrigerator for Shelf-Life study.

Table no.- 1 Ingredients of Gluten Free Chocochestnut Ball Per Packet

Ingredients	Amount
Ragi (Finger Millet)	120 grams
Oats flour	15 grams
Water-chestnut flour	1 tbsp
Chana Sattu flour	1 tbsp
Choco Powder	3 tsp
Sugar Powder	30 grams
Butter	90 grams
Dark Chocolate Compound (for coating)	150 grams

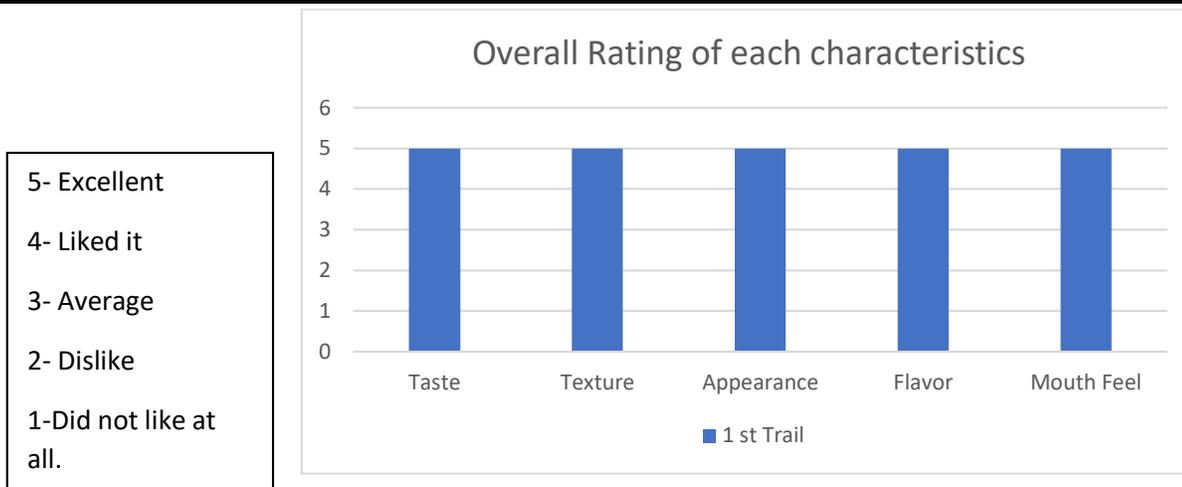


Figure no. – 1 sensory evaluation result for the first trial

Method of preparation:

- 1) Ragi (Finger Millet) – Wash it thoroughly for 2-3 times, soak for 4 hours, allow it to germinate wrapping it in a muslin cloth for about 10-12 hours (warm place).
After germinating allow it to dry under sunlight, roast and grind it using mixer into homemade ragi flour.
- 2) Mix all the dry ingredients- ragi flour, oats flour, water-chestnut flour, chana sattu flour, powdered sugar, Choco powder and sieve.
- 3) Melt butter and add it to the dry mix and kneed it to a dough.
- 4) Make small balls of medium size and allow it to refrigerate for 15-20 mins.
- 5) Melt dark chocolate compound and coat the refrigerated balls with the melted chocolate.
- 6) Again, allow it to refrigerate for an hour or two and its ready.
- 7) Wrapping it in a silver foil paper and packing it with brown paper bag.
- 8) Allow, it to store in refrigerator as a pack.

Packaging:

Packaging protects the product, helps to get visibility and promotion of the product, also helps to attract buyers and lastly differentiates from the competitors. Packaging of the product is important in terms of protecting it from any external- physical damage. It is important to ensure the packaging of the product, for marketing and making it safe to deliver. The packaging was done by using Silver-aluminium Foil paper to wrap the Choco balls. This is normal foil paper used at household kitchen level to maintain temperature of food. And later, it was packed in Brown paper Bag as final package to carry as shown in figure no. 2 and 3.



Figure no.- 2



Figure no. - 3

Nutritional Labelling:

Nutritional labels are guiding paths for people buying the food product, providing a brief information of all the necessary nutrients. Also, it is a legal requirement for any food product. Nutritional labels are to provide truth-full information and not to miss lead the consumers.[8] These are also provided with additional information with date of manufacture etc. Table no. 2 shows the nutritional label for the product. The label consists of the information that a consumer needs to choose a product. The label made for Gluten Free Chocochestnut ball consisted of nutritive value table, list of ingredients, manufacturing date, expiry date, net weight of the packet, manufactured by and contact details as shown in figure no. 4 and 5.

