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Comparative Study on Chemically and Biologically Raised Crackers Biscuits

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Abstract: The experiment was conducted to the comparative study of chemically and biologically raised cracker biscuit. There were two different formulas; Formula -A was biologically raised (using dry yeast) and Formula –B was chemically raised (using sodium bicarbonate, no yeast) crackers. For analyzing the quality of products, samples were collected from different points of the plant and conducted physical, chemical and organoleptic test. From physical test report it is found that the appearance, texture, color and flavor are better for formulation – A than the formulation – B. According to chemical test report it are found that oven moisture, Packing moisture, Fat and Ash were 1.9%, 2.8%,24.0% and 0.93% respectively of formulation – A and 2.0%, 3.1%, 24.2% and 0.92% respectively for formulation – B. From the panel test report 66.66% group voted the formula –A and 33.33% group voted the formula – B by the team -1 and secondly we form teamed – 2 by rearranging the team members of one and two. According to team-2 83.33% group voted the formula –A and 16.66% group voted the formula – B. All the test reports supported that biologically raised crackers biscuits was better than the chemically raised crackers biscuits.

Key Words: Biscuits, Crackers, Taste

Introduction

A bakery product is a processed food product made from wheat flour and various other ingredients, prepared for consumption through the process of baking. Typical bakery product, include: breads, cakes, pies sweet rolls buns cookies cracker, ice cream cones etc. **(**Ellis, 1990).Within the Biscuits and Cracker industry, the terms biscuits and cookie are used inter changeably. A cookie in the United States is a biscuits in England, Canada and many other countries. It is understood that the term biscuits never refers to baking powder biscuits, muffins etc. **(**Ellis, 1990). Biscuits in the cracker group are all used as long shelf-life bread substitutes and can be called crackers. The recipes are low in sugar, most of the dough are fermented with yeast and pre processed to give products with a dry flaky character. The flavor of the crackers is said to arise significantly from the products of fermentation so those made by long fermentation can be expected to have stronger flavors than those with short fermentation. During long fermentation not only does the added yeast grow but also the adventitious micro flora, mostly bacteria, present in the flour. Long standing times for dough are very inconvenient and there is no knowing how much activity will arise from the flour micro flora. For these reasons a continuous fermentation technique is now available to standardize the flavor development and to reduce the dough holding times (Duncun, 2001). The cracker also defined as thin bread like products which may be produced through fermented dough process, as in soda cracker's saltines, or in a non fermented dough process as in graham crackers and some snack cracker **(**Ellis, 1990). In general crackers contain little or no sugar but moderate levels of fat. The dough generally contains low levels of water. The consumer behavior is 13.79% influenced by healthy factor (Jaisam and Utama-ang, 2008). The consumer wants healthy food made with natural ingredients rather than the artificial and chemical ingredients due to good health. Keeping this view in mind the experiment was conducted with the following objectives: (1) to develop chemically and biologically raised crackers, biscuit and (2) to study the quality attributes of the developed biscuits.

Materials and Methods

The research work was carried out at Chittagong, Bangladesh in Banga Flavour Application Lab (BFAL) to prepare of cracker biscuits chemically and biologically. All ingredients are arranged by Banga Flavour and Fragrance, to complete the research work. The ingredients were: wheat flour, table sugar, fats and oils, eggs, milk and milk products, common salts, leavening agents, Emulsifying agents, water etc. The experiment was completed by some important steps, like mixing, standing, forming, sheeting, cutting, baking, cooling, stacking, packing, etc. Different chemical analysis such as moisture, fat, ash was determined as per method of AOAC (2005).

Formulation

There were two different formulations of crackers biscuit; Formula A is designed for biological rising (used dry yeast) and Formula B is designed for chemical rising (not used dry yeast) crackers biscuits.

