

Evaluation of Biscuits Prepared From Cowpea Flour (*Vigna Unguiculata*)

Saloni Omar¹, Seema Sonkar²

1. M.Sc. Research Student, Food Science and Nutrition Department, Chandra Shekhar Azad University Of Agriculture and Technology, Kanpur, India
 2. Assistant Professor, Food Science and Nutrition Department, Chandra Shekhar Azad University Of Agriculture and Technology, Kanpur, India.
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Abstract

Biscuit is a primarily flour-based baked food product. They are prominent ready-to-eat baked snack among the people. Biscuits were prepared from 3 flour blends of cowpea, moth bean and rice flour. The nutritional composition and sensory characteristics of biscuits were evaluated using standard methods. The investigation was carried out in the Food Science and Nutrition Department, College of Home Science, CSAU&T, Kanpur. The objective of this paper is to prepare biscuits from three different combinations of cowpea flour, moth bean flour and rice flour viz. 5:25:50, 10:20:50 and 15:15:50 percent to prepare flour mix. This study was aimed to analyze the nutritional and sensory quality of biscuits. It was noticed that incorporation of cowpea flour at 5% was “liked slightly” but it is higher in content of protein and iron in it. Data revealed that protein content of biscuits ranged from (6.51-9.74%) and iron content varies from (1.50-3.05 mg/100 gm). T3 incorporated sample of biscuit sample of murukku had better quality in terms of appearance, colour, texture and overall acceptability and were “liked moderately”. Hence, the study suggests that cowpea and moth bean can be used for the development fortified food products because of its exotic flavor, high iron and protein content and high acceptability.

Keyword: Cowpea flour, biscuits, iron, protein, sensory evaluation

1. Introduction:

Cowpea is an annual herbaceous legume referred as “*Lobia*” in India. Cowpeas are grown mostly for their edible beans, although the leaves, green peas and green pea pods can also be consumed, meaning the cowpea can be used as a food source before the dried peas are harvested. It is a gluten-free sources of protein and calories, as well as minerals and vitamins. Cowpea seeds contains of 25% protein and very low fat content. Cowpea has 13.4 gm of moisture and about 24.1 gm protein and a lower fat content of 1.0 gm. The fibre and mineral content of cowpea was around 3.8 gm and calcium 77 mg, phosphorus 414 mg and iron 8.16 gm (Gopalan et al, 1996).

Biscuits represent the largest category of snack item among bakery products (Pratima et al 2000). Biscuits are widely accepted and consumed by almost all profiles of consumers from many countries and therefore offer a valuable supplementation vehicle for nutritional improvement (Arshad et al 2007). It has become one of the popular snack foods for both young and elderly people due to their affordable price, convenience, shelf-

stable and nutritive value (Akubor, 2003). They are hard and may be savory or sweet such as chocolate biscuits. They are easy to carry, easy to store food in a day to day life. Therefore, this study was aimed to analyze the nutritional and sensory quality of biscuits incorporated with cowpea.

2. Material and Methods:

2.1 Preparation of Cowpea flour

Cowpea grains were cleaned and soaked in water for 2 hour at room temperature. They were washed well and dried in sun in 15 mm thick layer. Dried grains were ground by a grinder and sieved to get fine flour by a sieve.

2.2 Preparation of Biscuits

The biscuits were prepared after the flour preparation. Biscuits was prepared by traditional creaming method. Three different combinations were prepared for the assessment of nutritional and organoleptic evaluation. Dry ingredients (flour, cocnut powder and baking soda) were mixed and sieved thrice for uniform mixing. Weighed amount of butter was taken in a bowl and powdered sugar was added and stirred continuously for creaming. Flour mixture was added in small amount into the creamed butter and mixed uniformly. Soft dough was prepared, dough was rolled out and biscuits were cut into small round shape using biscuit cutter. Shaped biscuits were kept in a baking tray and baked for 20 minutes at 150°C till golden brown colour. Baked biscuits were then stored in air-tight container for further analysis.

Three combinations were prepared from cowpea flour, moth bean flour and rice flour. Treatment 1 contained flour in the ratio (5:25:50), treatment 2 (10:20:50) and Treatment 3 contained (15:15:50) and the control is made up from refined flour only.

