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#### Katte AT

Post Graduate Student,  
Department of Food Science and  
Technology, Post Graduate  
Institute Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar, Maharashtra,  
India

#### Dr. Chavan UD

Head of Department, Food  
Science and Technology, Post  
Graduate Institute Mahatma  
Phule Krishi Vidyapeeth,  
Rahuri, Ahmednagar,  
Maharashtra, India

#### Adsure PR

Post Graduate Student,  
Department of Food Science and  
Technology, Post Graduate  
Institute Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar, Maharashtra,  
India

#### Andale SS

Post Graduate Student,  
Department of Food Science and  
Technology, Post Graduate  
Institute Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar, Maharashtra,  
India

#### Musale SV

Ph.D., Scholar, Department  
of Food Science and Technology,  
Post Graduate Institute  
Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar, Maharashtra,  
India

#### Corresponding Author:

#### Katte AT

Post Graduate Student,  
Department of Food Science and  
Technology, Post Graduate  
Institute Mahatma Phule Krishi  
Vidyapeeth, Rahuri,  
Ahmednagar, Maharashtra,  
India

## Studies on sensory and nutritional quality of cookies prepared with jamun powder

Katte AT, Dr. Chavan UD, Adsure PR, Andale SS and Musale SV

#### Abstract

Exploration of underutilized or neglected but highly recommended medicinal plant powder such as jamun powder in bakery products. The powder of some selected medicinal plants is a rich source of protein, dietary fibre, calcium, phosphorous, and iron was utilized in bakery products such as cookies. Preliminary experiments were carried out to find out optimum level of jamun powder with maida for the preparation of quality cookies at various levels i.e. 0, 2, 4, 6, 8 and 10 per cent. The effect of different level of addition of jamun powder on sensory characteristics of cookies was judged by the semi trained panellist on 9 point hedonic scale. The differences for the sensory characteristics like colour and appearance, texture, flavour, taste and overall acceptability were statistically significant among all the treatments. The cookies samples prepared with treatment T<sub>2</sub> (96% maida + 4% jamun powder) were statistically superior for overall acceptability parameter amongst all other treatments. Nutritional composition of cookies showed that increasing levels of jamun powder in cookies affects the chemical composition of cookies.

**Keywords:** Studies, sensory, nutritional, cookies, jamun powder

#### Introduction

Bakery industry is one of the largest sector in the food industry in India. The demand for convenient foods and ready to eat food has improved considerably. Different types of such products are easily available in market, among these bakery products are very common in children and adults. Enrichment of foods especially bakery foods is of major interest due to its growing awareness and fondness by the consumers towards health and quality of food. The new product development is one of the important aspects, and most widely used techniques for new product development include the formulation of high quality protein foods and enrichment of traditional foods by incorporation of local staples (Lazou and Krokida, 2010) [8]. Cookies are often referred to a small, thin, crispy cake made from unleavened dough containing high percentage of fat and sugar (Navy, 1980) [7] which holds a vital position in snack foods due to its diversity in taste, crispiness, digestibility and storage. Cookies are palatable and provide an excellent source of fat, carbohydrates, protein, minerals and vitamins. Cookies are a great source of nutrients, flavour, convenience and mobility.

India is rightfully called as the "Botanical garden of the world". It is the land of several medicinal plants and herbs that are traditionally used to cure various diseases occurring in humans (Pearline and Kamat, 2015) [9]. Medicinal plants have been identified and used throughout human history. Herbal supplements are obtained from naturally growing plants, fungus, shrubs and trees. It is unique health care tool and found to be base of many modern medicines (Choudhary and Dixit, 1999; Sharma and Garg, 2013) [3, 12] and perhaps these herbal supplements are different from vitamin and mineral supplements. Jamun (*Syzygium cumini*) is an ancient medicinal plant with an illustrious medical history. It is also recognized by the names jamun, java plum, jambhul, blackberry, malabar plum, and black plum. It is an evergreen tropical tree belonging to the Myrtaceae family. It is the most valued plants in Ayurveda and is commonly used in Indian traditional health care systems (Shaikh *et al.*, 2013) [11]. Jamun seed possess an alkaloid jambosine, glycoside jambolin or antimellin which halts the conversion of starch into sugar. Jamun is rich in compounds containing anthocyanins, glucosides, ellagic acid, isoquercetin, kaemfeol, myrecetin, alkaloids, gallic acid, coriligin etc. (Swami *et al.*, 2012) [13]. Consumption of jamun is effective in treatment of diabetes mellitus, inflammation, ulcers, cough, cancer, mouth blisters, piles, pimples, stomach ache, act as liver tonic, strengthen teeth and gums and is good lotion for removing ringworm infection from head. Different parts of the Jamola were also reported for its antioxidant, anti-inflammatory,

neuro-psychopharmacological, antimicrobial, antibacterial, anti-HIV, anti-fungal, free radical scavenger, anti-fertility gastroprotective and radioprotective.

