



INTERNATIONAL JOURNAL OF ADVANCE RESEARCH, IDEAS AND INNOVATIONS IN TECHNOLOGY

ISSN: 2454-132X

Impact factor: 6.078

(Volume 6, Issue 1)

Available online at: www.ijariit.com

Preparation of multigrain Khakhra from legumes and study its nutritive values

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ABSTRACT

Khakhra is a thin cracker commonly consumed in Gujrat and Rajasthan. Khakhra is more like readymade roasted papad made from mat bean, wheat flour, and oil but there are several varieties of cereals and legumes that can be used in the preparation of Khakhra are available. Grains and legumes have a unique place in human civilization as it serves as an important source of protein, vitamins, and mineral. As technology emerged, we developed several products from legumes and cereals like extruded product RTE snacks etc. This paper focuses on the development of Multi-Grain Khakhra. It was prepared by using Wheat, Gram, Rice and Mung flour in standardized proportions flour were mixed with dry ingredient and dough were made by adding milk instead of water. The dough was given the shape of tortilla and then Roasted.

Keywords— Legumes, Wheat flour, Gram flour, Rice flour, Mung flour

1. INTRODUCTION

Grain Legumes are an integral part of the Nepalese agricultural system. These are the important crops of the country and according to studies, legumes are a good source of protein, carbohydrate, and vitamins. Regularly eating legumes may help lower total and LDL cholesterol levels. As we know Legumes are rich in Potassium, Magnesium and fiber, all nutrients that have a positive impact on blood pressure management. While preparing the multi-grain khakhra all the Protein, Carbohydrate, Vitamins, potassium, Magnesium and Fiber in Legumes were considered and Wheat flour, Gram flour, Rice flour, Mung flour were selected. Then mix salt, Turmeric and green chili and Dough is prepared. Some of the health benefits of ingredients are enlisted below.

1.1 Wheat flour

Wheat is one of the world's most commonly consumed cereal grains. White and whole wheat flour are key ingredients in baked goods, such as bread other wheat-based foods include pasta, noodles, semolina, bulgur, couscous, and khakhra. Wheat is highly controversial because it contains a protein called gluten, which can trigger a harmful immune response in predisposed individuals. Wheat is a rich source of various antioxidants, vitamins, minerals, and fiber. Wheat is mainly composed of carbs but also has a moderate amount of protein like all cereal grains. The health effects of starch mainly depend on its sugar levels. Wheat is also a good source of several vitamins and minerals, including selenium, manganese, phosphorus, copper, and folate. Wheat bran which is present in whole wheat may contain a number of healthy antioxidants, such as alkylresorcinols and lignans. Notably, white flour and other refined wheat products do not contain these compounds.

1.2 Gram flour

Gram flour is rich in fiber, iron, potassium, manganese, copper, zinc, phosphorus, magnesium, folate, vitamin B-6 and thiamine. One bowl of cooked chickpeas can produce 20% of your daily protein requirement. Gram flour contains healthy unsaturated fats which help in lowering the cholesterol level of the body. There are also so many health benefits of gram flour-like controls diabetes, helps to improve the health of the heart because it contains fiber on it. Healthy for gluten, helps to get rid of iron deficiency, it is useful in pregnancy, help during fatigue, help to regulate mood and appetite, regulate blood pressure and also help in strengthening of bones.

1.3 Rice flour

Rice contains ferulic acid, ferulic acid, and allantoin. Ferulic acid helps to increase the absorption of vitamin C in the body. Ferulic acid is an antioxidant and allantoin. Rice flour is also good for the skin because it consists of ferulic acid

antioxidants. Rice flour is high in beneficial fiber, it is a gluten-free grain, it also enhances liver function. Rice contains choline which helps to transport cholesterol and triglycerides for the liver.

1.4 Mung flour

Mung flour is a high source of vitamins, minerals, protein, and fiber. Sprouted mung contain fewer calories but have more anti and amino acids. Mung is a good source of anti-oxidant and reduces the risk of chronic diseases, such as heart disease, diabetes, and certain cancer. Vitexin and isovitexin are the main antioxidants present in mung that may protect against free radical damage that occurs due to heatstroke. Mung flour is also a good source of potassium, magnesium, and fiber.

