The Pharma Innovation Journal 2018; 7(11): 338-341

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2018; 7(11): 338-341

www.thepharmajournal.com
Received: 25-09-2018
Accepted: 27-10-2018

Bhavna Tripathi
Ph.D. Research Scholar, Rani Durgavati University Jabalpur, Madhya Pradesh, India

Dr. Rajlakshmi Tripathi
Professor, Dept. of Food and Nutrition Govt. M.H. College of Home Science & Science For Women (Autonomous) Jabalpur, Madhya Pradesh, India

Dr. Meera Vaidya
Professor, Dept. of Food and Nutrition Govt. M.H. College of Home Science & Science For Women (Autonomous) Jabalpur, Madhya Pradesh, India

Correspondence
Bhavna Tripathi
Ph.D. Research Scholar, Rani Durgavati University Jabalpur, Madhya Pradesh, India

Influence of orange bagasse addition on chemical composition of biscuits

Bhavna Tripathi, Dr. Rajlakshmi Tripathi and Dr. Meera Vaidya

Abstract
Biscuits containing four different levels of orange bagasse powder (0%, 4%, 6% and 8%) were studied regarding proximate composition, total dietary fiber content, physical characteristics, and acceptability in a sensory test. data revealed that incorporation of orange bagasse in biscuits formula increased dietary fiber from 0.25 to 5.99% and ash have the same trend, while protein content was decreased from 14.13 to 13.39% respectively. The thickness and diameter of sample decreased significantly with increasing levels of orange bagasse. Sensory evaluation of biscuits has showed that biscuits with 6% of orange bagasse powder had highest scores for all organoleptic characteristic.

Keywords: Orange bagasse, biscuits, dietary fiber, proximate composition

1. Introduction
Bakery industry is the one of the largest food industry in India with an estimated production of 70,000 tones and cost of Rs.3000 billion US Dollar. The industry has been growing at an average rate of 15% during the past three year and this is expected to be maintaining in coming year (IBMA, 2010) [8]. The major products within this industry include bread, biscuits, cakes and pastry (Chough et.al. 2013) [6]. The demand of bakery products is increasing at rate of 10.07% per annum (Kamaljit et.al, 2010) [13]. In India biscuits consumption per capita is 2.1 kg., compared to more than 10 kg in the USA, UK and west European countries and above 4.25 kg in south-east Asian countries, e.g. Singapore, Hong Kong, Thailand, Indonesia, etc. China has per capita consumption of 1.90 kg, while in the case of japan it is estimated at 7.5 kg (Srivastava, 2009) [18]. Bread and biscuits form the major baked products accounting for over 80% of total bakery foods produced in the country. Bakery products are gaining extreme popularity as processed foods which offer ready to eat convenience as well as have comparatively long shelf life.

Dietary fiber (DF) is such a non-nutritional component. It is edible part of plant or analogous carbohydrate that are resistant to digestion and absorption in the human small intestine with complete and partial fermentation in the large intestine. Dietary fiber includes polysaccharides, oligosaccharides, lignin and associated plant substances. It promotes beneficial physiological effects including laxation, and/or blood cholesterol attenuation, and/or blood glucose attenuation (AACC, 2001) [1]. Citrus is the most abundant crop in the world, orange lemon grapefruits and mandarins represent the total produced citrus fruits. The amount of waste obtained from citrus fruits account for 50 percentage of the original amount of whole fruit.

Developments of new products with substantial DF contents are a strategic area for the Bakery industry. Dietary fibers are a common and important ingredient of a new generation of healthy food products (Schleibinger, M. *et al*. 2013) [17]. The dietary fiber content of bakery products may be increased by adding various substances from plant kingdom rich in dietary fiber (Kamaljit, K. *et al.* 2011) [12]. Dietary fiber has received attention from researcher due to their functional properties such as water holding capacity, oil holding capacity, texturizing, stabilizing, gel forming capacity, antioxidant capacity, swelling capacity, viscosity, synergism with sweetener and fat replacement properties etc. (Elleuch *et al*., 2011) [7] derived from different sources; cereal, fruits and vegetables, have created a renewed interest in fiber particularly in bakery industry. Many of the fiber supplements which have been researched are obtained from by- products resulting from the processing of cereals, fruits, vegetables, legumes and other agricultural products.

