

# Evaluation of Nutritional analysis of “Khakhra” Prepared by Buckwheat Flour and Gram Flour (Sattu)

Sunita Mishra\*, Gaurav Singh

Department of Food and Nutrition, Babasaheb Bhimrao Ambedkar University, Lucknow, Uttar Pradesh, India

## Research Article

**Received:** 10-Apr-2022,  
Manuscript No. JAAS-22-60403;  
**Editor assigned:** 13-Apr-2022,  
Pre QC No. JAAS-22-60403 (PQ);  
**Reviewed:** 27-Apr-2022, QC No.  
JAAS-22-60403; **Revised:** 10-  
Jun-2022, Manuscript No. JAAS-  
22-60403 (R); **Published:** 21-  
Jun-2022, DOI:10.4172/2347-  
226X.11.04.005

\***For Correspondence:** Sunita Mishra,  
Department of Food and Nutrition,  
School for Home Sciences,  
Babasaheb Bhimrao Ambedkar  
University, Lucknow. Uttar Pradesh,  
India

**Email:** gsinghg1254@gmail.com

**Keywords:** *Polygonaceae*;  
Thiamine

## ABSTRACT

India is a country with huge population with lots of religious values. That's why this study was formulated with the aim of providing full nutrition in one diet to whom that not able to buy expensive healthy food for their livelihood. Buckwheat (*Fagopyrum esculentum Möench*) with common gram flour was used to develop a papad which is very cost effective and also rich in nutritive values. A perfect fasting diet with moisture, ash, fat, protein, carbohydrate, and total energy value was found to be 7.30%, 2.30%, 3.17%, 14.36%, 65.57% and 348 Kcal/100 g respectively in flour. While in developed product, the moisture, ash, fat, protein, carbohydrate content and energy value were found to be 7.13%, 2.58%, 13.98%, 72.81%, and 379 Kcal/100 g.

## INTRODUCTION

Buckwheat (*Fagopyrum esculentum Möench*) is a member of family Polygonaceae. It has grate nutritional values along with various other dietetic and therapeutic properties which make it special amongst cultivable crops. Its valuable components are included into a group of nutraceuticals [1]. Buckwheat grains are rich in thiamine (vitamin B<sub>1</sub>), riboflavin (vitamin B<sub>2</sub>) and pyridoxine (vitamin B<sub>6</sub>) [2]. The major compounds in buckwheat grains, including proteins, polysaccharides, dietary fibre, lipids, rutin, polyphenols, micro and macro-elements, depends on the variety or environmental factors [3]. In

addition, buckwheat grains are a significant source of microelements, Zn, Cu, Mn, Se as well as of macro-elements, including: K, Na, Ca, and Mg [4,5]. Buckwheat is nutritionally superior in fatty acid composition to cereal grains with typically 80% unsaturated fatty acids and more than 40% polyunsaturated essential fatty acid [6]. Amino acid composition of buckwheat proteins is well balanced and displays a high biological value. Buckwheat grains are additionally a rich source of Dietary Fibre (TDF), including its Soluble Fraction (SDF). Due to nutritional rich properties grains and other parts of buckwheat plant are applied in the food, pharmaceutical, cosmetic and feed industry. A balanced diet is a key source for good health and a wide range of nutritional components in ample amount are necessary to fulfil the daily requirement of human being. It was found in various studies that chemical based products may causes profound toxicity which are unhealthy apart from that herbs and grains are occurring from the natural source which contain a huge amount of vitamins and minerals which are healthy for the human body and cures many disease. Among all known buckwheat species, common buckwheat (*F.esculentum*) and tartary buckwheat (*F. tartaricum*) are commonly cultivated. Whereas, nine other have agricultural and nutritional value. Buckwheat is mainly cultivated in China, Russian Federation, Ukraine, and Kazakhstan. It is also produced in Slovenia, Poland, Hungary, and Brazil. In this study, a food product was developed by mixing buckwheat food with gram flour named "Khakda" which is a kind of Indian Papad. Moreover, the product has been studied further on various nutritional parameters such as total protein, fat, carbohydrate moisture etc. The Kutu flour is mainly used during fasting and there is a possibility of excessive lack of nutrition in the body in such a situation, so that the main aim to develop this product is to reduce nutritional deficiency in the body which can be met to some extent because it is easily available and easy to use. That's why the developed product can help the mankind in proper nutritional uptake and also prove beneficial for those who cannot easily afford expensive food as well [7].

