



## Development and standardization of biscuits by using jamun seeds powder

1. Shashikant Tripathi, 2. Komal Singh, 3. Archana Vaishya

1. STUDENT OF BBAU SATELLITE CAMPUS, VI SEMESTER, 2. HEAD OF DEPARTMENT, ADMIN IN CHARGE OF BBAU SATELLITE CAMPUS, 3. FACULTY OF FOOD SCIENCE AND TECHNOLOGY, BBAU SATELLITE CAMPUS.

Food Science and Technology, BabasahebBhimraoAmbedkar University, Satellite Campus, Tikarmafi, Amethi, India and 2 Bhimrao Ambedkar University (Central University), VidyaVihar, Raibareli Road, Lucknow, India

Received- 03.07.2020, Revised- 07.07.2020, Accepted - 11.07.2020 Email : archanavaishya81@gmail.com

**Abstract:** Jamun seed are popular among alternative medicine systems to control different ailments such as diabetes, cardio-vascular and gastro-intestinal disorders. Owing to such attributes, the most important aspect of this study to develop jamun seed powder fortified biscuits have been commercialized to meet these purposes. Efforts were made to prepare biscuits having different combinations of Maida (M), finger millet (FM) and jamun seed powder (JSP) were prepared by mixing the different proportions viz., T1-87%+10%+3%, T2-84%+10%+6%, T3-81%+10%+9%, T4-78%+10%+12%. The biscuits were baked in a mally controlled oven at a temperature of 170°C for 20 min. The prepared biscuits were subjected to textural analysis and compared with the control biscuit containing 100% maida flour.

The physical and textural properties of biscuits made by various blending were determined. The qualities of the product were determined with the help of sensory evaluation.

In sensory analysis, treatment T3 (81% maida + 9% jamun seed powder + 10% finger millet flour) secured maximum score for colour, taste, flavour and acceptability. Therefore, treatment T3 was more acceptable so it was optimised treatment than others.

**Key Words:** Jamun seed powder; Biscuit; Texture analysis, Diabetes, sensory analysis, treatment.

**Introduction-** Biscuits are made for a variety of baked, commonly flour-based food products. Indian Biscuits Industry is the largest among all the food industries and has a turnover of around Rs. 3000 crores. India is known to be the second largest manufacturer of biscuits, the first being USA. Biscuits were assumed as sick-man's diet in earlier days. Now, it has become one of the most loved fast food product for every age group. Biscuits are easy to carry, tasty to eat, cholesterol free and reasonable at cost.

Jamun seed powder has been used for centuries as a natural form for balancing the healthy blood sugar level. It is a very delicious, detoxifying herb which has properties that help to maintain natural urination and sweating. It also acts as a liver stimulant, digestive, coolant and a blood purifier. Jamun seeds contain a glycoside, named Jambo line which helps in the maintenance of glucose levels as in the normal limits.

Finger millet (*Eleusine coracana* L.) is one of the important millets grown extensively in various regions of India and Africa. Regarding protein (6% to 8%) and fat (1% to 2%) it is comparable to rice and with respect to mineral and micronutrient contents it is superior to rice and wheat. Nutritionally, it has a high content of calcium (344 mg/100g), dietary fiber (15% to 20%) and phenolic compounds (0.3% to 3%). This minor millet contains important amino acids viz. isoleucine, leucine, methionine and phenylalanine which are deficient in other starchy meals. It is also known for several health benefits such as anti-diabetic, anti-tumorigenic, atherosclerogenic effects, antioxidant, which are mainly attributed due to its polyphenol and dietary fibre contents. Being an indigenous minor millet, it is used in the preparation of various foods both in natural and malted forms. Grains of this millet are converted into flours for preparation of products like porridge, puddings,



pancakes, biscuits, roti, bread, noodles, and other snacks. Besides this it is also used as a nourishing food for infants when malted and is regarded as whole some food for diabetic's patients. Finger millet being staple food in different parts of India and abroad is promoted as an extremely healthy food<sup>[1]</sup>.

Jamun seed powder-containing biscuit has been developed and incorporated into the diabetic diet. It has been found to be effective in reducing the postprandial rise in the blood glucose level and in improving glycaemic control<sup>[2]</sup>. These biscuits can be used for dealing with the symptoms of indigestion. These biscuits can also stimulate the liver functions<sup>[3]</sup>.

Finger millet has the highest calcium content among all the food grains, but it is not highly assimilable. The protein content in millet is very close to that of wheat; both provide about 11% protein by weight, on a dry matter basis.

Ayurvedic texts suggest that 1-3 gm jamun seed powder per day is an average dose for the treatment of diabetes<sup>[4]</sup>. The direct consumption of jamun seed powder is uneasy. Therefore, this work has been undertaken to develop the biscuit so that diabetic people will consume it easily and get recommended dose of jamun seed powder.