The present investigation was performed to assess chemical profile of orange bagasse fortified biscuits. Study included estimation of dietary fiber and organoleptic properties of control and fortified biscuits.

2. Materials and method

2.1. Preparation of raw materials: Control biscuits were prepared by using rubbing method as given by Kamaliya (2002). The following ingredients wheat flour, baking soda, milk powder, sugar and shortening were purchase from Priyedarshani market Jabalpur. Commercial variety of sweet orange (citrus sinensis) were procured from local market. Commercial variety of sweet orange (citrus sinensis) were procured from local market. The peel of the orange was removed with plain stainless steel knife and juce extracted manually. The bagasse left was dried at 60 c 8 hour in air oven dryer. The dry bagasse was ground with grinder and sieved through a mesh number 40(425) as described by Romero-Lopez (2011) [16].

2.1.1 Steps in the preparation of orange bagasse powder sample

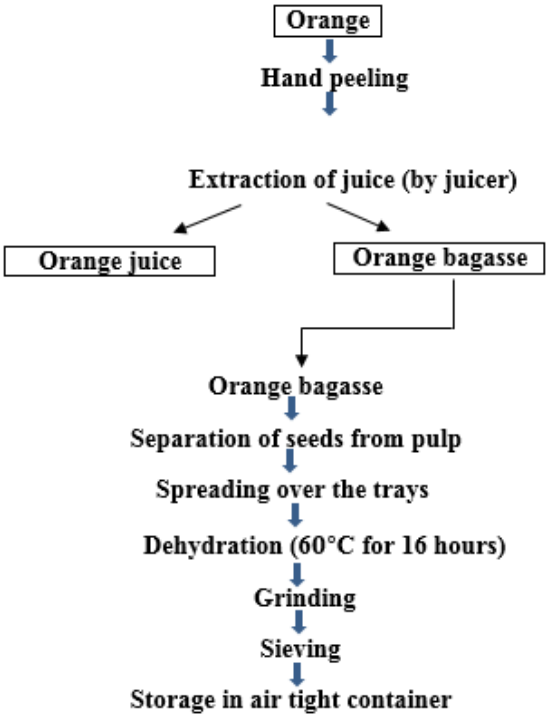


Fig 1

Table 1: Biscuits formulation with various percentage of Orange Bagasse Powder

Ingredients (g)	OBB1	OBB2	OBB3	OBB4
Refined wheat flour	100	96	94	92
Orange bagasse powder (OB)	0	4	6	8
Powdered sugar	12	12	12	12
Shortening	40	40	40	40
Skimmed milk power	5.0	5.0	5.0	5.0
Baking powder	1.5	1.5	1.5	1.5
Ammonium bicarbonate	1.5	1.5	1.5	1.5
Common salt	2.5	2.5	2.5	2.5
Ajwain	1.5	1.5	1.5	1.5

OBB1= biscuits with 100% refined wheat flour
OBB2= biscuits with 4% Orange Bagasse Powder
OBB3= biscuits with 6% Orange Bagasse Powder
OBB4= biscuits with 8% Orange Bagasse Powder

