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Research Article

Nutritive value of value added products prepared from jamun seeds powder and fenugreek seeds

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ABSTRACT
Jamun seeds and pulp powder have good nutritive value and are quite rich in carbohydrate. Fenugreek seeds are rich source of minerals, vitamins, phytonutrients, calories are very good source of soluble dietary fiber. Jamun seeds and fenugreek seeds were oven dried. Jamun seeds were ground and powder was prepared while fenugreek seeds were roasted. After that, final products were prepared using jamun seeds powder and fenugreek seeds viz. laddoo, momoz. These products were analyzed for its nutritive value by AOAC method. Nutritive value of prepared products revealed that product IV (60:24:16) incorporated sample of laddoo and momoz contained high amount of protein and fat, moderate amount of crude fiber and ash. Product-I (60:36:4) incorporated sample of laddoo and momoz contained high amount of carbohydrate.
On the basis of findings of present study authors suggests, how to prepare and take advantage of medicinal properties of value added products from jamun seeds powder and fenugreek seeds.

Keywords: Phytonutrients, valued added products, *E. jambolana*, anti-nutritional factors, trigonelline.

INTRODUCTION

Jamun *(syzygium)* is an important indigenous minor fruit of commercial value. The botanical name of Jamun is *Eugenia jambolana* or *Syzygium cumini L* (Myrtaceae family). Though the fruits are liked by all and sell at a high price, but it is still not grown as an orchard tree. It is commonly known as Jamun (Hindi), Naaval (Tamil), Java plum, Black plum, Jambul and Indian Blackberry[1] analyzed the jamun seeds for proximate composition, available carbohydrate, dietary fiber and anti-nutritional factors (anti-nutrient content helps in controlling blood sugar). Protein, fat, ash, crude fiber, carbohydrate and energy contents were significantly reported[2]. Indrayan et al. (2005) determined the nutritive value and analysis of mineral elements for some medicinally valued plant seeds including E. jambolana[3].

Fenugreek *(Trigonella foenum-graecum L.)* is an annual crop belonging to the legume family. Although grown as a spice in most parts of the world, the species name "foenum - graecum" means "Greek hay" indicating its use as a forage crop in the past[4]. A common spice in Indian households, fenugreek seeds have both culinary and medicinal value. Traditionally, these small, roughly angular, brown seeds were given to mothers (post childbirth) to stimulate breast milk production. Rich in minerals, vitamins, phytonutrients and dietary fiber, fenugreek seeds have a bitter yet pleasing flavor and pungent aroma. The seeds of fenugreek have high protein content (25%), lysine (5.7g/16g of nitrogen), soluble (20%) and insoluble (28%) dietary fiber, L-tryptophan and trigonelline besides being rich in calcium, iron and beta-carotene[5]. Considering the above facts, the present

investigation was carried out with the specific objective, to study the nutritive value of Jamun seeds powder and fenugreek seeds based products.

METHODOLOGY

LOCATION OF THE STUDY: Present investigation was carried out in the Department of Food Science and Nutrition, College of Home Science, Department of Dairy Science and Department of Crop Physiology, Chandra Shekhar Azad University of Agriculture and Technology, Kanpur.

PERIOD OF THE STUDY: January 2013 to June 2013.

PROCUREMENT OF RAW MATERIAL: Jamun and fenugreek seed were used in the study. The wheat flour and refined flour were used as a base material for the preparation of laddoo, momoz from jamun and fenugreek seed and other ingredients used in these preparations are; ghee, salt, vegetables, jiggery, dry fruits. All ingredients were purchased from local market of Kanpur city.

PROCESSING OF RAW MATERIAL

1. Cleaning of seeds: The cleaning of jamun seeds and fenugreek seeds was performed manually to remove damaged seeds, dust particles, seeds of other grains/crops and other impurities such as metals, stones and weeds.

2. Oven drying of jamun seeds: All jamun seeds kept in an oven tray. The tray was placed in the oven and set it at 80 ^{0}C for 8 hrs. When dring completely seeds were removed from oven, cooled at room temperature.