In this research cookies were prepared possessing medicinal properties from jamun powder, powder by mixing them in appropriate amount.

## Materials and Methods

### Ingredients for Cookies

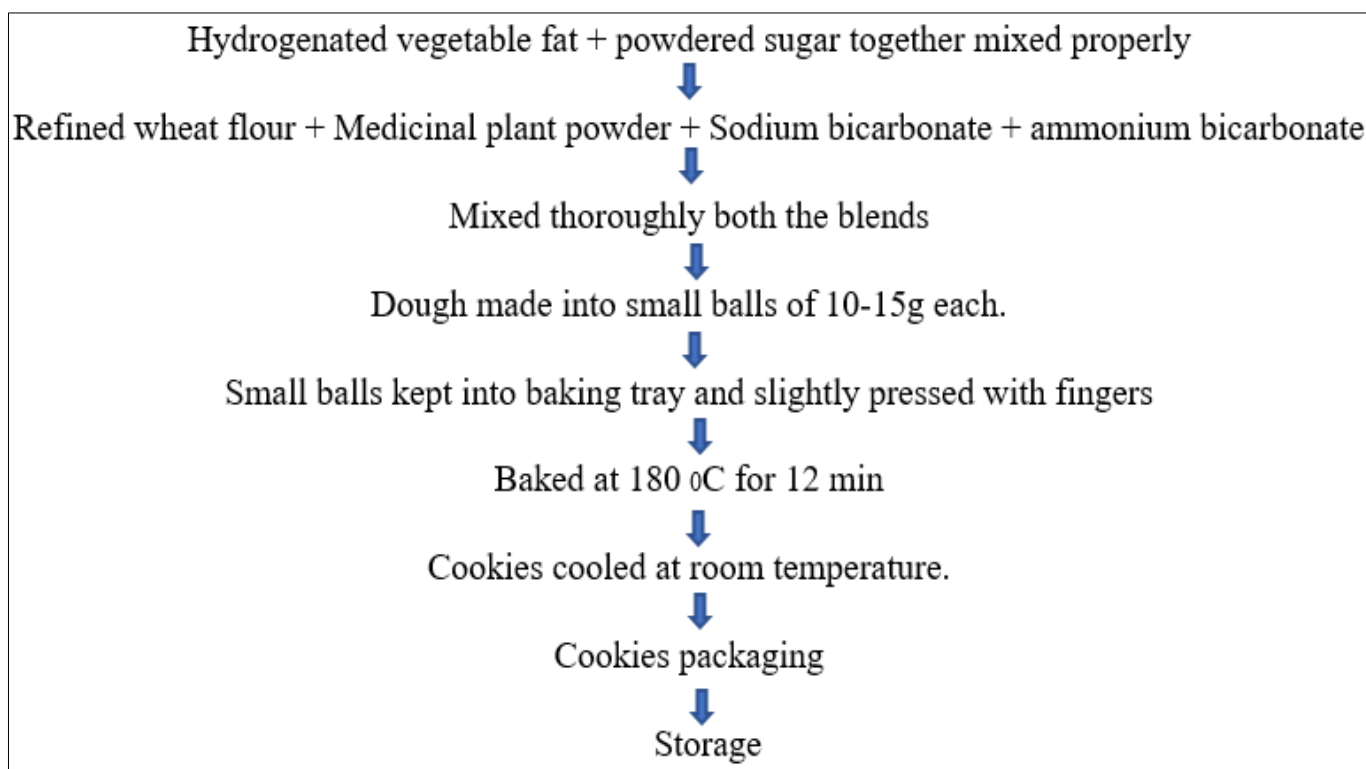
The materials like refined wheat flour, sugar, vanaspati ghee (Dalda), sodium bicarbonate and ammonium bicarbonate were purchased from local market of Rahuri and those were used in the preparation of cookies. Jamun powders were purchased from Medicinal and Aromatic Plant Research Centre, MPKV, Rahuri.

**Treatment details:** The cookies were prepared by using different levels of jamun powder with maida as shown below:

**Table 1:** Treatments for incorporation of jamun powder

Treatments	Jamun powder
T <sub>0</sub>	100% maida + 0% jamun powder
T <sub>1</sub>	98% maida + 2% jamun powder
T <sub>2</sub>	96% maida + 4% jamun powder
T <sub>3</sub>	94% maida + 6% jamun powder
T <sub>4</sub>	92% maida + 8% jamun powder
T <sub>5</sub>	90% maida + 10% jamun powder

**Preparation of cookies:** The Medicinal cookies were prepared using following ingredients as per the creaming process which is done traditionally.



### Proximate analysis

Chemical constituents like moisture, fat, protein, carbohydrate, crude fibre, ash and minerals like calcium and iron content of the raw material and cookies were determined as per the standard procedure (A.A.C.C., 2000) [1].

### Sensory evaluation of cookies

Sensory evaluation of jamun powder cookies was carried on 9 point hedonic scale. The average scores of the ten judges for different quality characteristics viz. Colour and appearance, flavour, texture, taste and overall acceptability were recorded.