2.1.2. Flow diagram for preparation of biscuits

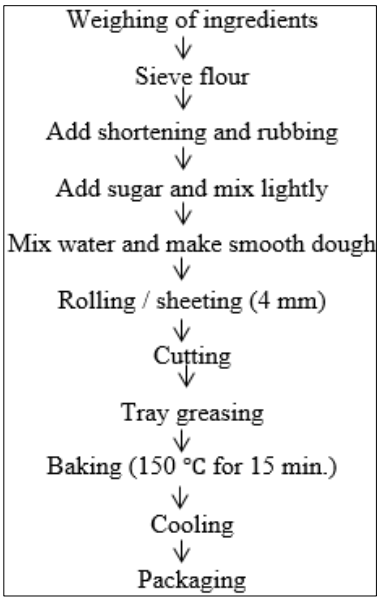


Fig 2

2.2 Sensory evaluation

Twenty four hour after preparation of biscuits organoleptic evaluation was performed. A total 20 semi-trained panelist were recruited from staff and students of the Govt. M.H College of home Sci. & Sci. for Women, Jabalpur. Each panelist evaluated all the samples prepared for each treatment in one session. Criteria for selection of panelist were that panelist were regular consumer of biscuits and were not allergic to any food. Panelist requested to evaluate colour, taste, texture, flavor and overall acceptability on 9 point Hedonic scale using numerical values ranging from 1 to 9, where 1entitled disliked extremely and 9 represented liked extremely. Samples were identified with a code and presented in a random sequence to panelist. The panelists were instructed to rinse their mouth with water after every product and not make comments during evaluation to prevent influencing other panelist. They were also asked to comment freely on samples on the score card provided to them.

2.3 Physical properties

2.3.1. Height / thickness

Thickness of biscuit was assessed by vernier calipers (AACC, 1967). Six biscuits were stacked one above the other and the average value was reported in millimeter.

2.3.2. Weight

Weight of biscuits was measured as average value of six individual biscuits with the help of electrical weighing balance Bala *et al.* (2015) [4]. Average value for weight was recorded in grams.

2.3.3. Diameter

The diameter was measured by laying six biscuits edge to edge and measuring nearest mm. the biscuits were rotated 90° and their diameter re measure as check determination. The average value of diameter was expressed in millimeter (AACC, 1967).

2.3.4. Spread ratio: According to AACC, (1967) the spread factor calculated by dividing the average value of diameter

(D) by average value of thickness (T) of biscuits.

2.3.5. Spread factor: the percentage of spread factor was calculated by the following formula (Silky *et al*, 2014)

$$\% \text{ spread factor} = \frac{\text{spread ratio of biscuits prepared from blend}}{\text{Spread ratio of biscuits prepared from control}} \times$$

2.3 Nutritional quality

Protein, fat, ash, moisture content of the biscuit were determined as per IS 7219: 1973(R S2010) [9], IS 12711:1989(R 2010) [11], IS 12711:1989 (R 2010) [11], IS 1011:2002 (R 2009) [10], IS 9497:1989 (R 1998), respectively.

2.4 Statistical analysis

The data were subjected to ANOVA and mean scores were separated using Duncan's multiple range test by SPSS version 16.0.

3. Results and discussion

3.1. Effect on chemical composition: The mean scores of chemical composition of experimental biscuits are shown in table no. 2. The Data revealed that moisture and protein contents decreased (3.17 to 5.36 and 14.12 to 13.28 respectively) with increasing the level of orange bagasse whereas, ash and total dietary fiber content increased significantly with increasing orange bagasse powder. These results confirmed those obtained by (Nassar *et al*. 2008) [15]. Proximate composition of substituted biscuits showed decrease in protein content, this might be due to the result of the lower protein content of orange bagasse as reported by Bilgicli *et al*. (2007) [5].

Table 2: Chemical composition of fortified biscuits

Treatments	Moisture	Ash	Protein	Fat	Dietary Fiber
Control	3.17±.03[a]	2.85±.15[a]	14.12±.10[a]	26.95±.069[a]	0.283±.05[a]
OBB4%	4.10±.o43[b]	3.08±.066[ab]	13.87±.10[b]	26.31±.299[b]	3.13±.015[b]
OBB6%	4.98±.005[c]	3.41±.50[bc]	13.65±.065[c]	26.31±.121[b]	4.58±.055[c]
OBB8%	5.36±.066[d]	3.62±.070[c]	13.28±.041[d]	26.17±.124[b]	5.95±.057[d]

[a]mean value ± standard deviation

[b] mean value marked with different superscript in the same column are significantly different at Duccan - p≤ 0.05

Table 3: Organoleptic characteristics of biscuits

Treatments	Color	Taste	Flavor	Texture	Overall acceptability
OBB1	7.2±.20[a]	7.33±.09[ab]	7.02±.115[a]	7.363±.005[a]	7.283±.105[a]
OBB2	7.2±.10[a]	7.20±.20[a]	7.033±.057[a]	7.60±.100[b]	7.416±.415[a]
OBB3	7.36±.08[a]	7.26±.01[ab]	7.40±.20[b]	7.26±.049[a]	7.50±.40[a]
OBB4	7.20±.10[a]	7.43±.01[b]	7.13±.12[a]	7.05±.043[c]	7.190±.127[a]
Total	7.24 ±.132	7.30±.129	7.145±.195	7.31±.212	7.361±.290[a]

