Production and Quality study of Gluten Free Crackers enriched with Sesame seeds

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Abstract **- Gluten free crackers enriched with Sesame seeds is an innovative and highly nutritious snacks product. It is made up of rice flour, soy flour and several spices added in it. Gluten free crackers are rich source of energy, protein, and carbohydrate. Rice flour is good source of protein and dietary fiber. Sesame seeds have anti carcinogenic, anti-cancer properties and it is excellent source of iron. Gluten free crackers are fat free product since the use of its dietary value. This product has a exclusive combination with goodness of appropriate composition of flour and spicy flavor, which make it marvelous tasty. The formula for preparation of gluten free crackers was standardized. The chemical composition of the gluten free crackers was found to contain carbohydrates 52g, fat 33g, protein 4.1g. The gluten free crackers as more acceptability due to the enhanced flavors and texture, nutritive values and health benefits.**

Index Terms **- Gluten free crackers, sesame seeds, sensory evaluation, nutritional value.**

INTRODUCTION

Gluten-Free Diet is a diet that firmly expelled by gluten, which is a blend of protein that is found in wheat as well and barley, rye and oats. In addition, a gluten-free diet may be used in least cases that can improve gastrointestinal or systemic symptom in diseases like irritable bowel syndrome, rheumatoid arthritis, multiple sclerosis or HIV and many more. Gluten-free diets have also been promoted as a substitute healing of people with autism. A gluten-free diet should be primarily based on naturally gluten-free foods with a high-quality of micro and micronutrients: milk and dairy products, legumes, nuts, fruits, vegetables, potatoes, rice and corn are all appropriate components of such a diet.

If commercially prepared, gluten-free products are replaced by enriched or fortified with vitamins and minerals are preferable. Some minor cereals are healthy alternative to these ready products and have high biological and nutritional value. Moreover, it contents protein of higher nutritional quality than those of wheat and in greater quantities.

A rising demand of gluten free products is cause by a growing total of diagnosed celiac patients and allergenic proteins consumers from the diet. Driven by the speedily increasing sell, wide-ranging of gluten free products are necessary. The main principle of this research study is to concisely present an overview of various approaches to improve physicochemical and sensory qualities of gluten free bread, cake and pasta products.

In current living, there has been an ever-increasing interest on gluten free food products. The market for gluten free products is predictable to produce at a compound annual growth (CAGR) rate of 10.4% from $4.63 billion in 2015 to reach $7.59 billion in 2020.

The compositions of gluten free bread are based on rice, buckwheat, sorghum, quinoa, oat, maize and chia flours are commonly used. These flours are rich in protein, minerals and fiber. Rice flour is widely used in Western countries for its neutral flavor and pale color, making it simpler to incorporate due to it has good amount of hypoallergenic protein. Frequently rice flour is combined with other flours such as oat, ragi, soya and chickpea. Starch sources as a sole substitute for wheat flour are rarely used.

MATERIALS AND METHODS

The raw material for production of this product was purchased from local market. The process for preparation of the Gluten free crackers was standardized (Table 1).

Table 1: Ingredients for Preparation of Gluten free crackers

Ingredients	Quantity in g for 100g
Rice flour	40
Soya flour	30

Sesame seed	20
Chili powder	3
Coriander powder	2
Cumin	2
Salt	3
Oil	60

The Gluten free crackers were prepared in lots and the packaging material used for the product is low density polyethylene (Figure 1).

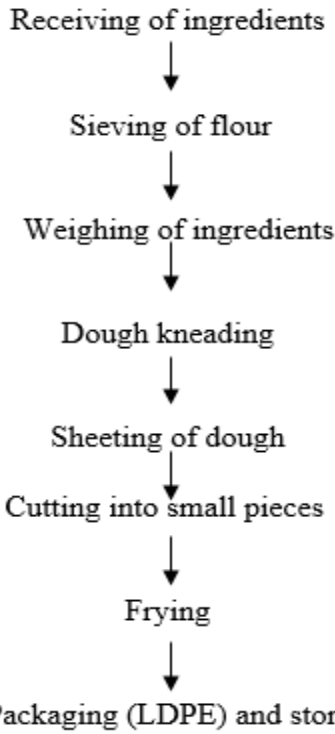

Figure 1: Flow Diagram for Preparation of Gluten free crackers

DETERMINATION OF PROXIMATE COMPOSITION

The proximate composition of the samples (soy flour, rice flour, oats flour) was determined using the standard methods described in the (AOAC, 2005). The parameters analyzed were moisture, ash and crude fiber.

Determination of Moisture Content

The determination of moisture was carried out using the hot air-oven method. The Petri-dishes were washed, dried in the oven, allowed to cool in a desiccator and the weight noted. The samples 5g was weighed into the Petri- dishes and dried in the oven at 105°C for 4 h. The sample was finally dried to a constant weight and the moisture content was calculated.

