



Evaluation of sensory properties of toast breads containing banana powder

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Abstract

The increasing rate of population makes it necessary for enhancing nutritional properties and quality of bread. Banana was selected for this study due to its popularity and high nutritional value. In the present research banana powder at concentrations of 10, 15 and 20% was added to wheat flour, and bread preparation was performed by semi-industrial method. Internal and external sensory properties were measured by sensory panelists. Based on results incorporation of banana powder at concentrations of 10, 15 and 20% led to improvement of external and internal properties. Samples containing 15 and 20% banana powder were considered the best.

Keywords: Bread, Food quality, Banana powder.

Introduction

In Iran, the per capita consumption of bread is amounted to 130 kg which is twice that of some European countries. Bread as a daily food is of high interest, therefore its production and distribution deserves improvement. Based on data, food fibers are considered useful substances for human consumption; therefore nutritional experts try to find appropriate methods of adding fiber to food preparations, especially bread. For instance, in some countries bakery products are prepared with food fibers, and breads enriched with soluble fibers are very valuable. Banana is a high fiber fruit and its consumption decreases blood cholesterol. Addition of about 300-500 g/kg freeze dried banana to diet had a reducing effect on cholesterol. In general, the more soluble fiber and protein at bread formulation, the tendered and the more nutrition's obtained bread. Mohamed and Jingyuan (2010) showed that banana flour is rich at some vitamins, minerals, antioxidants, proteins and fibers which can decrease heart disease, blood cholesterol, cancer, diabetes and renal calculus. Li Choo and Noor Aziah (2010) reported that addition of different fibers such as banana powder (10%) to bread formulation enhanced water absorption and lengthened dough mixing time. Based on Zhang *et al.* (2005) banana's starch had high resistance to enzymatic activity as well as a high viscosity. Aparicio-Saquilan *et al.* (2007) produced cookies containing 15% banana powder and found that these cookies had more digestibility and shelf life than control cookies. Aurore (2009) showed that molecular structure of banana starch is different from starches of other resources. Also based on their studies, x-ray was located between α and β paten and was similar to corn refraction pattern. Aparicio-Saquilan *et al.* (2007) reported that banana powder incorporation at bread formulation was exposed to some limitations, for instance addition of banana powder to preparations stored at refrigerator or

freezer cause syneresis due to low resistance of starch to cold conditions.

Materials and methods

Raw materials for bread preparation including wheat flour with derivation degree of 68% (Sahar Co.), salt (Hedieh Co.), banana flour (Diana Co.) and bakery yeast (Iran Molass Co.) were obtained. Chemical properties of consumed banana flour contained 25% protein, 7.1% fat, 3.2% ash, 27% Ca, 3.9% Na, 0.25% Fe and 0.5% moisture. In all treatments, the control treatment was signified with C code; the treatment containing 10% banana powder on the wheat flour basis was signified with B₁ code, treatment containing 15% banana powder was signified with B₂ code and the treatment containing 20% banana powder was signified with B₃ code.

Flour chemical tests

Chemical tests were carried on wheat flour with three replications measured with moisture (AACC-No. 44-16), ash (AACC- 08-01), protein (AACC-46-12) and fiber (Iran national standard, 3105). Also chemical tests were carried on toast samples measured with moisture, ash, protein and fiber according to the aforesaid standard methods (ICC, 1992) and (AACC, 2003).

Preparation method of toast bread

In order to bake toast bread, raw materials (wheat flour, salt, water, the yeast, liquid oil) were prepared and weighted. Banana flour with different concentrations of 10, 15 and 20% was then added to wheat flour followed by mixing at dough-making tank for 20 min. Other dried and powdery substances were added to the obtained mixture. Then water was added and complete mixing of water and flour led to formation of flexible dough. Initial rest of samples was done for 10 min. some portions of dough with approximate weight of 450g were dividend and rounded followed by a 10 min additional resting. The dough were then baked in a deck oven for 45 min at 200-220°C.

Assessment of external and internal properties of bread samples by sensory method

In order to evaluate external (volume, crust color and shape fitness) and internal (texture, chewiness, taste and flavor) properties of all bread samples, a sensory panelist was used. In this regard samples were cut, coded and then evaluated by trained assessors. Pre-determined scores were assigned to each property by sensory assessors. After performing the said tests (for four treatments with three replications) analysis of variance (fully randomized design) was used to compare treatments' effect followed by Duncan's test.

Statistical analysis

Statistical descriptive properties were analyzed using analysis of variance. Also statistical analysis of data was performed using SAS software followed by Duncan's multiple range tests.

Results and discussion

Table 1. Mean value of chemical tests of wheat flour (%)

Flour	Moisture	Ash	Protein	Fiber
Wheat	10.12	0.59	10.32	0.97

Table 1 shows the results related to chemical properties of the consumed wheat flour. Table 2 indicates the results obtained from mean comparison of external and internal properties test through sensory method. Enrichment with banana powder caused an improvement of all internal and external properties so that each of three treatments containing banana powder (B₁, B₂ and B₃) had better external sensory properties compared with the control treatment.

Furthermore, there was no significant difference among these treatments while they showed a significant difference with the control treatment. The sample containing 20% banana powder (B₃) had the best scores in internal properties whereas the control treatment had the lowest scores regarding the scud properties. Also no significant difference in chewiness, taste and flavor was observed between B₁ and B₂ treatments. There was a significant difference in texture between B₃ and other treatments. This can be attributed to materials especially minerals, vitamins, moisture, fibers and proteins in banana powder.

Conclusion

Results showed that addition of banana powder to toast bread formulation improved sensory properties. Also B₂ and B₃ treatments had the best sensory properties. Today use of natural drugs for chemical ones is of increasing interest; therefore production of breads which contain banana powder seems logical due to high nutritional value.

Table 2. Mean comparison of internal and external properties by sensory evaluation

Treatment	Volume	Crust Color	Shape Fitness	Texture	Chewiness	Taste and Flavor
C	5.33±0.42 ^b	5.33±0.32 ^b	1±0.11 ^b	10±1.21 ^c	6±0.81 ^b	10±1.61 ^b
B ₁	6.67±0.42 ^a	6.66±0.32 ^a	2±0.11 ^a	11±1.21 ^b	7±0.81 ^a	11±1.61 ^{ab}
B ₂	6.67±0.42 ^a	7±0.32 ^a	2.33±0.11 ^a	11.33±1.21 ^b	7.33±0.81 ^a	11±1.61 ^{ab}
B ₃	9±0.42 ^a	7.33±0.32 ^a	2.66±0.11 ^a	12.33±1.21 ^a	7.66±0.81 ^a	11.3±1.613 ^a

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