Table. 1 Standardized recipe of biscuits

Ingredients	Amount (gram)
Flour mix	80
Coconut Powder	20
Butter	40
Sugar	50
Baking Soda	0.350

2.3 Nutritional composition of Lobia Biscuits

The nutritional composition of murukku samples were determined using standard methods. The Moisture, ash , protein and iron was determined by the method described in AOAC (2000)

2.4 Organoleptic evaluation of Biscuits

Cowpea fortified products was evaluated for sensory characteristics using nine point hedonic scale and sensory score card (Amerine, 1965). Sensory evaluation was done by expert panel members consisting of 30 members.

2.5 Statistical Analysis

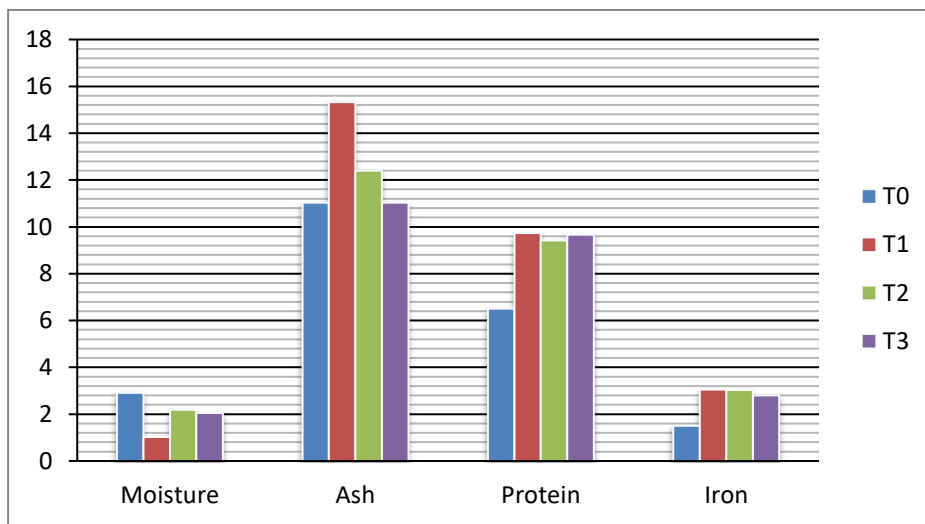
The statistical tools used for the analysis of the above data were Mean ± S.E. and One-way ANOVA (Analysis Of Variance) (**Snedecor and Cochran, 1980**). The aim of the analysis was to identify the significant difference in the nutrient content of the different products developed from cowpea used in present study.

3. Results and Discussion:

3.1 Nutritional Composition of biscuits:

Table. 1 **Nutritional Composition of biscuits:**

Treatment	Moisture (%)	Ash (%)	Protein (%)	Iron
Biscuits Control	2.91±0.01	11.03±2.05	6.51±0.23	1.51±0.009
Biscuits T1	1.02±0.02	15.33±2.93	9.74±0.09	3.04±0.018
Biscuits T2	2.19±0.03	12.40±2.74	9.42±0.05	3.05±0.003
Biscuits T3	2.05±0.02	11.03±2.03	9.66±0.16	2.80±0.05
C.D. at 5%	0.06	N/A	0.507	0.082



Results depicted in table.1 revealed that moisture content significantly varied from (1.02-2.91%), whereas the moisture content of control murukku was found to be highest (2.91%). There is significant difference in moisture content in control treatment and treatment 3, but it is depicted that there is no significant difference in control treatment and treatment 2 and 3. The range of ash content was found to be (11.03-15.33%). Treatment 1 contains maximum ash content (15.33%). There is no significant difference in ash content of control treatment and treatments. Protein content of prepared murukku varies in the ranged from (6.51-9.74%). Treatment 1 contains maximum protein content (9.74%). There is significant difference in protein content in control treatment and treatments. Control murukku contained (1.51mg/100gm) iron, whereas the highest level of iron content was recorded in Treatment 1 (3.05 mg/100gm). There is significant difference in Iron content in control treatment and treatments. Overall, murukku prepared from cowpea flour 5%, moth bean flour 25% and rice flour 50% (Treatment 1) is found to be rich in protein and iron. According to the column

