

## Sensory evaluation of breadstick of wheat flour supplemented with buckwheat flour

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### Abstract

This research work had been carried out to study the breadsticks prepared from wheat flour supplemented with buckwheat flour. The treatments were wheat flour WF<sub>0</sub> (100 % WF), Buck wheat flour WBF<sub>1</sub> (90:10), WBF<sub>2</sub> (80:20), WBF<sub>3</sub> (75:25) and WBF<sub>4</sub> (70:30). Sensory analysis revealed the supplemented buckwheat flour has improved the overall quality of breadsticks. Buckwheat enhanced the taste color and crispiness of the product at initial day that was 7. After storage the score rate for crispiness 7 to 5% and taste decreased from 7 to 3.5% respectively.

**Keywords:** Sensory evaluation, taste, colour, wheat flour, Buckwheat flour

### 1. Introduction

Buckwheat (*Fagopyrum esculentum*) use as a cover crop and its plant is well known for its grain like seed. In Asia, Central and Eastern Europe buckwheat is cultivated as conventional crops (Wijngaard and Arendt, 2006) [1]. It shows both the similarities as well as differences with cereal s that's why well known as pseudo cereal. (*Fagopyrum esculentum Moench*) is the most common buckwheat grown species. It is the major source of dietary minerals like zinc, copper and manganese (Ikeda and Yamashita, 1994) [2]. There is no gluten present in Buckwheat seeds and it is very helpful and safe for those people who are suffering with celiac disease (Skerritt, 1986) [3]. Carroll [4] *et al.* 1975 reported the ratio of lysine and arginine is lower in buckwheat flour as compared to other plant protein and it's the main reason of lowering blood cholesterol level.

Wheat crop is considered the major cereal crop in many parts of the world. It belongs to the Triticum family, of which there are many thousands of species (Kent and Evers, 1994) [5], with *T. aestivum* sub species Vulgare and the hard wheat *T. durum* being the most important commercially (Macrae *et al.*, 1993) [6]. Intake of dietary fibers helps to prevent 8 to 10 major diseases. (Anderson *et al.* 2009) [7]. The longer shelf life, pleasant flavor and its unique gluten forming ability make it different and most popular grain for bread making. (Thomas 1976) [8].

### 2. Materials and Methods

#### 2.1 Preparation of composite flours

Both flours of wheat and buckwheat were blended for preparation of bread sticks as per treatments shown below.

Treatments

W<sub>0</sub> = W.F 100% + B.W.F 0%

WBF<sub>1</sub> = W.F 90% + B.W.F 10%

WBF<sub>2</sub> = W.F 80% + B.W.F 20%

WBF<sub>3</sub> = W.F 75% + B.W.F 25%

WBF<sub>4</sub> = W.F 70% + B.W.F 30%

After this dough was kept for few minutes and then sheeted and was cut to the desired shape the product then placed in oven at 170c for 20 minutes. The product is then cooled and packed in polythene zipped bags to avoid from atmosphere.

### 2.1 Sensory evaluation

To carry out the sensory evaluation of bread sticks Hedonic scale was used as described by (Zhang 2007). Using this test bread sticks were analyzed for color, texture, taste, flavor and overall acceptability. To perform this test a panel of ten judges were established from food science department. Judges had recorded their views on the questionnaire. The Performa contain marks from 9 to 1. 9 shows for extremely like and 1 indicates for extremely dislike. The sensory evaluation was taken out after 6 day interval.

As the product was preserved for 60 days this test was carried out interval to check out the stability and environmental effects on the taste and texture of the product without preservative.

### 3. Result and discussion Sensory Evaluation of Breadsticks

#### I. Color

Sensory evaluation of product was taken initially as well as during storage after the interval of 15 days. After the interval of each 15 days sensory analysis was carried out to check the quality of product. Color of the product was judged by the panel of 8 students of the food science department. At initially color of the product at control was slightly dark than that of supplemented with buckwheat flour T4. During the storage period there was no significant difference observed in the product. However the acceptability of color decreased because the increment of buckwheat flour which had lower lightness and higher yellowish value than control. (Duarte *et al.*, 1996). The overall acceptability of color for T0 was 4% than T4 that was 3%. Treatment T4 contained higher ratio 30% of buckwheat flour.

#### II. Taste

Product was scored for the taste by judges at initial and during storage after 15 days interval. The control product was scored higher as compared to other treatment combinations. T0 contained 100% of wheat flour. Treatment T4 contains the maximum ratio of buck wheat flour 30% which influence the taste of the product. The score reduces when ratio of buck wheat increases the treatment with 30% buckwheat and 70% wheat scored low. 10% and 20% increment of buckwheat didn't show any difference in taste ac compared to T0. The result showed agreement with Baljeet *et al.* 2010 [3] biscuits with maximum

ratio of buckwheat flour scored low as compared to others. This is because of presence of flavonoid (rutin) compound present in buck wheat flour. Bread sticks with 20 and 30% buck wheat flour got overall acceptability score 3 respectively. According to Kreft *et al.* (1999) approximately six flavonoid, rutin was observed in buck wheat. In 2006 Kreft *et al.* observed the value of rutin concentration in buckwheat groats.

**III. Appearance**

Bread stick was scored for appearance by the panel. The score for appearance reduces by increasing the ratio of buckwheat flour. This happened due to gluten free nature of buck wheat flour. Treatment T0 scored 8 in appearances which gradually decreased by increasing amount of buckwheat flour as supplement. T3 and T4 contained 20 and 30% buckwheat flour scored 5 respectively. These phenomena matched with (Schober *et al.*, 2003) [11]. Described the effect in gluten free bread, as compared to bread gluten structure is too elastic in biscuits. The use of non-glutinous composite flour reduces the strength of biscuits.