### Statistical analysis

The data obtained was analyzed statistically to determine statistical significance of treatments. Completely Randomized Design (CRD) and Factorial Completely Randomized Design (FCRD) was used to test the significance of results (Rangaswamy, 2010) [10] obtained during whole research for all trails with three to ten replications.

## Results and Discussion

### 1. Chemical composition of raw materials

**Table 2:** Chemical composition of raw materials

Parameter (%)	Maida	Jamun powder
Moisture	4.30	6.30
Fat	1.64	1.13
Protein	11.85	6.24
Crude fibre	0.89	10.03
Carbohydrate	72.77	80.19
Calcium (mg/100g)	23.21	22.13
Iron (mg/100g)	2.73	4.51

### 2. Sensory Evaluation of Cookies by Incorporating Jamun Powder with Maida

The results of sensory evaluation of jamun cookies for colour and appearance, texture, flavour, taste and overall acceptability are mentioned in Table 3. From the Table it can be perceived that the score for the colour and appearance of

medicinal cookies ranged from 7.4-9, while texture and flavour from 7.7-9 respectively, taste score ranged from 7.5-9 whereas, overall acceptability ranged from 7.5-9. The treatment T<sub>2</sub> acquired higher scores for its colour and appearance (8.8), texture (8.8), taste (8.9), flavour (8.9) and

overall acceptability (8.9) when compared with control and other treatments. The treatment MJP2 was found to be superior and mostly acceptable than other treatments. Cookies prepared by incorporating 4 per cent jamun powder with 96 per cent maida were selected on basis of sensory quality.

**Table 3:** Sensory Evaluation of Cookies Prepared by Incorporation of Jamun Powder with Maida

Treatments	Colour and appearance	Texture	Taste	Flavour	Overall acceptability	Rank
T <sub>0</sub>	8.40	8.50	8.50	8.40	8.50	3
T <sub>1</sub>	8.50	8.80	8.60	8.60	8.60	2
T <sub>2</sub>	8.80	8.60	8.90	8.90	8.90	1
T <sub>3</sub>	8.20	8.20	8.20	8.20	8.20	5
T <sub>4</sub>	8.20	8.10	8.10	8.30	8.30	4
T <sub>5</sub>	7.80	7.80	7.80	7.50	7.50	6
Mean	8.30	8.34	8.35	8.30	8.30	-
SE <sub>±</sub>	0.06	0.06	0.06	0.08	0.09	-
CD @ 5%	0.19	0.20	0.20	0.25	0.29	-

#### Chemical composition of control and selected cookies

The chemical composition of cookies prepared from 4 per cent jamun powder are mentioned in Table 4. The moisture content of cookies prepared from maida is 4.16 while the cookies prepared by incorporating maida with 4 per cent jamun powder is 5.03. Marufa *et al.* (2019) [6] reported 6.30 per cent moisture in jamun seed powder. Kumari and Gupta (2016) [5] studied 13.03 per cent moisture in ginger powder. It was observed that with increase in the medicinal plant powder in cookies the moisture per cent also tends to increase. Protein content in the cookies prepared from maida i.e. control is 11.97 per cent whereas, in cookies incorporated with 4 per cent jamun seed powder it is 11.94. The cookies prepared from maida possess 24.71 per cent fat and cookies prepared

with 4 per cent jamun seed powder contains 23.47 per cent fat. The control cookies contain 1.95 per cent crude fibre content in them. The cookies prepared with 4 per cent jamun powder contains has about 2.45 per cent crude fiber. Ajila *et al.* (2008) [2] studied that production of fibre rich food is increasing significantly to promote health benefits. The control cookies contains about 28 per cent of calcium. Cookies prepared from 4 per cent jamun powder has the 23.39 per cent calcium. The control cookies prepared from maida possess 3 per cent iron in them. Whereas, in cookies incorporated with 4 per cent jamun powder has about iron 2.80. Kshirsagar *et al.* (2019) [4] investigated that jamun seed powder contains about 0.140 mg of iron.

**Table 4:** Chemical composition of control and selected cookies

Treatments	Moisture	Fat	Protein	Crude fibre	Carbohydrate	Calcium	Iron
T <sub>0</sub>	4.16	24.17	11.97	1.95	65.57	28.00	3.00
T <sub>1</sub>	5.03	23.47	11.94	2.45	68.77	23.39	2.80

T<sub>0</sub> = Control (100% maida), T<sub>1</sub> = 96% maida + 4% Jamun powder

#### Conclusion

Maida and jamun powder incorporated cookies provides a healthy option for the health conscious consumers in bakery sector with enhanced dietary fibre, protein, carbohydrates, fat. Cookies at 96% maida flour and 4% jamun powder incorporation recorded higher acceptability as compared to control (100% maida) cookies. Cookies incorporated with tulsī powder have the potential to satisfy the consumer demands for nutritionally rich food product.

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