International Journal of Food Science and Nutrition
www.foodsciencejournal.com
ISSN: 2455-4898
Received: 18-01-2024, Accepted: 10-02-2024, Published: 04-03-2024
Volume 9, Issue 1, 2024, Page No. 51-53

Studies on development, processing and quality evaluation of multigrain instant dhokla mix

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Abstract
The present investigation entitled "Development and Quality evaluation of Multigrain Instant Dhokla Mix" was carried out in Department of Food Processing Technology. The aim to prepare Multigrain Instant Dhokla Mix to provide more nutrition and convenience to the consumer. Formulation was made with Ragi, Rice and Bengal gram flours. The developed Dhokla mix was subjected to sensory evaluation it showed that T_1 sample is more superior to others. For preparation, all ingredients are mixed and packed in laminated aluminium pouch. The proximate compositions of Multigrain Instant Dhokla Mix were moisture content (12 %), fat (9.6%), protein (13%), carbohydrate (56.9%), energy (365.25 kcal) and ash (8.5%). Multigrain Dhokla mix rich in Protein and Carbohydrate. It was concluded that Multigrain Instant Dhokla Mix stored for 3 months in laminated aluminium pouches. So it can be satisfy the consumer in accepts and quality.

Keywords: Multigrain, instant dhokla mix, sensory evaluation, proximate composition, packaging material, laminated aluminium pouch

Introduction

Dhokla is a vegetarian food items that originates from the Indian state of Gujarat. Dhokla can be eaten for breakfast, as a main coarse, as side dish or as snack. There are different kind of Dhokla prepared with different ingredients and ratio of Chickpeas. It is easy to cook and easy to digest snack.

Man needs a wide range of nutrients to perform various functions in the body and lead a normal healthy life. Proteins are nutritionally considered as the most essential and important nutrient among the known nutrient present in the living cell (Sanghi, 2013) [4]. Value addition by utilization of protein and carbohydrate rich foods *viz*. Ragi, Rice and Bengal gram is possible. Finger millet commonly known Ragi. It contains protein, iron, calcium, phosphorus, fibre and vitamin content. The calcium content is higher than all cereals and iodine content is said to the highest among all the food grains also Bengal gram significantly lowers serum lipid in man.

Ragi is one of the rich sources of nutrient compared to other cereal crop. It contain Moisture content about (12%), Dietary fiber (18%), Protein (9.8%), Carbohydrate (81.5%), Starch (65-75%), Fat (1-1.7%), Minerals (2.7%), and Crude fiber (4.3%) that equivalent to other millets and cereals. It is also rich source of Calcium (344 mg), Phosphorous (283 mg), Iron (3.9mg), Vitamin B and Vitamin E and other Micronutrient. It contains Anti-nutritional factor such as Tannins (0.04-3.47%), Phytate (0.48%), Oxalate (0.36%) and Polyphenols. Because of regular intake as staple food Ragi has various health benefits such as regulating the proper blood glucose level, wound healing is impaired in diabetic patient. It contains Tryptophan which controls our appetite, keep weight under control. Ragi contain high Calcium and Iron and because of that it can strengthen body bones (Rathore *et al*., 2019) [3].

Rice (*Oryza sativa*) is a dietary staple food, one of the most important cereal crop, especially for people in Asia. Rice is great source of complex Carbohydrates. The Rice is one of the rich source of the nutrient such as Moisture (13.7%), Carbohydrate (78.2%), Protein (6.8%), Fat (0.5%), Crude fiber (0.2%) respectively. Gluten is major Protein of Rice (Khetarpoul *et al.*, 2005).

The Protein content can be increased and the flour preparation containing as much as 26% Protein has been obtained. Aflatoxin is an Anti-nutritional factor may contain in Rice (Manay and Shadaksharaswamy, 2008) [2]. Rice has various health benefits such as it is an excellent food to include in a balanced diet. Rice has no Fat, no Cholesterol and is Sodium free.

Chickpea is an cool season food legume (Guar *et al.*, 2013).

The Chickpea is a good source of Carbohydrate and Protein which together constitute about 80% of the dry seed mass. The nutritional value contain in Chickpea are Moisture (8.09%), Ash (3.1%), Protein (24.5%), Fat (6.1%), Crude fiber (1.3%), and Carbohydrate (58.21%) respectively. In Chickpea the Anti-nutritional factors are such as Trypsin (8.1-15.7%), Chymotrypsin Inhibitor (6.1-8.8%), Amylase Inhibitor (5.0-9.7%), and Polyphenols (1.9-6.1%) (Sultana *et al.*, 2014) [5].

It could have beneficial effects on some of the important human diseases such as Cardio- vascular disease, Type 2 Diabetes, Digestive diseases and some Cancer (Jakanti *et al.*, 2012). Is also used for blood purification, they can also assists in lowering of cholesterol in the blood steam (Sanghi, 2013) [4].

The need to develop new product is driven by the widening tastes of consumers who are looking for convenience, value-for-money and variety, without compromising on the nutritional aspect. The value added instant Dhokla mix developed by Ragi, Rice and Bengal gram. It is liked by all age groups; soft in texture therefore is suitable even for old people and children.

However, it is prepared by using only either rice or semolina and Bengal gram it is essential to convert the traditional Dhokla into nutritious Dhokla with enhanced content of

nutrient by value addition so that it can be nutritional supplement in addition to the daily diet.