3. Preparation of Jamun seeds flour: Whole jamun seeds kept in a grinder and start it. When seeds were powdered completely then removed it from grinder.

4. Roasting of fenugreek seeds: A shallow bottom pan was placed on gas stove. Whole fenugreek seeds were gently roasted at medium flame by constant stirring, until appearance of light brown colour and a pleasant smell.

PREPARATION OF LADDOO: Value added laddoos were prepared in which jamun seeds powder and fenugreek seeds were added in refined flour in the ratio of 60:36:4 (product-I), 60:32:8(product-II), 60:28:12 (product-III) and 60:24:16 (product-IV) respectively.

- Take a pan on gas stove at medium flame and pour ghee in it.
- Seasoned with cardamom powder.
- Wheat flour was gently fried at medium flame by constant stirring.
- Mix all ingredients (jamun seeds powder, roasted methi seeds,wheat flour, ground sugar and coconut powder.
- Take a pan again and pour small amount of ghee.
- Add small amount of jaggery till melting.
- Mix melted jaggery in the mixture.
- Make small size balls.

PREPARATION OF MOMOZ: Value added momoz were prepared in which jamun seeds powder and fenugreek seeds were added in refined flour in the ratio of 60:36:4, 60:32:8, 60:28:12 and 60:24:16 respectively.

- Take jamun seeds powder and refined flour in a plate.
- Make smooth dough of mixed flour.
- Prepare stuffing material with fenugreek seeds, cabbage, onion and capsicum.
- Make small round shaped pieces of dough.
- Give momoz shape of the dough piece.
- Put stuffing material in middle.
- Steam all momoz in the momoz cooker for 10 minute.
- Serve it hot with tomato chutney.

NUTRITIONAL ANALYSIS OF PREPARED PRODUCTS[6]

- Fat estimation by soxlet method (AOAC, 2007)
- Protein estimation by Soxhlet method (AOAC, 2007)
- Crude fiber estimation using Extraction method (AOAC, 2007)
- Total ash content estimation using muffle furnace (AOAC, 2007)
- Carbohydrate estimation by difference method (AOAC, 2007)

RESULT AND DISCUSSION

Table: 1**:** Mean Score of Nutritive value of Ladoos Prepared by Jamun seeds powder, Fenugreek seeds and Wheat flour for Nutrients Content.

Level of incorporation	Crude Protein	Carbohydrate	Fat	Crude fiber	Ash
60:36:4 (Product-I)	5.70	79.21	11.50	0.95	1.21
60:32:8 (Product-II)	6.07	78.56	11.60	1.07	1.23
60:28:12 (Product-III)	6.46	77.91	11.70	1.20	1.25
60:24:16 (Product-IV)	6.86	77.26	11.80	1.31	1.27
Total mean	6.27	78.23	11.65	1.13	1.24
SE(d)	0.1113	0.2705	0.0663	0.0399	0.0049
CD	0.2371	0.5730	0.1423	0.080	0.0104

60:36:4 = wheat flour:jamun seeds powder:fenugreek seeds
60:32:8 = refined flour:jamun seeds powder:fenugreek seeds
60:28:12 = refined flour:jamun seeds powder:fenugreekseeds
60:24:16 = refined flour:jamun seeds powder:fenugreek seeds