[a]mean value ± standard deviation

[b] mean value marked with different superscript in the same column are significantly different at Duccan - p≤ 0.05

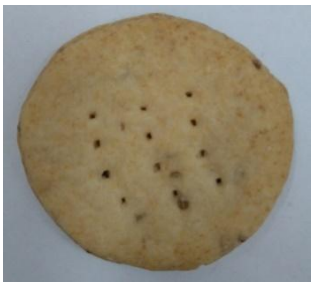


Fig 4: Control

Fig 5: 4% orange bagasse

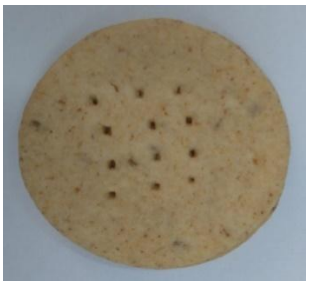


Fig 6: 6% orange bagasse

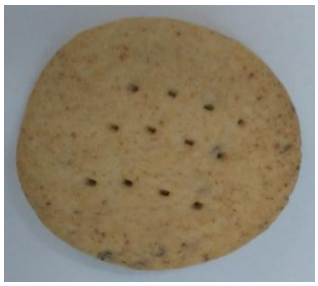
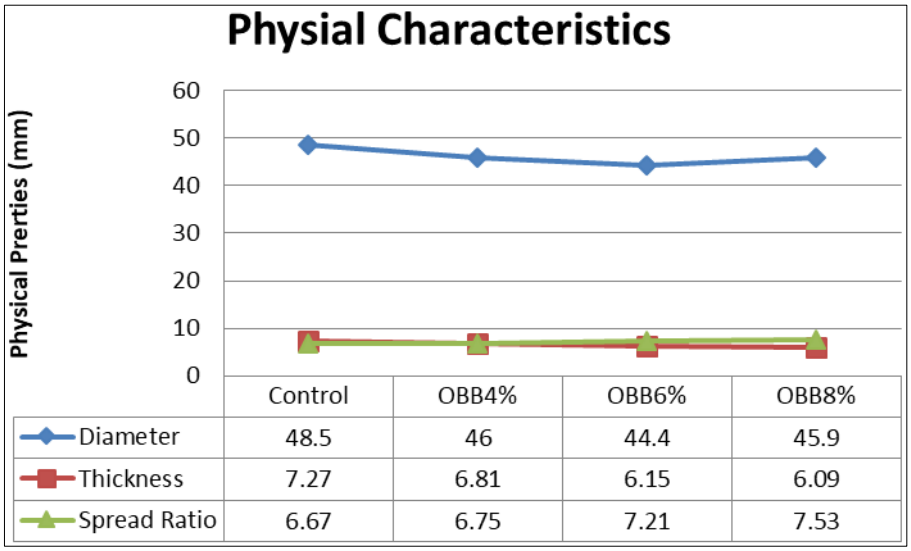


Fig 7: 8% orange bagasse

3.2. Sensory evaluation: The results of the organoleptic evaluation of biscuits sample are presented in table 3 and figure 4 -7. Statistical analysis revealed that there were no significance difference (p<o.o5) among all treatments for overall acceptability. While, the biscuits with 8% and 6% orange bagasse powder had highest score for taste and flavor respectively. Thus, sensory scores of biscuits has revealed that, biscuits with 8% and 6% orange bagasse had highest levels of acceptance for all sensory characteristics.



