



Development of Instant Dokla Mix Blended with Dehydrated Carrot Powder

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ABSTRACT: This study presents the Development of Instant Dhokla mix blended with dehydrated carrot powder. Dhokla is a vegetarian food originating from Gujarat, India. It can be eaten for breakfast, as a main course, as a side dish or as a snack and is usually tangy and slightly sweet in taste. Carrot is one of the nutritious and economical vegetable. To extend carrot's utilization during offseason, carrot was oven-dried at 50 °C for 4-5 hours and powdered. The Dehydrated carrot (*Daucus carota L.*) powder was blended at the levels of 10%, 20%, 30% and 40% in the Instant Dhokla mix powder. The best variation was identified to be the Sample C in which 30% Dehydrated carrot powder was blended in Instant Dhokla mix. It was identified by sensory analysis using five point hedonic scale by a group of 30 semi trained panel members. Vitamin A content was 5.4 mcg/100g in the standard instant Dhokla mix which increased to 9.2 mcg/100g in the Sample C and Iron content was 3.5mg/100g in the standard instant Dhokla mix which increased to 6.0 mg/100g in the Sample C. The mix underwent microbial analysis and shelf life analysis with the interval of one day for a period of one week that is on 1st day, 3rd day and 5th day respectively. The mix was stored in a Zip lock bag. The popularization of the Instant Dhokla mix blended with dehydrated carrot powder was done among school going children by briefing on its significance, functional properties, nutritional aspects and health benefits with the help of a questionnaire and analyzing their responses.

KEYWORDS: Dehydrated Carrot Powder, Iron, Instant Dhokla Mix, Sensory Analysis, Popularization, Shelf Life, Vitamin A.

INTRODUCTION

Food is a substance consisting essentially of protein, carbohydrate, fat, and other nutrients used in the body of an organism to sustain growth and vital processes and to furnish energy. New product development (NPD) is the process of designing a new product, producing it and bringing it to market. Product development is a continuously expanding list of research actions, involving issues connected with core product itself and issues concerning quality assurance, packaging, technical aspects of production, nutritional value labeling, raw materials, technology that needs to be used and marketing (McIlveen, 1994).

Dhokla is a vegetarian food item that is made with a fermented batter derived from chickpea flour. Dhokla can be eaten for breakfast, as a main course, as a side dish or as a snack. It is usually tangy and slightly sweet in taste. It is usually liked by all age groups, as it has a soft texture therefore is suitable even for old people and children. (Amruta S. Lohekar and Asha B. Arya., 2014)

Carrot (*Daucus carota L.*) is a biennial herbaceous species which is a member of the Apiaceae family. The carrots are a good source of carotenoids, vitamins, and dietary fiber and is also rich in minerals and antioxidants. They are also rich in potassium, magnesium, calcium, sodium, and iron. (Feng Que et al., 2019). To extend carrot's utilization during off-season with maximum retention of β -carotene, oven-drying is a low-cost conventional method. Hot-air drying methods could result in a quality product characterised by uniform, hygienic and attractive colour of dried fruit and vegetables powder (Roongruangsri W & Bronlund J.E, 2016). Dried powdered carrot has been used in several items in Indian culinary and offers healthy alternative without much sacrificing in nutritive value.

Objectives of the study are as follows:

- To develop Instant Dhokla mix blended with Dehydrated Carrot powder.
- To evaluate the best proportions of the Dehydrated carrot powder in the Dhokla.
- To analyze the nutrient content of standard and selected best proportion of the dehydrated carrot powder blended Instant Dhokla mix.
- To determine the microbial analysis of the product.

- To estimate cost of the prepared product.
- To popularize the product among School going children.

1. MATERIALS AND METHODS

1.1. Selection and Procurement of Ingredients: The ingredient selected is Dehydrated carrot powder which is blended in Instant Dhokla mix. The ingredients required for the preparation of the product were procured in the local market as it is convenient for the researcher.