Materials and Methods

Procurement of Raw Material

Raw materials required during present investigation were procured from local market of Saralgaon such as Ragi, Rice, Bengal gram, Semolina, Sugar, salt, Citric acid, Sodium Bicarbonate and Asafoetida etc. Most of the chemicals and equipments used in this investigation were of analytical grade which are obtained from College of Food Technology Saralgaon, Thane

Physical Properties of Dhokla

The colour of Dhokla was determined by visual observations, the length, breadth and width of Dhokla was measured by vernier caliper. The weight of Dhokla was measured on analytical weighing balance.

Chemical Properties of Dhokla

Proximate composition such as moisture, ash, crude fat, crude protein and crude fibre of all the Ingredients and Crackers was determined according to the procedures given in AOAC (2000). For moisture determination samples were dried in oven at 130ºC for 60 minutes. For ash determination samples were placed in muffle furnace at 550ºC to burn out all carbon compounds leaving in organic part (ash). Fat was determined by fat extraction unit by using Hexane. For fibre determination, samples were treated with 1.25% Sulphuric acid and Sodium Hydroxide solution. After filtration of digested material it was washed with hot water and then ignited. By calculating loss of weight after ignition, crude fibre contents were determined. Protein contents were determined by using Kjeldahls unit.

Sensory Evaluation of crackers

Prepared product were evaluated for sensory characteristics in terms of appearance, color, flavor, after taste, texture and overall acceptability by 10 semi-trained panel members comprised of academic staff members using 9- point Hedonic scale. Judgments were made through rating the product on a 9 point Hedonic scale with corresponding descriptive terms ranging from 9 ‘like extremely’ to 1 ‘dislike extremely’. The obtained results were recorded in sensory score card.

Statistical Analysis

The analysis of variance of the data obtained was done by using completely randomized design (CRD) for different treatments as per the method given by Panse and Sukhatme (1967). The analysis of variance revealed at significance of $p<0.005$ level S.E and C.D. at 5 percent level is mentioned wherever required.

Preparation of flours

The Ragi, Rice and Bengal gram were cleaned properly and then Ragi, Rice and Bengal gram was grinded in household flour mill. The flours were sieved through of BS 100mm-Mesh size. All the flours were stored in air tight containers for further use.

Formulation of Multigrain Instant Dhokla Mix

Instant Dhokla Mix prepared with Ragi, Rice and Bengal grams were investigated. The formulation was made by varying levels of Ragi, Rice and Bengal gram *viz.*, 100:00:00, 19:19:19, 19:17:21 and 19:23:15 percent respectively and T1 sample was selected because it got highest score in sensory evaluation.

Table 1: Formulation for preparation of Instant Dhokla Mix

Ingredients	Treatments			
	T0	T1	T2	T3
Ragi	-	19g	19g	19g
Rice	-	19g	17g	23g
Bengal gram	56 g	19g	21g	15g
Semolina	28 g	28g	28g	28g
Sugar powder	8 g	8g	8g	8g
Salt	2 g	2g	2g	2g
Citric acid	2.8g	2.8g	2.8g	2.8g
Sodium Bicarbonate	2.4g	2.4g	2.4g	2.4g
Asafoetida	0.28g	0.28g	0.28g	0.28g
Turmeric	0.13g	-	-	-
Water	80ml	80ml	80ml	80ml

Where**,** T0-Bengal gram flour 56g + 44 g other ingredients
T1- Ragi+Rice+Bengal gram (19+19+19) g
T2- Ragi+Rice+Bengal gram (19+17+21) g
T3- Ragi+Rice+Bengal gram (19+23+15) g

Preparation of Multigrain Instant Dhokla Mix

Flow-sheet of Multigrain Instant Dhokla Mix

Collection of flours (19:19:19 in proportion)
↓
Mixing
↓
Addition of other Ingredients
↓
Mixing
↓
Packaging and Sealing
(Laminated Aluminium Pouches)

Result and discussion

Table 2: Physical parameter of Dhokla

Parameter	Result
Colour	Light brown
Length	4.5 cm
Breadth	4 cm
Height	2.5 cm
Weight of piece	21 gm
Cooking time	20 min

It was evident that the colour of Dhokla was Light brown which was determined by visual observation. Length (4.5cm), Breadth (4cm), Height (2.5cm) of Dhokla was determined. The Weight of piece was 21gm measured by analytical weighing balance. Cooking time of Dhokla was 20min.

Table 3: Chemical properties of Instant Dhokla mix

Chemical Parameter	Selected Sample
Ash	8.5%
Moisture	12%
Fat	9.6%
Protein	13%
Carbohydrate	56.9%
Energy	365.4 kcal

It concludes that Ash value of Dhokla was found to be 8.5%, Moisture content12%, Fat content 9.6%, Protein content 13%, Carbohydrate content 56.9% and Energy value 365Kcal respectively. It concluded that Dhokla rich in Carbohydrate and Energy.

Sensory evaluation

Table 4

	Sample T0	Sample T1	Sample T2	Sample T3
Colour	8.5	9	8	7
Flavour	8	8.5	8	7.5
Taste	8.5	9	7	7.5
Texture	8	8.7	7	8
Appearance	8	9	7.5	7
overall acceptability	8	9	7	7

It was concluded that sample T1 has highest score as compared to other samples. The overall acceptability of sample T1 was selected by 9 points whiles other samples. T1 more acceptable on its sensory attributes.

Conclusion

In the present study finally it is concluded that Instant Dhokla Mix prepared from different Variations of multigrain such as Rice, Ragi and Bengal gram has high Nutrition quality and also its is rich in Protein, carbohydrates and some vital minerals such as calcium and iron in proper amount and has great health benefits. The present investigation carried out for information of Instant Dhokla mix in which T1 sample found more superior than sample T2 and T3. T1 sample is more acceptable on its sensory attributes.

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