## MATERIALS AND METHODS

### Sample preparation

Raw buckwheat flour with gram flour, were used for the making papad ideally for using in fasting diet. Buckwheat flour and gram flour were procured from the local market of Telibagh Lucknow in the quantity of 1 kg each. Further, both of the flour was sieved for removing bran particle. A mix dough was then prepared with the help of clean drinking water. Moreover, rock salt (2 table spoon) was added in it during the making of dough. Once the dough prepared, cut it into small bolls. In continuation, these bolls were then pressed manually in the shape of papad (Khakhra) and collect all these in a bucket after proper dry for final use [8,9].

### Nutritional analysis

Raw material with end product were analysed for various nutritional parameters such as moisture, ash, fat, protein, carbohydrate and energy value with slandered protocols described in Manual for analysis of foods by food safety and standards authority of India (2016) for cereal and cereal products [10].

### Moisture Content

For the determination of moisture in raw and final product first of all dry both the test sample and grind to give sufficient ground material for replicate determination. Ensure that the sample is neither too coarse nor too fine and passes through the 1.0 mm sieve. Further, weigh accurately about 5 gm of each sample in a previously dried and tared dish which was then placed in the oven with its lid underneath for 2 hours. Remove the dish after 2 hours, cool in the desiccator and

weigh. The dish should be placed back in the oven at half hour intervals till constant weight is achieved. The specification for the size of the dish should also be included [11,12].

$$\text{Moisture\%} = \frac{(W_1 - W_2)}{W_1 - W} \times 100$$

Where,

$W_1$  = Weight in gms of the dish with the material before drying

$W_2$  = Weight in gms of the dish with the material after drying

$W$  = Weight in gms of the empty dish

### Ash content

Ash content approx. 5 gm of fresh sample was used for the determination of ash content, Ignite the dried material in the dish with the flame of a burner till charred. Further, ignition at 550–600°C in a muffle furnace was continuing till grey ash is obtained. The grey ash then cools in a dessicator and weigh. All the process was repeated to get a notable difference in weight in two consecutive weighings is less than 1 mg, note the lowest weight [13].

$$\text{Ash\%} = \frac{W_3 - W_1}{W_2 - W_1} \times 100$$

Where,

$W_1$  = weight of empty crucible dish

$W_2$  = weight of crucible dish + sample

$W_3$  = mean of the dry sample.

### Protein estimation

The present of protein was estimated by the determination of Nitrogen using standard Kjeldahl procedure as described in FSSAI manual 2016. The protein contents were calculated using the conversion factors 6.25 which is commonly used for estimation in food products, respectively. All results are expressed on a natural moisture basis [14].

### Fat Percentage

The fat content was determined according to the Soxhlet method. In this method, the fat was heat extracted using the non-polar solvent. In the end of the distillation, the solvent was distilled off and the residue was dried and weighed.

### Carbohydrate

The carbohydrate contain in buckweed is determined by the following formula as recommended by FSSAI 2016.

$$100 - (\text{Moisture} + \text{Ash} + \text{Fat} + \text{Protein}) \text{ in } 100 \text{ g of food}$$

### Sensory analysis

Sensory analysis of developed product was done according to Tiwari and Michra 2019. Briefly, sensory analysis of freshly produced “Papad” samples was carried out by a panel of 5 members. The samples were evaluated for desirability in appearance, colour, crispiness, texture, taste, flavour and overall acceptability using a 9-Hedonic scale test, varying from 9, which means ‘like extremely to 1, which means ‘dislike extremely. During preliminary trials, it was noticed that the

sensory properties of the product were affected *i.e.* flavour and taste wise, body and texture, colour and appearance and overall quality whereas addition of gram flour produced good results [15].

