The Pharma Innovation Journal 2018; 7(11): 556-558

www.ThePharmaJournal.com

The Pharma Innovation

ISSN (E): 2277- 7695
ISSN (P): 2349-8242
NAAS Rating: 5.03
TPI 2018; 7(11): 556-558

www.thepharmajournal.com
Received: 06-09-2018
Accepted: 07-10-2018

Sapna Chauhan
Department of Food Technology, ITM University, Gwalior, Madhya Pradesh, India

Hradesh Rajput
Department of Food Technology, ITM University, Gwalior, Madhya Pradesh, India

Correspondence
Hradesh Rajput
Department of Food Technology, ITM University, Gwalior, Madhya Pradesh, India

Production of gluten free and high fibre cookies using beet root waste powder and wheat flour husk

Sapna Chauhan and Hradesh Rajput

Abstract
Beetroot waste, a by-product of beetroot processing industry, and wheat flour husk, a by-product of wheat flour, are rich source of fibre. Beetroot waste procured from beetroot processing unit was dried. Beetroot waste powder and wheat flour husk contained moisture 10.70±1.12, 6.10±1.50; ash 5.60±0.48, 6.38±0.85; Crude protein 12.65±0.78, 15.68±0.35; Ether extract nil, 2.12±0.88 and Crude fibre 62.75±2.56, 51.77±1.20 respectively. Beetroot waste powder and wheat flour husk was mixed with other ingredients and cookies were prepared. The chemical properties of prepared cookies were moisture (4.69%), total minerals (5.53%), crude protein (21.68%), ether extract (44.70%) and crude fiber (30.75%). Functional and Chemical properties of crude fibre indicated that beetroot waste powder and wheat flour husk can act as a good source of crude fibre and mineral content.

Keywords: Beetroot, cookies, crude fibre, ether extract, total ash, wheat flour husk

1. Introduction
The bakery industry is one of the largest organized food industries all over the world and in particular biscuits and cookies are one of the most popular products because of their convenience, ready to eat nature, and long shelf life (Sindhuja *et al*. 2005). Cookies are widely consumed baked products which can be served as breakfast to bedtime snack. Cookies are appreciated for their taste, aroma, convenience, and long shelf stability due to low moisture content. Recently, increasing consumer demand for healthier foods has triggered the development of cookies made with natural ingredients exhibiting functional properties and providing specific health benefits beyond those to be gained from traditional nutrients (Hai-Jung Chung, 2007). Beetroot (Beta vulgaris rubra) is an important raw material of plant origin with proven positive effects on the human body. They can be eaten raw, boiled, steamed and roasted. Red beetroot is a rich source of minerals (manganese, sodium, potassium, magnesium, iron, copper). Beetroot contains a lot of antioxidants, vitamins (A, C, B), fiber and natural dyes. Red beetroot is also rich in phenol compounds, which have antioxidant properties. These colorful root vegetables help to protect against heart disease and certain cancers (colon cancer) (Kavalcova *et al*., 2015). Beetroots are rich in other valuable compounds such as carotenoids (Dias *et al*., 2009), glycine betaine (de Zwart *et al*., 2003), saponins (Atamanova *et al*., 2005), betacyanins (Patkai *et al*., 1997), folates (Jastrebova *et al*., 2003), betanin, polyphenols and flavonoids (Vali *et al*., 2007). Therefore, beetroot ingestion can be considered a factor in cancer prevention (Kapadia *et al*., 1996). The fresh beetroots are exposed to spoilage due to their high moisture content and needs preservation. One of the preservation methods ensuring microbial safety of biological products is drying and dehydration (Mathlouthi, 2001). Dried beetroots can be consumed directly in the form of chips as a substitute to traditional snacks (Aro *et. al.*, 1998), or after easy preparation as a component of instant food (Krejcova *et. al.*, 2007). Decreasing the moisture content of fresh foods to make them less perishable is a simple way to preserve these foods. Foods with high nutritional value are in great demand for proper functioning of body systems and potential health benefits. As a result, value-added foods or functional foods with higher level of dietary fiber and antioxidant have been developed, especially in bakery products such as cookies. The incorporation of composite flour into traditional wheat based food products provided additional nutrients from non-wheat material and improved the nutritional value of the products (De Ruiter, 1978). The utilization of beetroot powder with wheat flour in bakery products has not been studied extensively. Therefore, the research was designed to evaluate the effect of substitution of wheat flour with different levels of beetroot powder on the physico-chemical and sensory properties of the cookies.