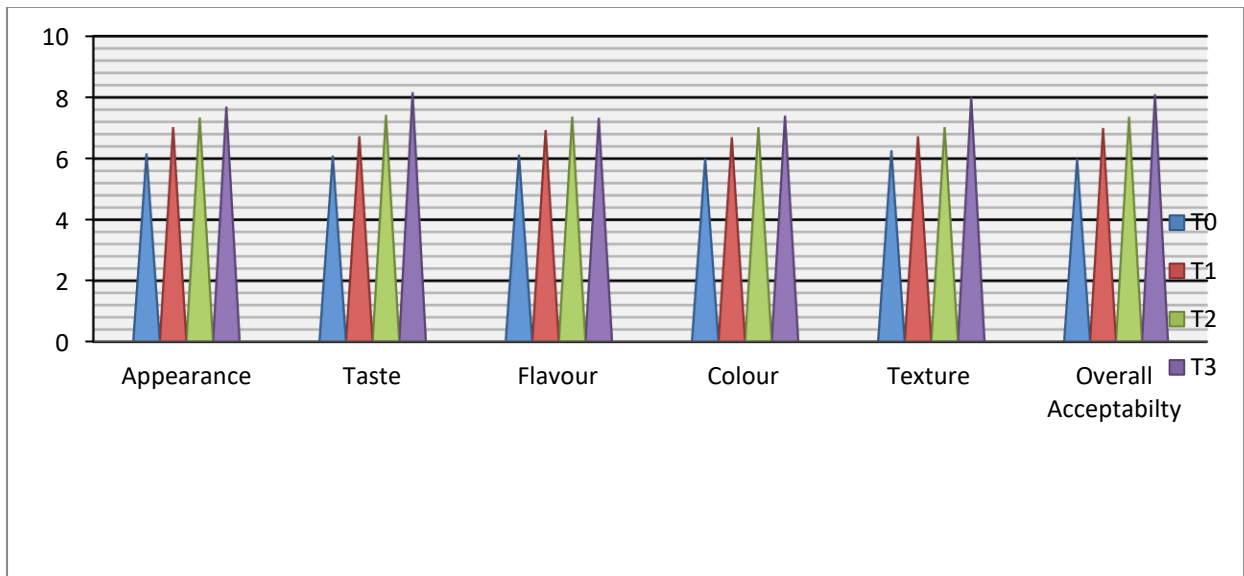
graph, Nutritional composition of Murukku Treatment 1 found to be highest and murukku prepared from 100% rice flour (Control) had the lowest nutritional composition.

Organoleptic Analysis of Biscuits:

Quality analysis for the biscuits prepared from Lobia was done by the panel of 30 expert judges. The panel evaluated colour, texture, taste, flavor and overall acceptability. A nine-point hedonic scale was used for this purpose.

Table.1 Organoleptic Characteristics of Murukku

Products	Appearance	Taste	Flavour	Colour	Texture	Overall acceptability
Control	6.17 ± 0.34	6.10 ±0.30	6.13±0.27	6.00±0.244	6.27±0.29	6.00±0.29
T1	7.03 ± 0.16	6.73 ±0.20	6.93±0.19	6.70±0.25	6.73±0.21	7.00±0.18
T2	7.34 ± 0.20	7.43±0.22	7.37±0.22	7.03±0.21	7.03±0.25	7.37±0.16
T3	7.70 ± 0.20	8.17±0.16	7.33±0.21	7.40±0.20	8.00±0.16	8.10±0.14
C.D. (P≤ 0.05)	0.65	0.65	0.64	0.63	0.65	0.56



3.1. Appearance:

Appearance of a food includes all its visible attributes and has become the consumer’s only consideration when evaluating a food product. There was a significant difference in control treatment and treatments. According to ANOVA test, biscuits prepared from 15% cowpea flour, 15% moth bean flour and 50% rice flour (T3) had the highest mean value of 7.70.

3.2. Taste:

Taste is the primary factor which determines the acceptability of any product. According to ANOVA test, murukku prepared from 15% cowpea flour, 15% moth bean flour and 50% rice flour (T3) had the highest mean value (8.17) for taste.

