

Organoleptic evaluation of fortified cookies prepared from admixture of Barley and Oat flour

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Abstract

An investigation was undertaken to explore the possibility of using Barley and Oat flour in preparation of cookies and study the changes in physicochemical and sensory characteristics. Cookies were prepared from blends of refined flour containing different levels (50-70%) of Barley and (30-50%) of Oat flour. The overall acceptability of cookies containing 60% Barley and 40% Oat flour scored maximum. On the basis of overall acceptability score of cookies, it was observed that formulation containing 60% level of Barley and 40% Oat flour was found most acceptable. The optimized cookies contained, moisture (3.29%), Protein (8.15%), fat (19.68%), total ash (2.44%) and carbohydrate (66.42%). On the basis of above findings it is concluded that good quality cookies can be prepared with the incorporation of Barley and Oat flour. Thus as far as product acceptability judged by sensory evaluation, the treatment can be rated as $T_2 > T_1 > T_3 > T_0$

Keywords: Cookies, Wheat flour, Barley flour and Oat flour.

Introduction

Biscuits are the most popular bakery items consumed nearly by all sections of the society in India. Some of the reasons for such wide popularity are low cost in compared with other processed foods (affordable cost), good nutritional quality and availability in different forms, varied taste and longer shelf life. The word biscuit is derived from Latin word "DANIS BISCOCTUS", which means "Twice cooked bread" and refers to the bread that was made for marines (Anonymous 1972, 1980).

A cookie is a small flat or slightly raised cake. Some cookies are made from cake batter. Most cookies formulas, however call for less liquid than cake. Cookies dough range from soft to very stiff, most cookies are individually formed or shaped. Cookies are most commonly baked until crisp or just long enough that they remain soft, but some kind of cookies is not baked at all. Cookies are made in wide variety of styles, using an array of ingredients including sugars, spices, chocolate, butter, peanut butter or dried fruits. The softness of cookies may depend

on how long it is baked. Millet is one of the foods to lower cholesterol level because it contains soluble fibre which reduces the low density lipoprotein (Ciolek *et al.* 2012). The food containing the barley bran may help to reduce the risk of heart disease, if consumed as a part of low fat diet. Barley millets contain high content of complex carbohydrate and water soluble fibre also promotes slow digestion and aids in the maintenance of stable blood glucose levels. Barley supplies carbohydrate energy and well balanced proteins. It also contain copper, zinc, iron, calcium, magnesium and vitamins E, B₁, B₂, and D. Oats are common breakfast dish and are excellent sources of minerals, dietary fibre and thiamin. They also contain antioxidants that are believed to protect the circulatory system from diseases such as arteriosclerosis, which affects the arterial blood vessels. Oat grain is rich in vitamins and minerals. But the most important nutritional advantages are the soluble fibre and gamma linoleic acid. It is full of protein and minerals to help in building strong bones, teeth and connective tissues (Boobier *et al.* 2007).

Therefore, keeping in mind the functional and therapeutic properties an attempt has been made to explore the use of Barley and Oat for manufacturing cookies by using the method of manufacture as laid down by (Kaezmareck *et al.* 2013).

Methods and materials

The control cookies (T₀) were made from wheat flour alone. For experimental cookies, T₁ was prepared with admixture of Barley flour and Oat flour (50:50), T₂ 60:40 (BF:OF) and T₃ 70:30 (BF:OF). Butter was then added with the mix @ 25% of the mix. Then sugar was added @ 20% of the mix and water was added @ 13% of the mix. Further baking powder and vanilla were added @ 0.5% of the mix. Flours were thoroughly mixed. Sheeting and rolling were done on a wooden board with rolling pin cutting. The mix was baked in hot oven at 200°C for 20 minutes. It was then cooled to 27°C and packed.