Moisture content = Weight loss * 100/ Weight of sample g

Determination of Ash Content

One gram (1g) of sample was weighed into a clean, dry and pre-weighed crucible. The crucible was transferred into a muffle furnace at 550°C for 5h. Ashing continued until a light grey or white ash was obtained. The crucible was cooled in desiccators and weighed. The ash content was calculated.

% Ash content = Weight of Ash * 100 / Weight of sample g

Determination of Crude Fat

Two grams of the samples was weighed in filter paper and folded neatly, was inserted into a Sox let apparatus where extraction was carried out for 4h using n-hexane (40- 60°C). At the end of the extraction, the filter paper was placed in the oven for 30 min to evaporate the solvents. This was cooled in a desiccators and weight was noted. The fat extracted from the given quantity of the sample was calculated.

% Fat content = Weight of fat extracted g 100 / Original weight of sample

Determination of Crude Protein

The crude protein was determined using the micro Kjeldahl method, sample 0.2 g was weighed into a Kjeldahl flask. Catalyst containing sodium sulphate, selenium, and copper was added to the sample along with 10 ml of concentrated sulphuric acid in order to speed up the rate of digestion. The flask was swirled and gently clamped in an inclined position and heated electrically in a fume cupboard. This was heated until a clear solution was obtained. The clear solution was cooled and transferred into a 100 ml volumetric flask and made up to mark with distilled water. The resulting mixture (10 ml) was measured into the distillation set through the funnel. About 5 ml of 2% boric acid was transferred into a 100 ml conical flask containing 2 drops of screened methyl orange and placed at the receiving end of the distillation apparatus. Sodium hydroxide (40%) was used to liberate ammonia from the digest under alkaline condition during distillation. As soon as the contents became alkaline, the pink color changed to green

showing sodium hydroxide to be in excess. Steam was generated into the distillation set and ammonia was trapped in the boric acid solution and about 50 ml of the solution collected into the conical flask. The solution in the flask was titrated against 0.1 M HCl until the first permanent pink color change was observed. A blank sample was carried through the procedure and titrate value of the blank was used to correct titrate of the samples. The nitrogen content was determined using the equation.

% N = Molarity of HCl * 0.014* titrate value dilution factor * 100 / Weight of sample used

The percentage of nitrogen was converted to crude protein by multiplying with 6.25.

Estimation of Carbohydrate

Carbohydrate content of each sample were determined by difference by adding % (moisture, ash, fat, protein and crude fiber) and subtracted from 100.Determination of Mineral Elements Minerals was determined by the method described by AOAC. A dried and ground sample of (2g) was pre-ash on a Bunsen flame for 20 min. Thereafter, the sample was subjected to dry ashing in well cleaned porcelain crucibles at 550°C in a muffle furnace. The resultant grayish-white ash was dissolved in 0.1 M HCl solution (10 ml) was added to the crucible to break up the ash and leach the metals. The crucible was washed three times with 0.1 M HCl and made up to 100 ml with distilled water. Standard stock solutions were prepared for each metal using salts of each metal to prepare a standard curve.

RESULTS AND DISCUSSIONS

The chemical composition of the Gluten free crackers was found to contents carbohydrates of 49g, fat 1.5 g and protein 23.2 g. Similarly, additions of flavors help in enhancing the keeping quality of gluten free crackers to the great extent at ambient temperature.

Table 2: Innovations and Trials Trial recipe

Ingredients (g)	Sample T0	Sample T1	Sample T2	Sample T3	Sample T4
Rice flour	50	55	40	30	40
Soya flour	40	30	40	45	30
Sesame seed	-	5	10	15	20
Chili powder	3	3	3	3	3
Coriander powder	2	2	2	2	2
Cumin	2	2	2	2	2
Salt	3	3	3	3	3
Oil	60	60	60	60	60

The trial, which was conducted on different proportion of rice flour, soya flour, sesame seed. Sample T4 was the most acceptable and the best sample selected during sensory evaluation on the basis of result revealed in the formulation of crackers was satisfy consumer taste and preference and will be accepted in the market as fasting purpose. The results indicated that T0 to T3 were slightly darker in colour compared to T4.T0 is control sample contain pale yellow in colour. Crackers supplement with sesame seed is highly acceptable due to its organoleptic attributes. T4 contain high overall acceptability score is 8.0 as compared to T0, T1, T3, and T4. Control sample obtained lower acceptability score than sample T4 due to the improved colour, texture, flavors, and taste.

CONCLUSION

Crackers are a flat, dry fried food typically made by flours. The product is highly nutritious because of sesame seed soya flour and rice flour. Thus, recommended the use of sesame seed in formulation of crackers in turns also help to increase overall nutritional value of crackers. The shelf life of gluten free crackers is 24 days. The crackers are highly nutritious because it contains soya flour and sesame seed. Finally, it can be concluded that sample T4 has more sensory quality due to its different flavors and improved appearance, nutritive values and health benefit such a higher dietary intake of carbohydrates and protein would be beneficial for all liable people groups, such as children, women and men and also old

people can consume it. This product is focused and complete which will help the business stay on course.

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