3.3. Flavour:

Flavor is the sensory impression of a food, and is determined by mainly by the senses of taste and smell. There was a significant difference in control treatment and treatments. Highest mean value (7.37) for flavor was shown by cowpea flour added murukku Treatment 2 followed by the murukku prepared from 100% rice flour had the lowest mean value.

3.4. Colour:

An attractive color lead to the good demand for the product in the market. There is significant difference between control treatment and treatments. According to ANOVA test, cowpea flour added murukku T3 had the highest mean value (7.40) for colour.

3.5. Texture:

Texture is the property of a food that are sensed in touch in the mouth and with the hands. There is significant difference in control treatment and treatment 2 and 3, but there is ni significant difference in control treatment and treatment 1. Murukku prepared from 15% cowpea flour, 15% moth bean flour and 50% rice flour (T3) had the highest mean value (8.00) for texture followed by the murukku prepared from 100% rice flour had the lowest mean value.

3.6. Overall Acceptability:

Overall acceptability is an important parameter in sensory evaluation. There is significant difference in control treatment and treatments. Murukku prepared from 15% cowpea flour, 15% moth bean flour and 50% rice flour (T3) had the highest mean value (8.10) for overall acceptability.

Organoleptic evaluation of murukku revealed that combination of cowpea flour 15%, moth bean flour 15% and rice flour 50% (Treatment 3) taste, texture and overall acceptability was found to be “liked very much” with mean sensory value of 8.17,8.00, and 8.10. Murukku Treatment 3 was “liked moderately” in terms of appearance, flavor and colour. Murukku Treatment 2 was “liked moderately” in terms of appearance, taste, flavor, colour and texture. Murukku Prepared from 100% refined flour was “liked slightly” with mean sensory score of 6.00 in terms of overall acceptability,. Hence it was revealed that the Treatment 3 was more acceptable than the other treatments.

4. Conclusion:

It can be concluded from the present study that the cowpea is a nutritious legume. The study established that cowpea seeds can be utilized in flour form besides the traditional use as

whole cowpea seed. Study indicated that the baked product *viz.*; biscuits from cowpea incorporation remained organoleptically acceptable in terms of all sensory attributes. It was observed from the mean scores of overall acceptability of the biscuits were in “liked moderately” category during the study. Incorporation of biscuits with 5% cowpea flour, 25% moth bean flour and 50% rice flour found to be higher in protein and iron content, but it was “liked moderately”. The incorporation of cowpea in such food products will not only expand its diversified usage as a food grain but will also benefit the human health. The study shown a potential use of cowpea in the preparation of various traditional, baked and extruded food products. These products can be utilized by the masses for improving the nutritional value. The challenge for future researchers is to recognize the consumer’s preferences for the various cowpea based products developed in the present study and to tap the potential market for this commercial viability. These products can be commercialized through self help groups of women at a small scale in the villages for their entrepreneurship development, which in turn can improve their economic as well as nutritional status ultimately.

5. References

1. Akubor,P. (2003) Functional properties and performance of cowpea/plaintain/wheat flour blends in biscuits. *Journal Plant Food Human Nutrition*, 58,1-8.
2. Amerine,M.A., Pangborn, R.M., and Rosseler, E.B. (1965). In principles of sensory evaluation of food. *Academic Press: New York*.
3. A.O.A.C. Official Methods of Analysis, (2000). Horwitz. W. Ed. Washington, Association of Official Analytical Chemists. 16th ed. Washington, D.C., U.S.A.
4. Arshad,M.U., Anjum, F.M., and Zahoor,T. (2007). Nutritional Assessment of cookies supplemented with defatted wheat germ. *Food Chemistry*, 102, 123-128.
5. Gopalan,C.; ramasastri, B.V. and Balasubramaniam, S.C. (1987). Nutritive value of Indian foods. National Institute of Nutrition, ICMR, Hyderabad.
6. Pratima,A., and Yadave, M.C., (2000). Effect of incorporation of liquid dairy by-product chemical characteristic of soy fortified biscuits. *Journal Food Science Technology*, 37, 158-161.
7. Snedecor, G.W. and Cochran, W.G. (1980). Statistical methods. 7th ed. Ames: lowastate university press. 215-237.