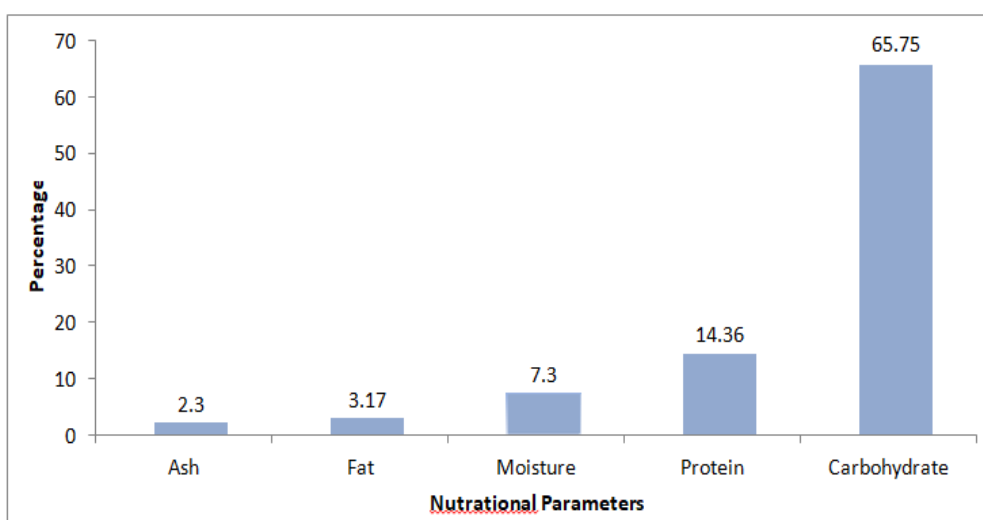
### RESULTS AND DISCUSSION

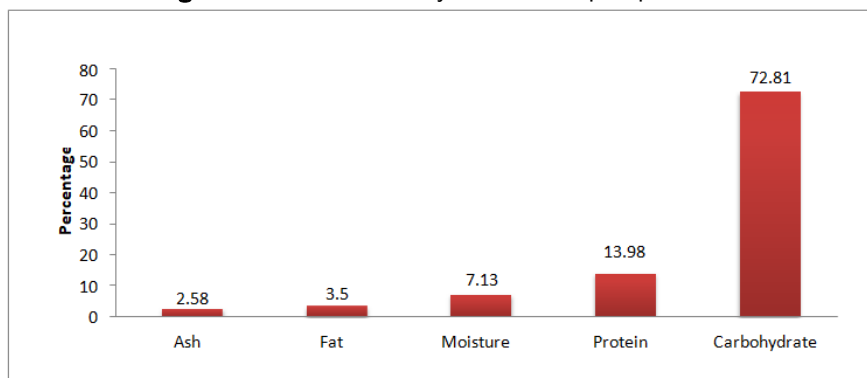
Proximate compositions of buckwheat flour (on dry basis): In the study, in case of buckwheat flour and gram flour, the moisture, ash, fat, protein, carbohydrate, and total energy value was found to be 7.30%, 2.30%, 3.17%, 14.36%, 65.57% and 348 Kcal/100 g respectively. While in developed product, the moisture, ash, fat, protein, carbohydrate content and energy value were found to be 7.13%, 2.58%, 13.98%, 72.81%, and 379 Kcal/100 g. Supported by other studies In case of mineral contents, buckwheat flour has significantly higher sodium, potassium, copper, zinc, iron and manganese content than that of the wheat flour. Further, moisture content is one of the most important factors that maintaining food quality because increase in moisture content assists microbial growth and eventually deteriorates quality. In the present study, the moisture content of both flour and papad was found 7.30% and 7.13% respectively this may be explained as buckwheat flour contained greater amount of total dry solids. This study is in agreement with others (Table 1 and Figure 1,2) [16].