	Control	OBB4%	OBB6%	OBB8%
Diameter	48.5	46	44.4	45.9
Thickness	7.27	6.81	6.15	6.09
Spread Ratio	6.67	6.75	7.21	7.53

Fig 3

3.3. Effect on physical properties: the mean values of physical attributes of control biscuit and fortified biscuits with orange bagasse powder are outlined in figure (3). The mean value of diameter for control biscuits was 48.5mm while that of developed biscuits ranged from 46 to 44.4 for orange bagasse powder at 4-8% levels. On the side, the average thickness of control biscuits were 7.27mm and for incorporated levels, it varied from 6.81to 6.09. The data recorded a gradual increment of spread ratio of all substituted biscuits ranging from 6.67 to 7.53. Results indicated that the incorporation of orange bagasse significantly affected the diameter, thickness and spread ratio of the fortified biscuits. The same trend was reported by (Nassar *et al*. 2008 and Youssuf and Mousa, 2012) [15, 19].

4. Conclusion

It could be concluded that dehydrated orange bagasse the remaining after juice extraction could be utilized as a suitable source of dietary fiber and could be incorporated as ingredients in large variety of food products such as biscuits.

5. References

1. AACC. Report of the Dieatary Fiber Definition Committee to the Board of Directors of the American Association of Cereal Chemist. 2001; 46(3):112-125.
2. American Association of Cereal Chemist (AACC), 7th edition, St Paul Minneesota, 1969.
3. American Association of Cereal Chemists (AACC), 7th edition, St Paul, Minnesota, 1969.
4. Bala A, Gul K, Riar CS. Functional and Sensory Properties of Cookies prepared from Wheat Flour supplemented with Cassava and Water chestnut Flour. Cogent Food Agriculture. 2015, 1:1019815. https//doi.org/10.1080/23311932.2015.101915
5. Bilgicli N, Ibanoglu S, Herken EN. Effect of dietary fibre addition on the selected nutritional properties of cookies. Journal food Engineering. 2007; 78:86-89.
6. Chough B, Singh G, Kumbhar BK. Development of Low Soft Dough Biscuits using Carbohydrate – based Fat Replacer. Hindawi Publishing Corporation Inter Journal of Food Science. 2013, 1-11.
7. Elleuch M, Bedigian D, Roiseux O, Besbes S, Blecker C, Attia H. Dietary Fiber and Fiber rich by products of food processing: characterization, technological functionality and commmercial application: A review. Food Chemistry. 2011; 124:411-4.
8. IBMA. Biscuits industry in India. 2010. www.ibmabiscuit.in/indutry-statistics.htm
9. Indian standard methods for determination of protein in foods and feeds IS 7219-1973
10. IS 1011. 2002. (R 2009) Biscuits- Specification (forth revision)
11. IS 12711. Bakery Products – Methods of Analysis, 1989.
12. Kamaljit K *et al*. Analysis of ingredient, functionality, formulation optimization and shelf life evaluation of fiber bread. American Journal of Food Technology. 2011; 6(4):306-313.
13. Kamaljit K, Amarjeet K, Baljeet S. Preparation of bakery Products by Incorporating Pea Flour as a Functional Ingredient American Journal of Food Technology. 2010; 5(2):130-135.
14. Kamiliya MK, Kamiliya KB. Baking Science & Technology. Anand (Gujrat stte), M.K. Kamaliya, 2001, 75.
15. Nassar AG, AbdEl-Hamid AA, El-Naggar EA. Effect of Citrus by-Products Flour Incorporation on Chemical, Rheological and Organoleptic Characteristics of Biscuits. World Journal of Agriculture Sciences. 2008; 4(5):612-616.
16. Romero-Lopez, Adel KD, Er. Lal A, Rathod AS. Development and Quality evaluation of Pine apple Pomace and Wheat Bran fortified Biscuits. International Journal of Research in Engineering &Advanced Technology. 2011-2014; 2(3):1-6.
17. Schleibinger M, Meyer AL, Afsar N, Agy AG, Dieker V, Schmitt JJ. Impact of Dietary Fiber on Moisture and Crumb Firmness of Brown Bread Advance Journal of Food Science and Technology. 2013; 5(10):1281-12.
18. Srivastava A. India per capita biscuit consumption. 2009 July 04 www.indiavetaling.com/7/32/29.
19. Youssuf HME, Mousa RA. Nutritional Assessment of Wheat Biscuits and Fortified Wheat Biscuits with Citrus Peel Powders. Food and Public Health. 2012; 2(1):55-60.