#### Materials and Methods

**Processing of raw material-** The pulp and seed of jamun fruit was separated by pulper. Then the seed was washed in water and dried in tray dryer at 60°C for 48 hours till complete drying and ground the seed in pulveriser to fine powder of average particle size 0.58 mm. Milling of wheat and finger millet was done to obtain fine flour with help of attrition mill. The proposed research was carried out in the bakery training centre, Department of Agricultural Process Engineering, College of Agricultural Engineering and Technology, Dr. Balasaheb Sawant Konkan Krishi Vidhyapeeth, Dapoli.

#### Treatment details

- Control - 100% (M).
- T1 - 87% (M) + 10% (FM) + 3% (JSP).

- T2 - 84% (M) + 10% (FM) + 6% (JSP).
- T3 - 81% (M) + 10% (FM) + 9% (JSP).
- T4 - 78% (M) + 10% (FM) + 12% (JSP).

**Process for preparation of biscuit-** The biscuits were prepared by mixing of ingredients like maida, finger millet (10%) and jamun seed powder (3%, 6%, 9%, and 12%), salt, sugar etc. were put together for dough formation (Table 1). The dough was kept for resting for 10 minutes. The sheet of appropriate thickness was prepared with the help of wooden roller (bellon). The prepared sheet was cut by using mould (rhomboidal shape). The cutting part of sheet was kept in convection oven as shown in Figure 1 at 170°C for 20 min. for baking. After completion of baking the biscuits were allowed to cool at room temperature (26±2°C) for 1 hour.

The ingredients required for the preparation of jamun seed powder fortified biscuit by using finger millet for different compositions are as follows.

**Results and Discussion-** The biscuits were prepared by making different proportions of jamun seed powder of average particle size 0.58 mm. The standard procedure was used for preparation of biscuits as described in Figure 1. The maida, finger millet and jamun seed powder and other ingredients were taken as mentioned in Table 1. Then the physical properties, calorific value and textural properties were measured. The results obtained are as follows.

**Physical properties of biscuit-** The biscuits were prepared with help of mould which is having rhomboidal shape. All the biscuits were prepared with the help of same mould hence the shape of all the biscuits was same, i.e. rhomboidal shape. The physical properties measured for all treatments are shown in Table 2.

All the biscuits were prepared with the help of same mould so there was minute difference for the length and breadth for all the treatments. The length of T1, T2 and T4 was 7.3 ± 0.05 and for T3 it was 7.2 ± 0.05 cm. The breadth for treatment T1 was 3.6 ± 0.057 cm and that for treatment T2, T3 and T4 was 3.5 ± 0.057 cm. Thickness for the treatment

T1, T2, T3 and T4 were 0.70±0.009, 0.75±0.008, 0.77±0.008, 0.76±0.007 mm respectively. The unit weight for the treatment T1, T2, T3 and T4 were 9.325±0.09, 9.356±0.07, 9.414±0.06, 9.420±0.057g respectively. The density for the treatment T1, T2, T3 and T4 were 0.345, 0.346, 0.347 and 0.346 shows the mean values of hardness of biscuit samples having different proportion of jamun seed powder as calculated in various experiments. From Figure 3, it was found that maximum hardness was obtained in treatment T2 whereas minimum hardness was obtained in treatment T1. The hardness values obtained for the biscuits of various blends were in the range of 468.33 to 453.5 g.

**Calorific value-** The calorific value of the developed biscuits was determined by using the Bomb Calorimeter (ASTM D271-70) [5]. Table 3 shows the results of the calorific value of the developed biscuits. The calorific value of fatty biscuits (experimental samples) varied between 402.23 to 482.68 kcal/100g. The calorific value of the treatment T3 was found more i.e. 482.68 kcal/100g followed by the treatment T2, i.e. 453.426 kcal/100g.

**Sensory analysis-** Sensory analysis has been carried out in NAIP laboratory of Department of Agricultural Process Engineering and Technology, CAET, Dapoli. Product of different treatments was analyzed by different subjects in our college faculty and students. They were

Ingredients (g)	T <sub>1</sub>	T <sub>2</sub>	T <sub>3</sub>	T <sub>4</sub>
Maida	870	860	810	780
Jamun seed powder	30	60	90	120
Finger millet	100	100	100	100
Baking powder	10	10	10	10
Milk powder	20	20	20	20
Salt	5	5	5	5
Sugar	200	200	200	200
DATE	250	250	250	250

Table 1: Ingredients required for the preparation of jamun seed powder biscuits (per 1 kg flour basis).

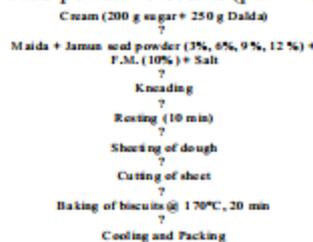


Figure 1: Process flow chart of preparation of jamun seed powder biscuit.