Table 1 Details of different treatments using Wheat flour, Barley flour and Oat flour for making cookies

Materials (%)	Different treatments (cookies)			
	T ₀	T ₁	T ₂	T ₃
Wheat flour	100	-	-	-
Barley flour	-	50	60	70
Oat flour	-	50	40	30

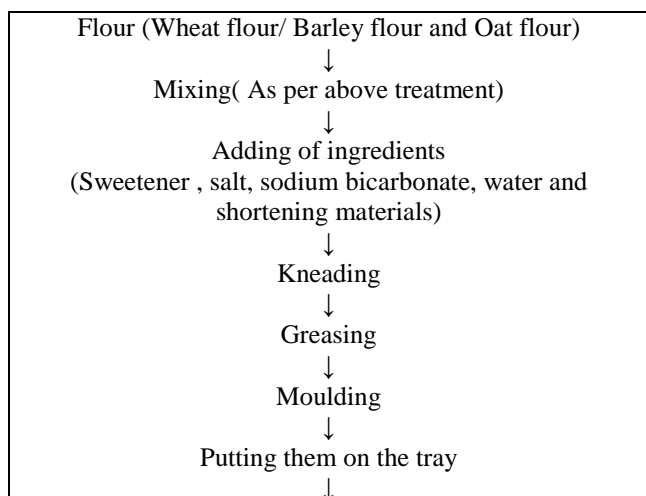


Fig. Contd....

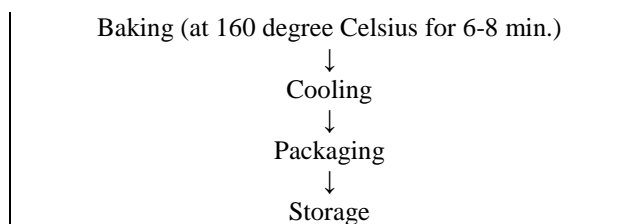


Fig. 1 Flow chart for preparation of cookies

Organoleptic evaluation of the prepared product

Freshly prepared herbal Kalakand were served for evaluation to panel members consisting of 5 experienced persons. 9 point hedonic scale proforma was used as suggested by Amerine *et al.* (1965).

Statistical analysis

The data obtained on different aspects as per plan were tabulated and statistically analyzed as per Chandel (1991).

Result and discussion

Organoleptic attributes of control and fortified cookies (prepared from admixture of barley and oat flour)

Table 2 shows organoleptic attributes of control and fortified cookies (prepared from admixture of barley and oat flour).

Colour and appearance

There were significant differences found among the treatments for colour and appearance. The highest score was found in T₂ (8.50), followed by T₃ (8.28), T₁ (8.26) and T₀ (8.14). F value was 3.76, indicating significant effect of treatment on colour and appearance (Fig. 2).

Body and texture

The average score for body and texture differed significantly. The highest score was found in T₂ (8.16), followed by T₀ (7.76), T₁ (7.68) and T₃ (7.68). F value was 5.23, indicating significant effect of treatment on body and texture (Fig. 2).

Flavour and taste

There was significant difference found among the treatments for flavour and taste score. The highest score was found in T₂ (8.58),

followed by T₀ (8.38), T₁ (8.36) and T₃ (8.27). F value was 3.97, indicating significant effect of treatment on flavour and taste (Fig. 2).

Table 2 Organoleptic attributes of control and fortified cookies (prepared from admixture of barley and oat flour)

Parameters (%)	Control and fortified cookies (prepared from admixture of barley and oat flour)				F value	C.D.
	T ₀	T ₁	T ₂	T ₃		
Colour and Appearance	8.14	8.26	8.50	8.28	3.76*	0.234
Body and Texture	8.12	8.00	8.60	7.82	5.23*	0.446
Flavour and Taste	8.38	8.36	8.58	8.27	3.97*	0.20

* Significant at 5 % level

** Non-significant at 5 % level

Overall acceptability score for control and fortified cookies (prepared from admixture of barley and oat flour)

Table 3 Overall acceptability of Control and fortified cookies (prepared from admixture of barley and oat flour)

Replication	Control and fortified cookies (prepared from admixture of barley and oat flour)				F value	C.D.
	T ₀	T ₁	T ₂	T ₃		
1	7.80	8.20	8.60	8.00	11.01*	0.234
2	8.02	8.20	8.50	8.20		
3	8.00	8.30	8.50	8.40		
4	8.40	8.30	8.60	8.40		
5	8.50	8.30	8.30	8.40		
Mean	8.14	8.26	8.50	8.28		