**Table 1.** Nutritional parameter analysis.

| S.no. | Parameters   | Raw ingredient | Developed product |
|-------|--------------|----------------|-------------------|
| 1     | Moisture     | 7.30%          | 7.13%,            |
| 2     | Ash          | 2.30%,         | 2.58%             |
| 3     | Fat          | 3.17%          | 3.50%             |
| 4     | Protein      | 14.36%         | 13.98%            |
| 5     | Carbohydrate | 65.57%         | 72.81%            |
| 6     | Energy value | 348 Kcal/100 g | 379 Kcal/100 g    |

**Figure 1.** Nutritional analysis of raw ingredients.



**Figure 2.** Nutritional analysis of developed product.

## CONCLUSION

In the concluding remark it was clearly observed that use of buckwheat flour with gram flour in the preparation of papad “Khakhra” has significantly enhance the nutritional and sensory attributes of prepared product. Based on the biochemical, physical and sensory results, it can also observe that buckwheat flour is acceptable in quality and it is nutritionally superior over locally available papads. The findings of the present study will help in development and utilization of functional foods that will not only improve the nutritional status of the population but also help those suffering from degenerative diseases [18,19].

## ACKNOWLEDGEMENT

The authors are grateful to Babasaheb Bhimrao Ambedkar central University Lucknow to provide such research and development facilities in the department of home science.

## CONFLICTS OF INTEREST STATEMENT

The authors of this manuscript certify that they have no conflicts of interest in the subject matter or materials discussed in this manuscript.

## REFERENCES

- Li SQ, et al. Advances in the development of functional foods from buckwheat. *Crit Rev Food Sci Nutr.* 2001; 41:451-464.
- Fabjan N, et al. Tartary buckwheat (*Fagopyrum tataricum Gaertn.*) as a source of dietary rutin and quercitrin. *J Agric Food Chem.* 2003;51:6452-6455.
- Kim SW, et al. Functional amino acids and fatty acids for enhancing production performance of sows and piglets. *J Anim Sci.* 2007;20:295-306.
- Stibilj V, et al. Enhanced selenium content in buckwheat (*Fagopyrum esculentum Moench*) and pumpkin (*Cucurbita pepo L.*) seeds by foliar fertilisation. *Eur Food Res Technol.* 2004;219:142-144.
- Wei Y, et al. Studies on the amino acid and mineral content of buckwheat protein fractions. *Food/Nahrung.* 2003;47:114-116.
- Steadman KJ, et al. Buckwheat seed milling fractions: description, macronutrient composition and dietary fibre. *J Cereal Sci.* 2001;33:271-278.
- Tomotake H, et al. Stronger suppression of plasma cholesterol and enhancement of the fecal excretion of steroids by a buckwheat protein product than by a soy protein isolate in rats fed on a cholesterol-free diet. *Biosci Biotechnol Biochem.* 2001;65:1412-1414.
- Krkošková B. Prophylactic components of buckwheat. *Int Food Res J.* 2005; 38:561-568.
- Li SQ, et al. Advances in the development of functional foods from buckwheat. *Crit Rev Food Sci Nutr.* 2001;41:451-464.
- Bonafaccia G, et al. Trace elements in flour and bran from common and tartary buckwheat. *Food Chem.* 2003; 83:1-5.

11. Kreft S. Extraction of rutin from buckwheat (*Fagopyrum esculentum Moench*) seeds and determination by capillary electrophoresis. *J Agric Food Chem.* 1999;47:4649-4652.
12. Government of India. The National Food Security Act, 2013. New Delhi, India: Ministry of Law and Justice Department of Legislative. 2013.
13. FSSAI. Manual for analysis cereal and cereal product, Ministry of Health and Family Welfare, Government of India, New Delhi. 2016.
14. Baljeet SY, et al. Studies on functional properties and incorporation of buckwheat flour for biscuit making. *Int Food Res J.* 2010;17.
15. Bhavsar G. Studies on physico-chemical characteristics of buckwheat and its exploration in bread as functional food. *Int J Eng Res Technol.* 2013;2:3971-3980.
16. Selimović A. The effect of baking temperature and buckwheat flour addition on the selected properties of wheat bread. *Croat J Food Sci.* 2014;6:43-50.
17. Tiwari A, Nutritive Evaluation of Wheat Bran Biscuits Incorporated with Flaxseed. *Int J Sci Res.* 2018;2319-7064.
18. Tiwari A. and Mishra S. Sensory Evaluation of Wheat Bran Biscuits Mixed with Flaxseed. *Asian J Adv Res.* 2019;1-5.