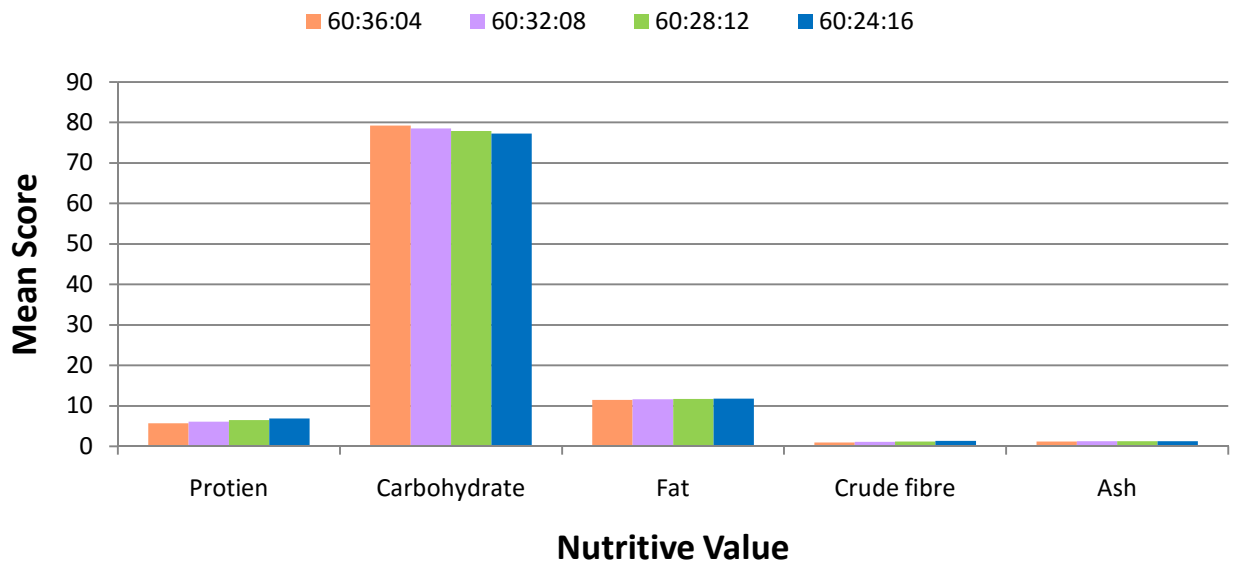

Figure 1: Mean Score of Nutritive value of Ladoos Prepared by Jamun seeds powder, Fenugreek seeds and Wheat flour for Nutrients Content.

Protein profile: Table 1 shows that mean score of protein content in I incorporated sample (60:36:4) of laddoo was 5.70, while the mean value of protein for II (60:32:8), III (60:28:12), IV (60:24:16) incorporated sample products were 6.07, 6.46 and 6.86 respectively. Table indicates that products were significant at 5% critical difference that means products were significantly differed from each others. From the table it was found that protein content of IV (60:24:16) incorporated product was higher than other incorporated products which reveals that the protein content of incorporated products were increased as the level of incorporation of fenugreek seeds was increased in laddoo. It was found that IV (60:24:16) incorporated sample had higher protein content than other

samples. studied functional properties of fenugreek protein concentrate and measured emulsion and foaming properties and showed that they are greatly affected by pH levels and salt (NaCl) concentration[7].

Carbohydrate profile: Table 1 indicates that the mean score of carbohydrate content in I (60:36:4) incorporated sample was 79.21 whereas for II (60:32:8) III (60:28:12) IV (60:24:16) incorporated products were 78.56, 77.91 and 77.26 respectively. The above table shows that incorporated products were significant at the level of 5% critical difference. Table reveals that as the level of incorporation of jamun seeds powder in laddoo decreased, the carbohydrate content of products was decreased in some amount. It means that carbohydrate content of I (60:36:4) incorporated products was higher than other sample. Shahnawaz et. al. (2009) Jamun seeds and pulp powder also have good nutritive value and were quite rich in carbohydrate. reported that injection of fenugreek seeds extracts improved plasma glucose and insulin responses and reduced urinary concentrations[5].

Fat profile: It is evident from the table 1 that the mean score of fat content in I (60:36:4) incorporated sample was 11.50 whereas the mean score of fat for II (60:32:8) III (60:28:12) and IV (60:24:16) incorporated sample products were 11.60, 11.70 and 11.80 respectively. A perusal of data presented in table indicates that the fat content differed significantly in each others, means that products were significant at 5% critical difference. The fat content of incorporated products was increased with increase in level of fenugreek seeds incorporation. IV (60:24:16) incorporated sample had contain high amount of fat than other incorporated products. Singhal et al. (1982) showed hypocholesterolemic effects of fenugreek seeds and reported that fenugreek seeds have lowered serum cholesterol, triglyceride and low-density lipoprotein in hypercholesterolemia suffering patients and experimental models.