Table no. 2 Nutritive value table per ball

Nutrients	Amounts
Energy	117 kcal
Carbohydrate	9.4 gm
Protein	1.5 gm
Fat	4.8 gm
Dietary Fiber	0.52 gm
Calcium	34.62 mg
Phosphorous	28.47 mg
Iron	0.4 mg
Potassium	6.45 mg
Folic Acid	2.52 mcg



Figure no. - 4



Figure no. - 5

Budgeting:

Budgeting holds core importance while developing a food product. The budgeting of product by calculating raw materials, gas, electricity, wages of workers, packaging material cost, and other miscellaneous items. Shown in Table no. 3.

Table no. 3 Budgeting table

Expenditure	Price
Raw materials for the product	90
Packaging	35
Labelling	10
Miscellaneous (gas, electricity, laborer' s wages, travel)	50
Total	190/-

The overall cost for one packet containing 10 balls is Rs. 190/-. If 100 packets were to be sold, then the total income would be 19,000/- out of which profit amount would be 3000/-.

Shelf- life study for 4 consecutive weeks:

The shelf life study was done for 4 consecutive weeks by using sensory evaluation technique 7 panel members were involved and the data was recorded. On the attributes seen in figure no. 6.

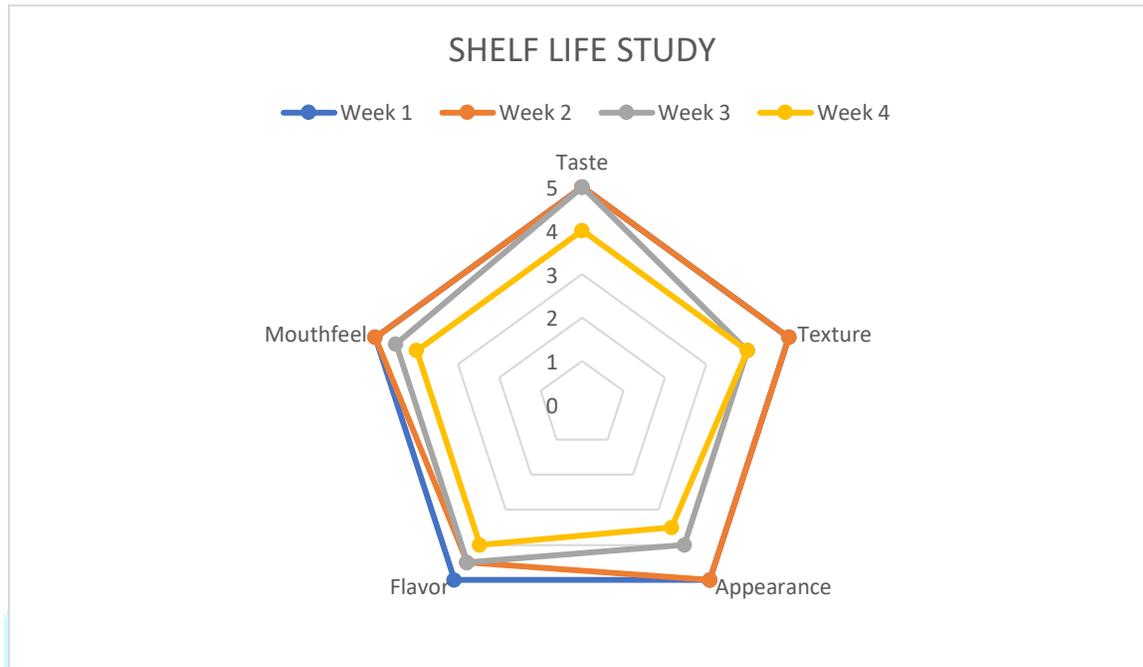


Figure no. -6 sensory evaluation for 4 consecutive weeks

- During 1st week, all the attributes of the product were rated excellent which means extremely good.
- In the 2nd week, the flavor decreased slightly but others characteristics were good enough.
- In the 3rd week, the taste flavor and mouthfeel were good but, the appearance and texture slightly decreased.
- In the 4th week, there was slight change in the taste and texture, flavor and mouthfeel were decreased and appearance deteriorated.
- This states that the product would last for 1 month, at the end of the month the taste might change slightly.

Marketing:

Marketing was done using digital platform like using social media - Instagram, Whatsapp and Facebook. The photo of the Food product was posted on these platforms. And these fetched the buyers to the product. The review from the customer was positive and appreciating to its taste and nutritional aspect. Which made this food product sell more and stand in good market.

Summary:

The gluten free chocochestnut balls are best snacking option and can be given as pre- workout or post- workout snack. It helps to provide good amount of energy, protein, dietary fiber, potassium, phosphorus, folic acid and high levels of calcium. The shelf life study assured that it had good shelf life when stored properly under storage conditions. The positive review that, it is accepted by all age groups proved that it has a good market and would be a profitable venture.

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