S.No.	Properties	T <sub>1</sub> (3% JSP)	T <sub>2</sub> (6% JSP)	T <sub>3</sub> (9% JSP)	T <sub>4</sub> (12% JSP)
1.	Length (cm)	7.3 ± 0.05	7.3 ± 0.05	7.2 ± 0.05	7.3 ± 0.05
2.	Breadth (cm)	3.6 ± 0.05	3.5 ± 0.05	3.5 ± 0.05	3.5 ± 0.05
3.	Thickness (cm)	0.70 ± 0.009	0.75 ± 0.008	0.77 ± 0.008	0.76 ± 0.007
4.	Unit weight (g)	9.325 ± 0.09	9.356 ± 0.07	9.414 ± 0.06	9.420 ± 0.057
5.	Density (g/cc)	0.345 ± 0.0071	0.346 ± 0.0069	0.347 ± 0.0068	0.346 ± 0.007

Table 2: Physical properties of biscuit for different treatment.

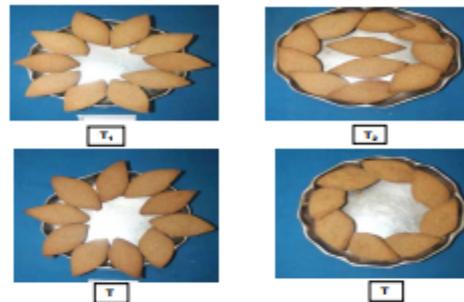


Figure 2: Jamun seed powder biscuits prepared by different treatments.

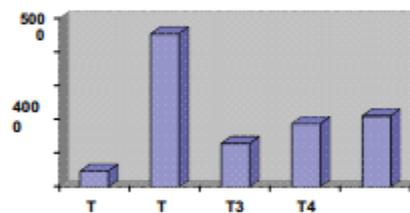


Figure 3: Hardness of different biscuit.

Treatment	Calorific value (kcal/100g)
T <sub>1</sub>	402.23
T <sub>2</sub>	453.426
T <sub>3</sub>	482.68
T <sub>4</sub>	446.18
Control	409.546

Sample Code	Sensory Parameters Score (Out of 9)				
	Colour (9)	Taste (9)	Flavour (9)	Texture (9)	Acceptability (9)
T <sub>1</sub>	7.5	8.5	7.5	7.0	7.5
T <sub>2</sub>	7.0	7.2	7.0	6.8	7.2
T <sub>3</sub>	8.0	7.9	8.1	7.9	7.8
T <sub>4</sub>	4.7	6.0	6.8	5.2	7.6
Control	7.8	8.1	8.0	8.0	7.6

Table 4: Results of sensory analysis.

provided with standard evaluation sheets based on nine-point hedonic scale by 20 members' consumer test panel for colour, texture, flavour, taste, appearance and overall acceptability for Jamun seed powder based biscuits. From collected data following results were derived as shown in Table 4. The sensory analysis of the developed biscuits was carried out by the 20 panel of judges from the faculty and students of the college. The treatment T3 (81%



M + 10% FM + 9% JSP) secured maximum score for colour, taste flavour and acceptability i.e. 8.0, 7.9, 8.1, 7.9 and 7.8 respectively.

**Summary and Conclusion-** Jamun seed powder in combination with finger millet and maida were used to prepare biscuit by using traditional creamy method. The results pertaining to standardization of composite flour for biscuit preparation revealed that sensorial quality characteristics of biscuits could be improved with incorporation of maida, finger millet flour and jamun seed powder. The various physical properties i.e. Length, width, thickness, unit weight, density, and calorific value, Textural properties of biscuits were determined.

The following conclusions were drawn from the analysis.

I. The density of Jamun seed powder biscuits was found to be in range of 0.345 to 0.347g/cc.

II. The calorific value of all type of biscuits varied between 402.23 to 482.68 kcal/100g. The calorific value of treatment T3 was found more i.e. 482.68 kcal/100g compared to others.

III. In textural analysis, the hardness values of biscuit T1, T2, T3 and T4 were 468.33, 4535, 1291.66 and 1873.33 respectively. The treatment T2 has more hardness i.e. 4535 g and moderate

hardness was found in treatment T3 (81% M + 9% JSP + 10% FM).

IV. In sensory analysis treatment T3 (81% M + 9% JSP + 10% FM) secured maximum score for colour, taste, flavour and acceptability. Therefore, treatment T3 was more acceptable so it was optimised treatment than others.

#### REFERENCES

- 1 Komal singh gupta (2019) Efficiency of bitter gourd and jamun fruit seed in the treatment of diabetes mellitus. Department of Food science and technology, College of Home Science, tikarmaafi, Amethi(INDIA).
- 2 Shorti DS, Kelkar M, Deshmukh VK, Aiman R (1962) Investigation of hypoglycaemic properties of Vincarosea and Eugenia jambolina. Indian Med 3:51-62.
- 3 Swami SB, Nayansingh Thakur J, Patil M, Haladankar P (2012) Jamun (Syzygium cumini L): A review of its food and medicinal uses. Food NutriSci 1102
- 4 ASTM (2006) Laboratory sampling and analysis of coal and coke. ASTM Method D271-70.

\*\*\*\*\*