# Proximate Analysis, Physicochemical Characteristics and Health Promoting Properties of Raw Banana Flour

**Deepali Singh[1], Sunita Mishra[2]**

[1]*Student, Department of Food and Nutrition, School for Home Sciences, Babasaheb Bhimrao Ambedkar University, A Central University, Lucknow. Uttar Pradesh, India.*

[2]*Dean & Head, Department of Food and Nutrition, School for Home Sciences, Babasaheb Bhimrao Ambedkar University, A Central University, Lucknow. Uttar Pradesh, India.*

*Corresponding Author: deep.s15798@gmail.com*

**Abstract:** This study aimed to investigate proximate analysis, physicochemical properties, mineral content and functional properties of raw banana flour. This study was conducted at Babasaheb Bhimrao Ambedkar University in the 2021-2022 session. With proximate composition, it was found that raw banana flour consists of carbohydrate of 62.30gm/100, fat of 0.701/100gm, protein of 4.33gm/100gm, ash 2.72gm/100gm, and moisture content of 8.3gm/100gm. In mineral composition, Potassium was the most abundant amongst all. In ascorbic analysis, it was found Vitamin C content 12 mg/100gm. Banana flour samples were also evaluated for physicochemical properties such as pH, total soluble solids, total sugar and titrable acidity and we found that 5.4, 5.32-degree brix, 2.64gm/100gm and 3.30%. This study suggested the use of banana flour in the preparation of food products for digestion disease patients, besides adding nutritional value to the food products.

**Key Words:** *—Raw Banana Flour, proximate analysis, physicochemical properties, mineral content, functional properties, pH, total soluble solids, total sugar and titrable acidity.*

## I. INTRODUCTION

The banana is one of the most popular fruits among all the fruits. It is leading not only in production but also consume on a large scale in the world. The banana tastes very delicious and ranks first with a production rate of 25%. The ripe banana has a shelf life of 5 to 10 days after harvest. It is a soft and delicate fruit which make it susceptible to diseases and injury when transported to the markets for utilization. Human consumption of banana fruit was increasing day by day, by cultivating the fruit on large scale and the potential for converting bananas into commercial cultivation by developing commercially attractive products is one way to address this problem. In developed countries, 40 – 50 % of the annual agricultural produce is converted into value added commodities.

Manuscript revised July 09, 2022; accepted July 10, 2022. Date of publication July 12, 2022.

This paper available online at www.ijprse.com

ISSN (Online): 2582-7898; SJIF: 5.59

So, in such a situation, it is more important to convert the banana into valuable products have high nutritional value and meet consumer demand and avoid spoilage. Banana is a well-known fruit all over the world, so it is very important to use it when banana is unripe procedures to make by products (banana flour) like edible cookies, bread and eatable films. Green banana is a high value food recommended for pathological subjects, including constipation and diarrhoea, due to its ability to normalize colon functions. Since it has the ability to stimulate the proliferation of beneficial acidophilic bacteria in humans, its intake is recommended in cases of colitis, ulcerative colitis, gastric ulcer, uraemia, nephritis, gout, cardiovascular disease, and celiac disease. When it is in the green phase, the banana is considered a functional food of the prebiotic type. Conversion of banana into powder in immature stage, which possess thickening and culinary properties that is most similar to that of starch. Banana is mainly consumed in Malaysia, Japan, China and other Asian countries. Flour of banana and their by-products with highly nutritive value is very useful for domestic purposes. Banana flour is composed of sugar and high energy content, which can be easily processed into food products requiring solubility and sweetness. Commercially, the banana flour production is not well known; therefore, the banana producing industries is gaining popularity. The banana pulp was also processes to

make banana flour, but high-quality control measures, budgets and manpower is required, physical qualities must be studies for analysing of chemical qualities and nutritional qualities of flour for this purpose fruit must be analyse. When banana is not mature fully its conversion into flour has major source of fibre, starch, total starch and minerals (P, Mg, K, and Ca). When banana was converted to flour it has the potential to use in bakery products. (Farooq, M., Khan, et.,al 2018).

## II. Materials And Methods

### *2.1 Sample Procurement:*

Raw banana was procured at 50% maturation from the fruit mandi at Vrindavan Colony, Lucknow, Uttar Pradesh. The bananas were washed, peeled and sliced with stainless knife into a uniform thickness approximately.