Crude Fiber profile: It is obvious from the table 1 that the mean score of crude fiber content in I (60:36:4) incorporated sample was 0.95 whereas for II (60:32:8) III (60:28:12) IV (60:24:16) incorporated products ladoos were 1.07, 1.20 and 1.31 respectively. The above table shows that crude fiber content of incorporated samples were significant at 5% critical differance. It means they were differed from each other. The fiber content of IV incorporated sample (60:24:16) product was higher than other incorporated products which reveals that the fiber content of products were increased as the level of incorporation of fenugreek seeds was increased in ladoos reported that inclusion of fenugreek recipes in daily diet to provide at least 25 g fenugreek seeds that helps in diabetes management.

Total Ash Profile: Table 1 shows that mean score of total ash content in I (60:36:4) incorporated sample was 1.21, while the mean score of II (60:32:8), III (60:28:12) and IV (60:24:16) incorporated products were 1.23, 1.25 and 1.27 respectively. Table indicates that IV (60:24:16) incorporated product was found slightly significant in respect to total ash content than other incorporated products. It is concluded that IV (60:24:16) incorporated product had highest ash content which shows its mineral constituents. Noomrio and Dahot (1996) studied on the evaluation of nutritive value of Eugenia Jambosa fruit like minerals, vitamins, free sugars and amino acids[8].

Table 2: Mean Score of Nutritive value of Momoz Prepared by Jamun seeds powder, Fenugreek seeds and Refined flour for Nutrients Content.

Level of incorporation	Protein	Carbohydrate	Fat	Crude fiber	Ash
60:36:4	9.02	79.57	1.34	0.45	1.08
60:32:8	9.78	78.27	1.54	0.57	1.11
60:28:12	10.56	76.96	1.74	0.68	1.14
60:24:16	11.28	75.67	1.94	0.80	1.17
Total mean	10.16	77.61	1.64	0.62	1.12
SE(d)	0.0824	0.2280	0.0447	0.0199	0.0283
CD	0.1753	0.4827	0.0948	0.0474	0.0522

60:36:4 = wheat flour:jamun seeds powder:fenugreek seeds
60:32:8 = refined flour:jamun seeds powder:fenugreek seeds
60:28:12 = refined flour:jamun seeds powder:fenugreekseeds
60:24:16 = refined flour:jamun seeds powder:fenugreek seeds

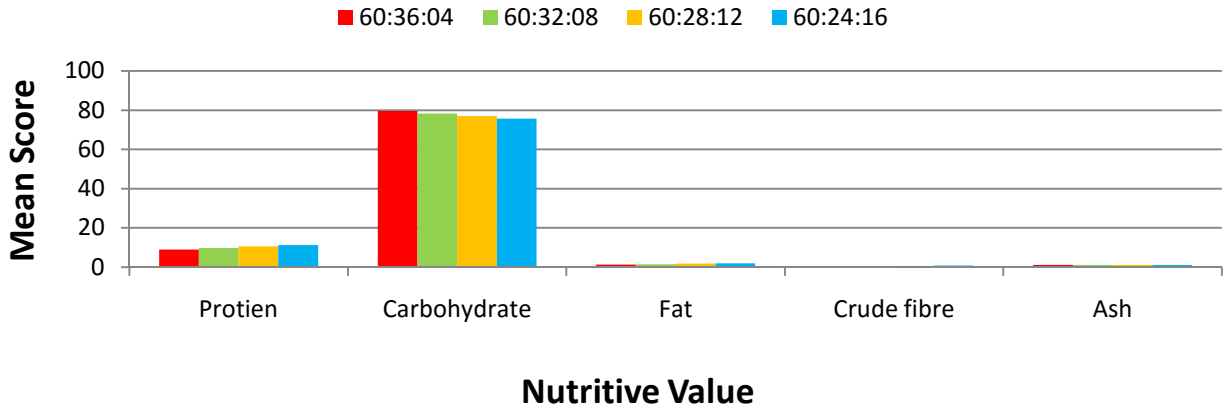

Figure 1: Mean Score of Nutritive value of Momoz Prepared by Jamun seeds powder, Fenugreek seeds and Refined flour for Nutrients Content.