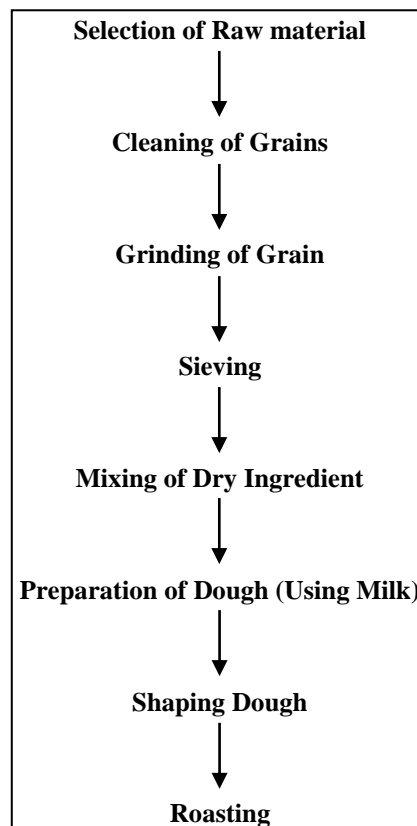


Fig. 1: Flow chart

- **Selection of Raw materials:** Selection of legume is done depending upon various factors such presence of moisture, foreign materials, insect, rodent, excreta or insect, etc. Dry grain with minimum impurities was selected for khakhra preparation. Wheat, Gram, Mung, Rice were purchased from trusted suppliers having quality certifications. For the preparation of dough standardized milk with the fat of 4.5% was selected. Other dry ingredients were selected on the basis of primary visual inspection for the overall quality of the final product.
- **Cleaning of Grains:** Taking all the necessary precautions legumes were selected still there was some minor impurities present which was not acceptable thus cleaning process was done to remove impurities. Unit operations such as Winnowing, Sieving (for separation of small stones), etc. were carried out.
- **Grinding of Grain:** Assuring that cleaning of grain is done satisfactorily the grains were subjected to milling process in with a hard grain of legumes were converted into powdered flour.
- **Sieving:** Sieving was done to obtain fine flour and also to remove un-grinded particles from the flour. Sieve size of 212 μm was used to refine flours.
- **Mixing of Dry ingredients:** Wheat, Rice, Gram, Mung flour was mixed in the ratio of 7:1:1:1. Similarly, other ingredients used like Turmeric, chia seeds, shabdakash, chili powder, and salt were also mixed to enhance the sensory characteristics of the final product.
- **Preparation of Dough:** All the mixed dry ingredients and milk were mixed for the formation of dough in the ratio of 7:3. Milk provides a smooth texture to the dough and also helps to enhance the nutritive value of khakhra.
- **The shaping of Dough:** The Well mixed dough was then subjected to the rolling process where it obtained circular shape. About 50 grams of dough was rolled in the circular of about the radius of 6cm.
- **Roasting:** The Rolled dough was roasted in a pan until the moisture content is reduced to 16% by weight. The resulted product is called as multigrain khakhra with yellowish-brown color.

2. SENSORY QUALITY TEST

The sensory Quality test was done by a student of SauVasudhatai Deshmukh College of Food Technology, marks were awarded out of 10.