**IV. Textural**

Properties of any product are the key source of attraction for the consumer’s acceptability. Crispiness is one of the main parts of texture analysis. Crispiness is the sole item for consumer’s attraction. Supplemented product was analyzed for the crispiness by the judges. Control treatment contained 100% wheat flour had been observed crispier as compared to other supplemented treatments. Maximum score was 7.21 (T0) followed by 6.45 (T1). The sensory analysis was taken initially and after 60 days storage the crispiness of the product decreased gradually during storage due to moisture absorption it becomes 5.4- 5.12 respectively. During this storage period product had absorbed moisture from the atmosphere crispiness of the product decreased slightly. During the storage intervals some physical changes had been observed, as the bakery products like biscuit, cookies and rasp are hygroscopic in nature loss in crispiness occurred due to uptake of water. (Wade, 1988) [14].

**V. Overall acceptability**

The overall acceptability scored of breadsticks was evaluated through sensory evaluation the score of breadstick decreased by increasing the amount buckwheat flour in wheat flour. The mean score for overall acceptability was scored 7 which reduced to 6.2 during storage. The taste and appearance of the bread sticks changed readily by addition buckwheat. Due to its gluten free nature taste and appearance of the product get affect. Different researches on buck wheat flour had shown that other substances could be added to enhance the mouth feel over all acceptability of product by enrichment of viscoelastic properties of gluten. (Gallagher *et al.*, 2003; Gujral *et al.*, 2003; Ahlborn *et al.*, 2005) [6, 7, 2]. T0 scored 7.5 and T3 and T4 got 6 and 5.6 respectively. The product containing buckwheat flour showed lower score rate than gradual to control sample contains only wheat flour with other minor ingredients.

**Table 1:** Ingredients used for bread sticks

Treatment	Wheat flour	Buckwheat flour	Sugar	Salt	Veg oil
T0 (control)	100%	0%	1tbs(6.73)g		
T1	90%	10%	-		
T2	80%	20%	-		
T3	75%	25%	-		
T4	70%	30%	-		

**Table 2:** Sensory analysis of color of the breadsticks stored at ambient temperature

Treatments	Storage interval(Days)					
	Initial	15	30	45	60	Mean
<b>Color</b>						
T <sub>0</sub>	7	6	5.5	4.5	4	5.4a
T <sub>1</sub>	7	6	5	4	3	5b
T <sub>2</sub>	7	6	5	4	3	5b
T <sub>3</sub>	7	6	5	4	3	5b
T <sub>4</sub>	7	6	5	4	3	5b
Mean	7a	6b	5.1c	4.1d	3.2e	5.08

**Table 3:** Sensory analysis of taste of the breadsticks stored at ambient temperature

Treatments	Storage intervals(Days)					
	Initial	15	30	45	60	Mean
<b>Taste</b>						
T <sub>0</sub>	7	6	5.5	4.5	4	5.4a
T <sub>1</sub>	7	6	5	4	3	5b
T <sub>2</sub>	7	6	5	4	3	5b
T <sub>3</sub>	7	6	5	4	3	5b
T <sub>4</sub>	7	6	5	4	3	5b
Mean	7a	6b	5.1c	4.1d	3.2e	5.08

**Table 4:** Sensory analysis of Appearance of breadsticks stored at ambient temperature

Treatments	Storage intervals(Days)					
	Initial	15	30	45	60	Mean
<b>Appearance</b>						
T <sub>0</sub>	8	7	7	7	7	7.1a
T <sub>1</sub>	7	7	6	6.5	6	6.5a
T <sub>2</sub>	7	6	6	6	6	6.2a
T <sub>3</sub>	6	6	6	6	5	5.8a
T <sub>4</sub>	6	6	5	5	5	5.4a
Mean	5.3a	6.4ab	6.4bc	6.1bc	7c	6.2

**Table 5:** Sensory analysis of crispiness of breadsticks stored at ambient temperature

Treatments	Storage intervals(Days)					
	Initial	15	30	45	60	Mean
<b>Crispiness</b>						
T <sub>0</sub>	8	7	7	7	7	7.1a
T <sub>1</sub>	7	7	6	6.5	6	6.5a
T <sub>2</sub>	7	6	6	6	6	6.2a
T <sub>3</sub>	6	6	6	6	5	5.8a
T <sub>4</sub>	6	6	5	5	5	5.4a
Mean	5.3a	6.4ab	6.4bc	6.1bc	7c	6.2

**Table 6:** Sensory analysis of overall acceptability of breadsticks stored at room temperature

Treatments	Storage intervals(Days)					
	Initial	15	30	45	60	Mean
<b>Overall acceptability</b>						
T <sub>0</sub>	7.5	7	7	7	7	7.1a
T <sub>1</sub>	7	7	6	6.5	6	6.5b
T <sub>2</sub>	7	6	6	6	6	6.2b
T <sub>3</sub>	6	6	6	6	5	5.8c
T <sub>4</sub>	6	6	5	5	5	5.4c
Mean	5.3a	6.4ab	6.4bc	6.1c	7c	6.2

#### 4. Conclusion

From this research it has been concluded that buckwheat contained much amount of essential nutrients that should be utilized in bakery products like cake bread biscuits and breakfast cereals. Other countries had done a lot of utilization on buckwheat flour and product as it has been used for gluten free bread manufacturing in many countries. As it is a pseudo cereal but can be used to manufacture bakery products in supplement form. According to its storage conditions and requirements taste and crispiness can be maintained by using suitable preservatives.

#### 5.1 Appendices

WF	Wheat Flour
BWF	Buckwheat Flour
T1 to 4	Treatments 1.to 4.

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#### 6. Reference

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