2. Materials and methods

2.1 Material: The present research work was carried out in department of food science and technology, ITM, University, Gwalior.

2.1.1 Raw materials

Beet root, wheat flour husk were procured from the local market of Gwalior. All chemical that was required for the analysis was procured from the scientific chemical of Gwalior.

2.1.2 Processing of beetroot waste powder and wheat flour husk

Fresh beetroots were washed, blanched, peeled and reduced to size (1-3 mm) using sharp knife. Extract the juice using the food processer. Beetroot waste was collected and dried in tray dryer at 40-45 ^{0}C for about 7-8 h. The dried beetroot waste was subjected to grinding in grinder. Then ground material was passed through sieve and packed in HDPE bags, sealed and stored for further use. Wheat flour husk was collected from the milling industry, cleaned it and dry in a conventional dryer and packed in HDPE bags, sealed and stored for further use.

2.1.3 Preparation of cookies

Cookies were prepared from beetroot waste powder and wheat flour. The formulation used was: 27g beetroot waste powder, 125g wheat flour husk, 125g sugar, 100g shortening, 30g milk, 0.5g sodium chloride, 2g baking powder. Sugar and fat were creamed in a Hobart mixer (N-50) with a flat beater for 3 min at 61 rpm. Sodium bicarbonate and sodium chloride were dissolved in water at 30 ^{0}C, added to the cream and mixed for 5-6 min at 125 rpm to obtain a homogeneous cream. Flour sieved with baking powder (using 100 mesh US standard sieve) was added to the cream and mixed for 3 min at 60 rpm. Cookies dough was sheeted, cut using a circular mould (diameter: 50mm, height 5 mm), and baked at 180 ^{0}C for 11-12 min. After baking, cookies were cooled to room temperature (28 to 30 ^{0}C), packed and sealed (Figure 1.).

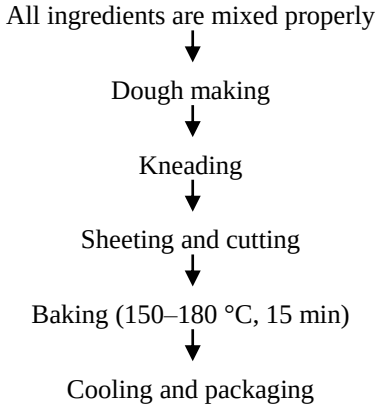

Fig 1: Method for preparation of cookies

2.2 Chemical Analysis

Moisture content, ash, protein, crude fibre, anthocyanin and fat were analyzed as per standard AACC methods (2000) [3]. Nitrogen content was estimated by Kjeldhal method, and was converted to protein using a factor of 6.25. Crude fibre constituents were determined using AOAC methods (1994) [3].

2.2.1 Sensory Evaluation

Biscuits were evaluated for appearance, flavour, texture, taste and overall acceptability by trained panel using 9-Point Hedonic Score System (Meilgaard *et al.*, 2007) [4] with following individual scores: liked extremely-9, liked very much-8, liked moderately-7, liked slightyly-6, neither liked nor disliked- 5, disliked slightly-4, disliked moderately-3, disliked very much-2 and disliked extremely-1, to find out the most suitable composition of biscuits for commercialization.

3. Results and discussion

3.1 Chemical Analysis of raw materials

The present study shows that the beetroot waste powder and wheat flour husk contained percentage of moisture 10.70±1.12, 6.10±1.50; ash 5.60±0.48, 6.38±0.85; Crude protein 12.65±0.78, 15.68±0.35; Ether extract nil, 2.12±0.88 and Crude fibre 62.75±2.56, 51.77±1.20 respectively. Through data tabulated in Table (1), it could be clearly concluded that beetroot waste powder and wheat flour husk are rich to great extent in many significant components such as crude fibre, protein and total ash.