1.2. Processing of Dehydrated Carrot powder

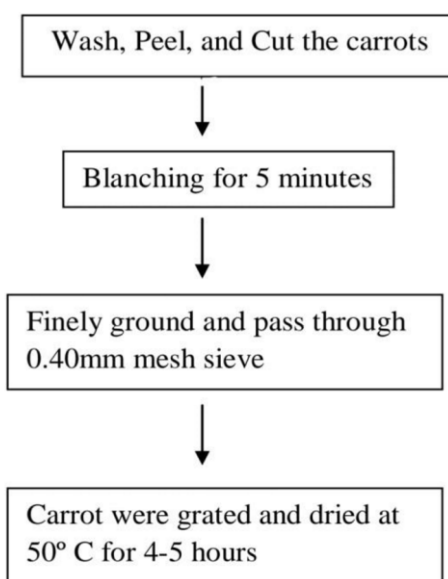


Figure 1 – Processing of Dehydrated carrot powder

1.3. Preparation method of Standard Instant Dhokla mix and Dhokla

- Add Bengal gram flour, 2 – 3 pinches of turmeric, Citric acid crystals, baking powder and required amount of salt in a bowl.
- Mix them well, make into a batter using water and allow it to rest for 15 minutes.
- Grease a steaming pan with oil, pour the batter and steam it for 15 -20 minutes.
- After it is cooked cut it into small pieces.
- In a pan, add little oil, mustard seeds, curry leaves and Green chilies.
- Sauté along with the pieces of Dhokla.

1.4. Preparation of Dehydrated Carrot powder blended Instant Dhokla mix

- Take Bengal gram flour (70 g), Dehydrated carrot powder (30 g), Turmeric powder (a pinch), Baking soda (1 g) and Citric acid crystals (0.5 g) and mix them all in a bowl.
- Pack it in a Zip lock bag under sterile condition and store it.

1.5. Standardization and Sensory evaluation of the Product

Standardization helps in ensuring the safety, interoperability, and compatibility of goods produced. The Carrot powder was incorporated at 10%, 20%, 30% and 40%. Sensory Evaluation has been defined as "A scientific discipline used to evoke, measure, analyze and interpret reactions to those properties of foods and materials as they are perceived by senses of sight, smell, taste, touch, and hearing" (Sidel & Stone, 1993). It is performed using five point hedonic scale.

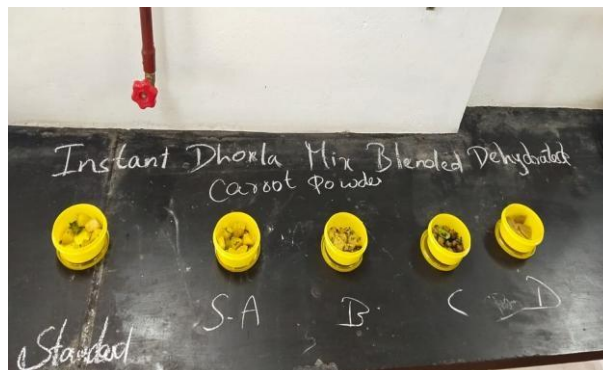


Figure 2 – Instant Dhokla mix blended with dehydrated carrot powder in different variations



Figure 3 – Sample C selected as Best Variant

1.6. Nutritional analysis

Nutritional analysis is the process of determining the nutritional content of food. The standard and the best variant is analysed for the nutrients such as Vitamin a and Iron.

1.7. Microbial analysis

The microbial analysis was carried out at an interval of 1 day for a period of 1 week, that is on 1st day, 3rd day and 5th day respectively.

1.8. Cost analysis

The primary reason for conducting cost analysis is generally to determine the true (full) costs of each of the programs under analysis (services and/or products). The cost estimation was done on the basis of cost of the ingredients used in the new product.

1.9. Popularization

The product, Instant Dhokla mix blended with dehydrated carrot powder is popularized among 30 School children, where the benefits of Dehydrated carrot powder and Dhokla were educated.

2. RESULT AND DISCUSSION

2.1. Comparison of the Selected product with the Standard product

Table - I depict the comparison of the sensory attributes of the selected Instant Dhokla mix with the standard product.

From the results it can be concluded that the Instant dhokla mix blended with dehydrated carrot powder had a good shelf life of upto 5 days under room temperature by the use of vacuum packaging – Ziplock bag.

Table I. Comparison of the selected product with the Standard product

S.no	Criteria	Score	Standard Product	Selected Product
1	Appearance	5	4.9 ± 0.25	4.9 ± 0.3
2	Colour	5	4.9 ± 0.3	4.8 ± 0.37
3	Flavour	5	4.9 ± 0.3	4.9 ± 0.3
4	Texture	5	4.9 ± 0.25	4.9 ± 0.34
5	Taste	5	4.96 ± 0.18	4.97 ± 0.18

From the Table I it is clear that Sample C had the similar mean score in all the criteria to that of the Standard product. So Sample C was chosen as the best product and subjected to further analysis.

2.2. Shelf life analysis of the Standard and Selected product

The mean sensory scores of standard and Instant Dhokla mix blended with dehydrated carrot powder on storage are given in Table – II.