### *2.2 Preparation of Banana Flour:*

Raw Banana flour was prepared and standardised in the laboratory. 1 kilograms of Raw bananas were removed from their bunches through manual method, peeled and sliced by using a sharp knife. Banana slices were dried in a solar drier and oven drier. By using solar drier, raw banana was dried for three days in a bright sunny day and then for fifteen minutes in dehydrator at 70 degree celsius. After completion, dried banana was grinded well to make powder out of raw banana to produce raw banana flour using a mechanical grinder it was found of 540gms weigh. And then packed in an air tight container for future use.

### *2.3 Proximate Analysis:*

The test was experimentally analysed in the Department of Food and Science Technology at Babasaheb Bhimrao Ambedkar University, Lucknow. The moisture level was estimated by Malaysian Standard (MS 1191:2013), where 3 g of sample was weighted into porcelain dish and dried in a hot air oven at 105 °C until steady weight was reached. Ash quality was estimated through dry-bashing in a furnace for 24 hrs. at a temperature of 550 °C by AOAC method 920.87 (AOAC, 2000). The raw fibre was calculated by alkali and acid hydrolysis, accompanied by the calculation of the residual ash quality took from AOAC process 962.09 (AOAC, 2000). The quality of proteins was calculated by Kjeldahl (Kjeltec 2300) method. Banana flour was processed with sulphuric acid, potassium sulphate further titrated with potassium hydroxide and sodium thiosulphate solution using Kjedahl process. The collected nitrogen value was transformed in to protein by multiplying it by a factor of 6.25. The fat was collected in Soxhlet (Soxtec Avanti 2055) apparatus.

### *2.4 ph:*

The pH of the banana flour was calculated according to the Suntharalingam and Ravindran, (1994). The pH of the flour was calculated by a pH meter, model 10. Flour suspension (8% W/V) was stirred for 5 min, allowed to stand for 30 min, filtered and the pH of filtrate was measured.

### *2.5 Total Soluble Solid Determination:*

The TSS content of raw banana flour was calculated according to the Salvaador et al, (2007) method. TSS in the same flour (8% W/V) were measured by refractometer.

### *2.6 Water Holding Capacity (WHC) and Oil Holding Capacity (OHC):*

The WHC and OHC character is tie of banana samples flour were determined according to the Rodrigue-Ambriz et al., (2008). Breuer, Twenty-five milliliters of distilled water or and commercial olive oil were mixed to 1gm of dry samples, stirred and incubated at 40, 60 or 80°C for 1h. Tubes were centrifuged at 3000xg for 20 min, the supernatant was decanted and the tubes were allowed to drain for 10min at a 45 angle. The residue was weighed and WHC and OHC calculated as g water or oil per g dry samples, respectively.

## III. Results And Discussion

### *3.1 Proximate Composition:*

Table 1 displays the findings of the raw banana flour. The analysis report shows the presence of ash, crude protein, crude fibre, starch and moisture content in unit of grams per 100g of dry material in the following table 1:

Table.1. Proximate composition of Raw Banana flour

| Composition | Concentration |
|---|---|
| Energy | 371.28 Kcal |
| Carbohydrates | 5.12gm |
| Fat | 0.80gm |
| Fiber | 2.35gm |

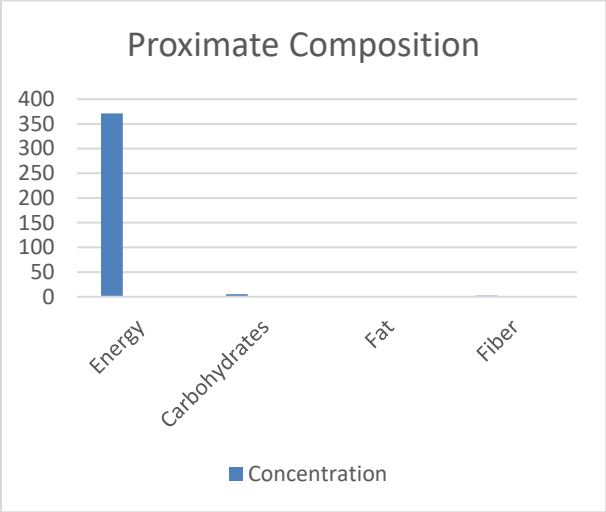


Fig.1.Graphical analysis of composition of Raw Banana Flour

### *3.2 Physiochemical analysis of raw banana flour:*

*3.2.1 pH Determination:*

The pH of raw banana flour samples was 6.7.