Protein profile: Table 2 shows that mean score of protein content in I incorporated sample (60:36:4) of momoz was 9.02, while the mean value of protein for II (60:32:8), III (60:28:12), IV (60:24:16) incorporated sample products were 9.78, 10.56 and 11.28 respectively. Table indicates that products were found significantly differed from each others. IV (60:24:16) incorporated sample was found significant to others. From the table it was found that protein content of IV (60:24:16) incorporated product was higher than other incorporated products which reveals that the protein content of products were increased as the level of incorporation of fenugreek seeds was increased in momoz. It was found that IV (60:24:16) incorporated sample was higher proteinous than other samples. In their study concluded that proteinous matter does not have any significant effect on the surface activity of the fenugreek gum[9].

Carbohydrate profile: Table 2 indicates that the mean score of carbohydrate content in I (60:36:4) incorporated sample was 79.57 whereas for II (60:32:8) III (60:28:12) IV (60:24:16) incorporated products were 78.27, 76.96 and 75.67 respectively. The above table shows that incorporated products were significant at the level of 5% critical difference. Table reveals that as the level of incorporation of jamun seeds powder in momoz decreased, the carbohydrate content of products was decreased in some amount. It means that carbohydrate content of I (60:36:4) incorporated products was higher than other samples. already reported that fenugreek seeds have hypoglycemic and hypocholesterolemic

effect as supported by findings during the experiment on animals[10].

Fat profile: It is evident from the table 2 that the mean score of fat content in I (60:36:4) incorporated sample was 1.34 whereas the mean score of fat for II (60:32:8) III (60:28:12) and IV (60:24:16) incorporated sample products were 1.54, 1.74 and 1.94 respectively. A perusal of data presented in table indicates that the fat content differed significantly in each other. The fat content of incorporated products was increased with increase in level of fenugreek seeds incorporation. IV (60:24:16) incorporated sample had contain high amount of fat than other incorporated products.

Crude Fiber profile: It is obvious from the table 2 that the mean score of crude fiber content in I (60:36:4) incorporated sample was 0.45 whereas for II (60:32:8) III (60:28:12) IV (60:24:16) incorporated products momoz were 0.57, 0.68 and 0.80 respectively. The above table shows that crude fiber content of incorporated samples were significant. It means they were differed from each others. The fiber content of IV incorporated sample (60:24:16) product was higher than other incorporated products which reveals that the fiber content of products were increased as the level of incorporation of fenugreek seeds was increased in momoz. Fenugreek seeds are rich source of fiber. As Naidu et al. (2011) reported that fenugreek husk is a valuable source of dietary fiber and phenolic acids[11]; therefore, it could be an effective source of natural antioxidants and natural ingredients in functional foods.

Total Ash Profile: Table 2 shows that mean score of total ash content in I (60:36:4) incorporated sample was 1.08, while the mean score of II (60:32:8), III (60:28:12) and IV (60:24:16) incorporated products were 1.11, 1.14 and 1.17 respectively. Table indicates that IV (60:24:16) incorporated product was found slightly significant in respect to total ash content than other incorporated products. It is concluded that IV (60:24:16) incorporated product had highest ash content which shows its mineral constituents. Higher occurrence of calcium, iron and zinc in curry made from fenugreek compared to the curry made from potato.

CONCLUSION

It is concluded that both incorporated products (laddoo and momoz) had better quality with respect to nutrition. The new nutritious natural and healthy processed foods are in great demand. Properties of Jamun seeds and fenugreek seeds are lesser known in rural India. There is immense potential to develop varied value added product of jamun seeds powder and fenugreek seeds without significant loss in its medicinal properties. Fenugrrek husk is a valuable source of dietary fiber and phenolic acids therefore it could be an effective source of natural antioxidants and natural ingredients in functional foods.

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