* Significant at 5 % level

** Non-significant at 5 % level

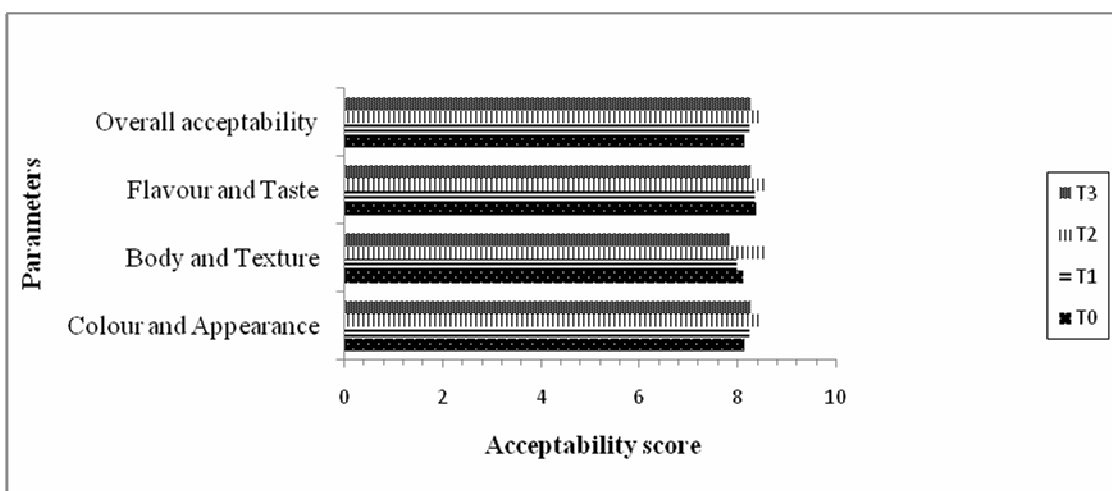


Fig. 2 Average of overall acceptability score control and fortified cookies (prepared from admixture of barley and oat flour)

Overall acceptability

There were significant differences found among the treatments for overall acceptability score. The highest score was T₂ (8.50), followed by T₃ (8.28), T₁ (8.26) and T₀ (8.14). The overall rating of the product was T₂ > T₃ > T₁ > T₀. F Value was 11.01, indicating significant effect of treatment on overall acceptability (Fig. 2)

Cost analysis of control and fortified cookies (prepared from admixture of barley and oat flour)

The data regarding cost of Control and fortified cookies (prepared from admixture of barley and oat flour) was found as cheap in T₃ (145.90 Rs/Kg), followed by T₂ (142.70 Rs/Kg), T₁ (141.70 Rs/Kg) and T₀ (140.70 Rs/Kg) (Table 4 and Fig. 3).

Table 4 Cost analysis of control and fortified cookies (prepared from admixture of barley and oat flour)

Parameters	Control and fortified cookies (prepared from admixture of barley and oat flour)			
	T ₀	T ₁	T ₂	T ₃
Cost (Rs/Kg)	145.90	142.70	141.70	140.70

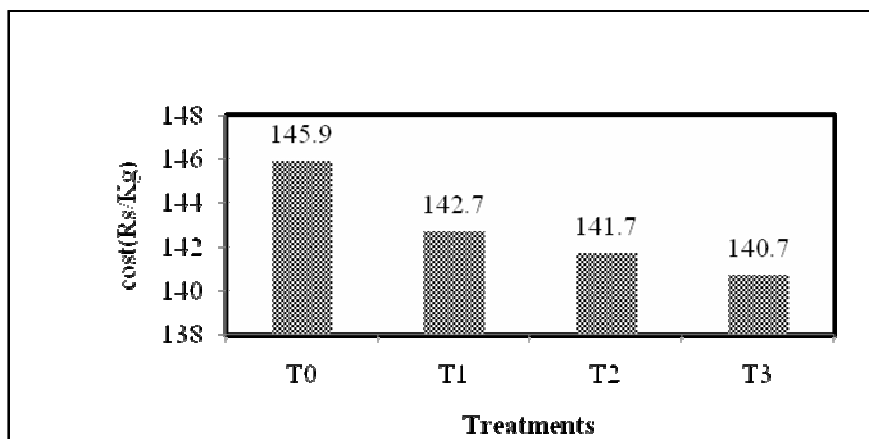


Fig. 3 Cost Analysis of control and fortified cookies (prepared from admixture of barley and oat flour)

Conclusion

On the basis of result obtained it can be concluded that the Barley and Oat flour can be successfully used for manufacturing of cookies. Cookies prepared from Barley and Oat flour in

60:40 ratio (T₂) received highest score, thus proved to be most suitable for manufacturing of cookies. Further cost of manufacturing cookies will be reduced with the admixture of Barley and Oat flour.

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