Table 1: Chemical composition of raw material used in cookies preparation

Parameters	Beetroot waste powder	Wheat flour husk
Moisture (%)	10.70±1.12	6.10±1.50
Total minerals (%)	5.60±0.48	6.38±0.85
Crude Protein (%)	12.65±0.78	15.68±0.35
Ether extract (%)	-	2.12±0.88
Crude fibre (%)	62.75±2.56	51.77±1.20

Values are mean ±SD, analysed individually in triplicate, and expressed as g/100 g sample.

3.2 Chemical Analysis and sensory evaluation of formulated cookies

The chemical composition of gluten free and high fibre cookies for their mean moisture, total minerals, crude protein, ether extract, and crude fiber are shown in Table (2). The result shows that cookies contain moisture (4.69%), total minerals (5.53%), crude protein (21.68%), ether extract (44.70%) and crude fiber (30.75%). According to Prashant and Shere, 2016 [1], beetroot cookies were contain protein content 7.12%, moisture content 2.70%, ether extract content 23.62%, crude fibre 2.92% and total mineral content 2.02%. Finally, through data tabulated in Table (2), it could be clearly concluded that gluten free and high fibre cookies are rich to great extent in many significant components such as protein and crude fibre. The ash content of about 5.53% indicates that the cookies are rich in mineral elements. The chemical composition values confirmed that beetroot waste powder and wheat flour husk are an excellent food source, justifying its direct use in human nutrition or development of balanced diets for animal nutrition.

Table 2: Chemical composition of formulated cookies

Parameters	Gluten free and high fibre cookies
Moisture (%)	4.69±0.50
Total minerals (%)	5.53±0.44
Crude Protein (%)	21.68±1.20
Ether extract (%)	44.70±0.50
Crude fibre (%)	30.75±2.56

Values are mean ±SD, analysed individually in triplicate, and expressed as g/100 g sample.

3.3 Sensory analysis of formulated cookies

The sensory evaluation of gluten free and high fibre cookies for their mean color, texture, flavor aroma and over all acceptability (OAA) are shown in Table (3). The result shows that cookies contain color value (8.00), texture value (7.90), flavor value (7.60), aroma value (8.10) and over all acceptability (7.90). Finally, through data tabulated in Table (3), it is concluded that gluten free and high fibre cookies are highly accepted by the sensory panelist. The flavor value of about 7.60 indicates that the cookies have good taste.

Table 3: Sensory evaluation of formulated cookies

Parameters	Beetroot waste powder
Colour	8.00±1.05
Texture	7.90±0.99
Flavour	7.60±1.17
Aroma	8.10±0.99
OAA	7.90±0.50

Values are mean ±SD, analysed individually in triplicate

4. Conclusions

Beetroot waste, a by-product of beetroot processing industry, and wheat flour husk, a by-product of wheat flour, are rich source of fibre. The crude fibre in Beetroot waste powder and wheat flour husk were containing 62.75% and 51.77% respectively. Cookies were prepared from beetroot waste powder and wheat flour husk. This combination was acceptable on the basis of sensory evaluation and also on the basis of high crude fibre and mineral content.

5. References

1. Prashant Sahni, Shere DM. Physico-chemical and Sensory Characteristics of Beet Root Pomace Powder Incorporated Fibre Rich Cookies. Intl. J Food. Ferment. Technol. 2016; 6(2):309-315.
2. AOAC. Official Methods of Analysis. Association of Official Analytical Chemists. Washington D.C, USA, 1990.
3. AACC. Approved methods of the AACC (10th ed.). St. Paul, MN, American Association of Cereal Chemists, 2000.
4. Meilgaard MC, Civille GV, Carr BT. Descriptive analysis techniques. In: Sensory Evaluation Techniques, 4th ed., CRC Press LLC, New York, 2007, 255-312.