Table II. Sensory Analysis of the Standard and Selected Product

S.no	Criteria	Score	Day-1 Mean ± SD		Day-3 Mean ± SD		Day-5 Mean ± SD	
			Standard	Sample	Standard	Sample	Standard	Sample
1	Appearance	5	4.9 ± 0.25	4.9 ± 0.3	4.9 ± 0.3	4.93 ± 0.25	4.8 ± 0.4	4.77 ± 0.5
2	Colour	5	4.9 ± 0.3	4.8 ± 0.37	4.87 ± 0.46	4.83 ± 0.45	4.87 ± 0.42	4.83 ± 0.37
3	Flavour	5	4.9 ± 0.3	4.9 ± 0.3	4.9 ± 0.25	4.96 ± 0.18	4.87 ± 0.43	4.9 ± 0.3
4	Texture	5	4.9 ± 0.25	4.9 ± 0.34	4.9 ± 0.3	4.9 ± 0.3	4.93 ± 0.25	4.9 ± 0.4
5	Taste	5	4.96 ± 0.18	4.97 ± 0.18	4.87 ± 0.34	4.83 ± 0.37	4.9 ± 0.25	4.9 ± 0.3
Over all acceptability			4.9 ± 0.26	4.89 ± 0.3	4.89 ± 0.33	4.89 ± 0.31	4.87 ± 0.35	4.87 ± 0.37

2.3. Nutrient analysis of the Standard and the Selected product

Nutritional Analysis refers to the laboratory evaluation of the nutritional content of a food. The Vitamin A content was 5.4 mcg/100g in the standard instant Dhokla mix which increased to 9.2 mcg/100g in the Sample C and Iron content was 3.5mg/100g in the standard instant Dhokla mix which increased to 6.0 mg/100g in the Sample C.

2.4. Microbial analysis of the Standard and Selected product

The details regarding the microbial content in standard Instant Dhokla mix and selected proportion that is sample C which is a Dehydrated carrot powder blended Instant Dhokla mix on storage is given In Table III. The microbial analysis was carried out in an interval of 1 day for a period of 1 week, that is on 1st day, 3rd day and 5th day.



Table III. Microbial Analysis of the Standard Product and Selected Product

S.no	Name of the sample	Total plate count		
		1 st day	3 rd day	5 th day
1.	Standard	21 × 10 ¹ cfu/g	24 × 10 ¹ cfu/g	26 × 10 ¹ cfu/g
2.	Sample	22 × 10 ¹ cfu/g	23 × 10 ¹ cfu/g	25 × 10 ¹ cfu/g

For Instant mixes <10⁴cfu/g is considered as Satisfactory, whereas <10⁵ and ≥10⁵ are considered as Marginal and Unsatisfactory. So it can be concluded that the result is Satisfactory and safe to consume as the result for both standard and sample for the 1st day, 3rd day and 5th day shows <10⁴cfu/g and the number of conies can be reduced if properly stored.

2.5. Cost estimation of the Standard and Selected product

The cost of standard Instant Dhokla mix is Rs. 22.34/- per 100g and the cost of Instant Dhokla mix blended with Dehydrated carrot powder is Rs. 21.78/- per 100g and this was compared with standard, there is a decrease in the cost of Instant Dhokla mix blended with Dehydrated carrot powder.

2.6. Popularization of the Selected product

Popularization mainly focuses on creating awareness among the public about the beneficial effects of a newly formulated food product. The popularization of the Instant Dhokla mix blended with dehydrated carrot powder was done among School going children by briefing on its significance, functional properties, nutritional aspects and health benefits with the help of a questionnaire. The results shows that the school going children are interested in consuming carrot whereas 40% are not interested; 73% school going children are aware that Vitamin A plays a major role in vision process whereas 27% are not aware of it; 33% school going children knows that the deficiency of Vitamin A can cause Night Blindness whereas 67% didn't know this; 53% of school going children have had Dhokla before whereas 47% were having Dhokla for the first time; 40% of the school going children have already tried Instant

Dhokla mix from the market, whereas 60% haven't; 57% school going children were aware that carrots are rich in Vitamin A whereas 43% were unaware of it; 53% school going children knew that iron deficiency leads to Anemia whereas 47% didn't know it; 13% school going children knew about the dehydrated carrot powder whereas 87% didn't know about it; 90% school going children liked the product and 10% of them didn't like it; 87% of school going children have shown interest to buy this product if it is available in the market and 13% have not shown much interest.

4. CONCLUSION

From the study, it is concluded that the Instant Dhokla mix blended with Dehydrated carrot powder, which has 30% of Dehydrated carrot powder was accepted in studies. The prepared product is high in Vitamin A and Iron when compared to the standard product. The prepared product is acceptable till 5th day without any microbial deterioration if it is stored in Zip lock bag at room temperature. The cost of the prepared best product was slightly lower than standard. In the popularization study most of the participants accepted the product.

5. ACKNOWLEDGEMENT

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