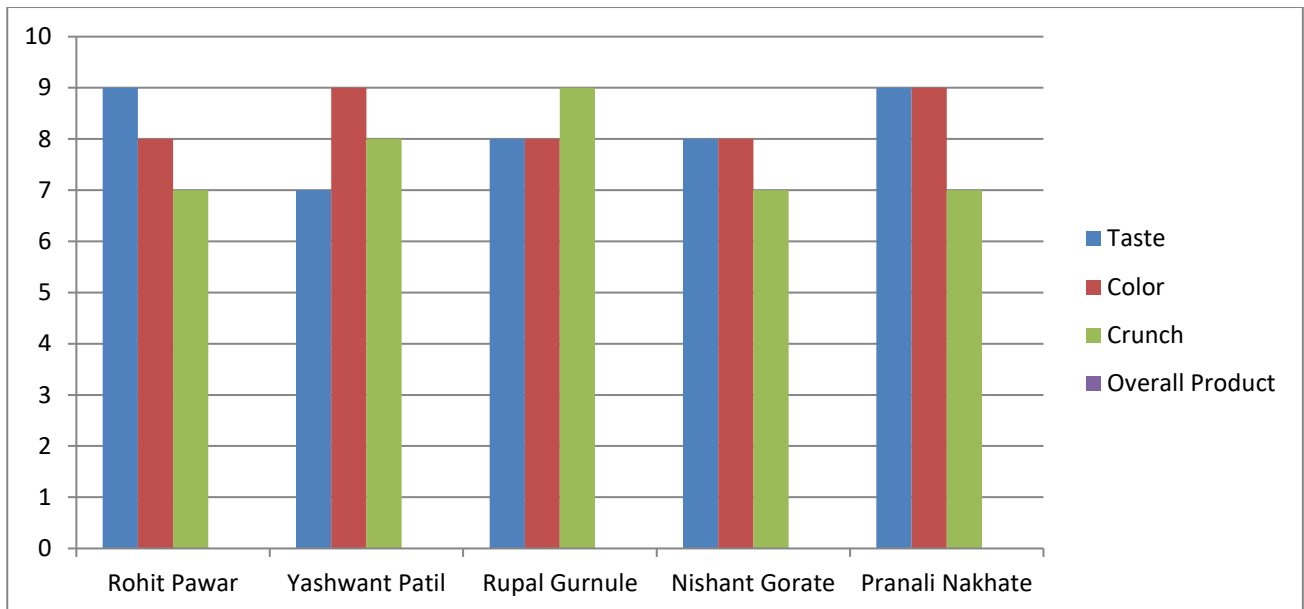


Fig. 2: Results from a sensory quality test

3. CHEMICAL ANALYSIS

Chemical analysis was done and results were obtained per 150gm of the sample. The total calories of the product were 426.50 by calculation.

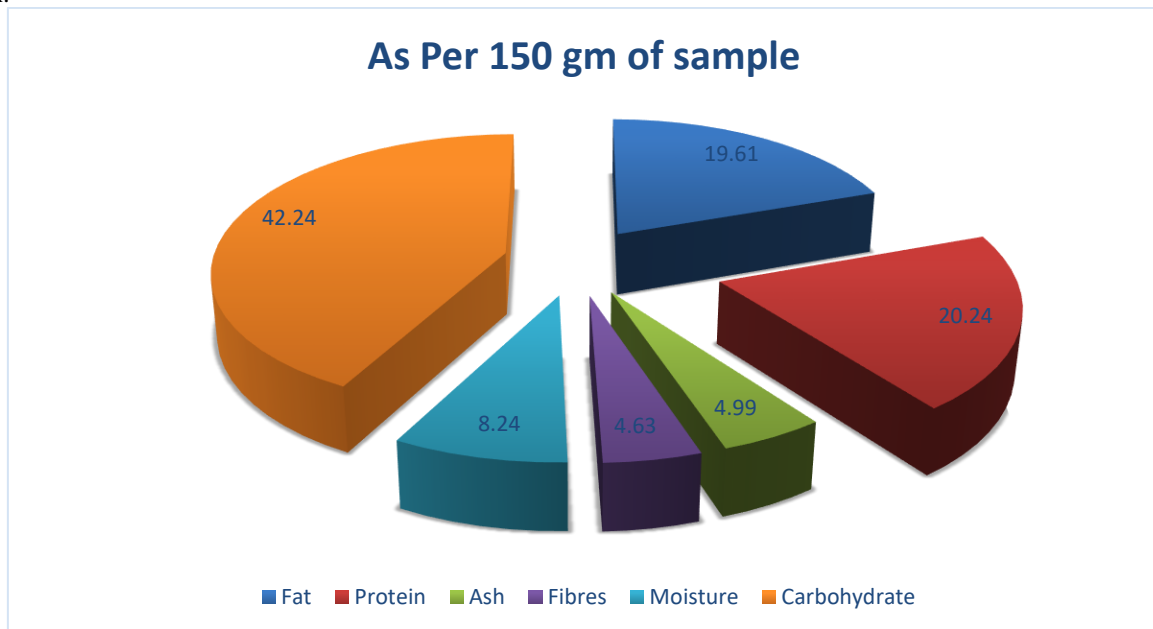


Fig. 3: Results from chemical analysis

4. CONCLUSION

As a result of chemical analysis, carbohydrates and proteins were found to be the most abundant constituent of the product followed by fats. Thus, the multigrain khakhra is excellent to overcome protein deficiency in young people especially for the people who lie on plant food. Fibers found in the product helps digest protein and carbohydrates during digestion. The final product made from multigrain also has a moderate number of antioxidants, minerals, and Vitamins. As gram and wheat flour were the main constituent of the product it is a rich source of Vitamin B6 and Vitamin C

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