*3.2.2 Total Soluble Solid Determination:*

The TSS ranged between 3.3. T.S.S indicates soluble solid content of flour, and high T.S.S has been associated with high sucrose content in banana pulp (Buga nd et al., 2006). It has been reported that the average starch content drops from 70% to 80% in the Pre-climacteric period to less than 1% at the end of the climacteric period, while sugars, mainly sucrose, accumulate to more than 10% of the fresh weight of the fruit (Zhang et al, 2005). The lower TSS of green banana flour is acceptable science it is known that amylase, glycosidase, phosphorylase, Sucrose syntheses and inverts can act in the degradation of starch and the formation and accumulation of soluble sugars (Emaga et al, 2007; Terra et al, 1983).

*3.2.3 Water Holding Capacity (WHC) and Oil Holding Capacity(OHC):*

*3.2.3.1 Water Holding Capacity (WHC):*

WHC raw banana flour increased with temperature increasing, and was 7.1g water/g dry samples, 7.6g water/g dry samples and 9.2g water/g dry samples at 40 degree Celsius, 60 degree Celsius and 80 degree Celsius. WHC could be related to the physical state of starch (Waliszewsld et al, 2003) dietary fiber and protein in the flour. According to Rodriguez- Ambriz et al, (2008), amylase has the properties to bind water molecules, resulting a higher WHC.

*3.2.3.2 Oil Holding Capacity:*

The OHC of raw banana flour increases as temp. increases, and it ranges from 0.2 at 40°C to 1.4 at 80°C g oil/g dry samples. OHC indicates to the hydrophilic character of starches present in the flour (Rodriguez-Ambriz et al., 2008) that is present in high quantity in green flour (Rodriguez-Ambrize et al., 2008; Zhang et al., 2005), and in less quantity in ripe flour.

## IV. Conclusion

The proximate composition assessed were Moisture, protein. fibre. ash, fat and carbohydrate content and physiochemical properties were also analysed. The high amount of fibre in green banana flour indicated healthy for consumption especially when the aim is to increase the non-digestible fraction in food and may have great health benefits.

*Acknowledgement:*

I would like to show my gratitude towards Prof. Sunita Mishra, Dean and Head, School for Home Science BBAU Lucknow for her guidance for this research work. I also want to thank my family for the support.

## References

[1]. Farooq, M., Khan, I., Ilyas, N., Saboor, A., Kakar, K., Bakhtiar, M., ... & Solangi, I. F. (2018). Study on the physico-chemical characteristics of value-added banana products. Intern J Environ Agri Res, 4(4), 83-87.

[2]. Juarez-Garcia, Agama-Acevedo, E., Sayago-Ayerdi, S. G., Rodriguez- Ambriz, S. L. and Bello-Perez, L. A. (2006). Composition Digestibility and application in bread making of banana flour. Plant foods for human nutrition 61: 131-137.

[3]. Salvador, A., Sanz, T., and Fiszman, F. M. (2007). Changes in color and texture and their relationship with eating quality during storage of two different dessert bananas, Posthawest Biology and Technology, 43: 319-325.

[4]. Suntharalingam, S. and Ravindran, G. (1993). Physical and biochemical Properties of green banana flour. Plant foods for Human Nutrition 43: 19-27.

[5]. AOAC. (2000). Official methods of analysis of AOAC International. 17th ed. Gaithersburg, MD, USA: AOAC.
[6]. Ocloo, F. C., Okyere, A. A., &Asare, I. K. (2014). Physicochemical, functional and pasting properties of flour produced from gamma irradiated tiger nut (Cyperusesculentus L.). Radiation Physics and Chemistry, 103, 9-15.
[7]. Zhang, P., Whistler, R. L., Be Miller, J. N., and Hamaker, R. (2005). Banana Starch: Production Physiochemical Properties, and Digestibility-A review. Carbohydrate polymers, 59: 443-458.
[8]. Waliszewsld, K, N, Aparicio, M. A, Bello. L. A, and Monroy, J. A. (2003). Changes of banana starch by chemical and physical modification carbohydrate polymers, 52: 237-242.
[9]. Emaga, T H, Andrianaivo R H, Wathelet B, Tchango J. T. and Paquot M. (2007). Effects of the stage of maturation and varieties on the chemical composition of banana and plantain peels, food chemistry, 103: 590-600.
[10]. Rodrioguez-Ambrize, S. L., Islas-Hernindez, J. J., AgamaAcevedo, E., Tovar, j. and Bello-Perez. L. A. (2008). Characterization of a fiber-rich powder prepared by liquefaction of unripe banana flour Food chemistry, 107: 1515-1521.