Table 1. Formulation of Crackers Biscuits

Ingredient	Formulation –A	Formulation –B
Wheat flour	603.5 gm	603.5 gm
Vegetable Fat	150 gm	150 gm
Table Sugar	160 gm	160 gm
Whole Milk Powder	5 gm	5 gm
Common Salt	10 gm	10 gm
Ammonium bicarbonate (raising agent)	30 gm	30 gm
Sodium bicarbonate	10 gm	10 gm
Sodium Acid Pyrophosphate, SAPP	1.5 gm	1.5 gm
Sodium metabisulphite	0.5 gm	0.5 gm
Liquid Glucose	10 gm	10 gm
Invert Sugar,	10 gm	10 gm
Emulsifying agent	5 gm	5 gm
Dry yeast	**10 gm**	**Not Applied**
Water	Required water content is (20-23) % on batch volume	

Preparation of Biscuits

The biscuits were prepared as the method described by Ellis (1988). Initially the stored raw materials quality was inspected then the ingredients were mixed through mixture. The mixing temperature was 40 ^{0}C and time was 10-12 minutes and the mixture speed was 40 rpm. Then the standing was performed for 60 minutes as the laying time exceeding 20 minutes is advised (Ellis, 1988). After standing, forming was done and then sheeting was performed to make the thickness as 0.15 mm and then cutting operation was performed. Finally the baking operation was conducted. In the baking zone, the oven has three sections, power type is direct hating system oven, and heat sources are top and bottom of the oven. Temperature in first zone was 180^{0}C at top and at bottom 160^{0}C. Temperature in second zone was 260^{0}C at top and at bottom 240^{0}C. Temperature in third zone was 140^{0}C at top and at bottom 100^{0}C. After baking, cooling of biscuit was done at 60 % RH (Relative Humidity). After that the biscuits were wrapped and packed for different purposes such as: To keep food products clean and hygienic and uncontaminated, to prevent infestation, to product the food item from changing with time and moisture pick up, to prevent mechanical damage, to give product identification, to supply information, to collate items/units into manageable quantities, to prevent tampering and theft etc as described by Firmenich (2004). And finally the biscuits were stored at room condition temperature (25^{0}C – 30^{0}C) and relative humidity (58- 65) %.

Sensory evaluation Test

As per method of sensory evaluation of cracker biscuits, we collect sample first from packing section. After the collection of samples make a Panel or Team of six groups (20 members in each group). We serve the sample to all Panel/Team members of six groups of total 120 respondents and take their comments about sample (biscuits). According to the comments of Panel/Team members we select best sample/products between Formulation – A and Formulation – B.

Results and Discussion

Physical and Chemical Parameter

From the Table 2 it is observed that the chemical parameters such as oven moisture, packing moisture, fat and ash contents of both the formulation are within the standard specifications. For physical attributes there was differences between the two formulations; Formulation-A and Formulation –B. According to chemical test report, oven moisture, Packing moisture, Fat and Ash content was 1.9%, 2.8%,24.0% and 0.93% respectively for formula – A and 2.0%, 3.1%, 24.2% and 0.92% respectively for formulation – B. From this it can be claimed that the formulation – A is better than the formulation – B and this betterment is due to addition of dry yeast in the formulation (Table 1 and 2)

Table 2. Physical and chemical quality test result of Crackers Biscuits

Attributes	**Specifications**	**Results**	
		Formulation – A	**Formulation – B**
Appearance	Good	Good	Good
Texture	Should be crispy	Good Crispy	Crispy
Flavor	Excellent	Excellent	Good
Color	Creamy to brown	More Brown	Brown
Oven Moisture	(1.5 – 2.5) %	1.9 %	2.0 %
Packing Moisture	(2.5 – 3.5) %	2.8 %	3.1 %
Carbohydrate	(18 – 22) %	20.01%	19.60%
Total Fat	(23.0 – 25.0) %	24.0 %	24.2 %
Total Ash	(0.9 – 1.0) %	0.93 %	0.92 %
Protein	(6.00 – 10.00) %	6.70%	6.02 %
Average panel report	Report should be acceptable	Very Good	Good

Sensory Evaluation

Table. 3 showed that, 66.66% group voted the formula –A and 33.33% group voted the formula – B. So from this test we can say formula –A is better than the formula – B.

Table.3. Test result of 1st team

TEAM –1	**VOTE**	Result (%)	
		Formula-A	Formula B
Group 1	Formula A	66.66	33.33
Group 2	Formula B		
Group 3	Formula A		
Group 4	Formula A		
Group 5	Formula A		
Group 6	Formula B		

Table. 4 showed that, 83.33% group voted the formula –A and 16.66% group voted the formula – B. So from this test we can also say formula –A is better than the formula – B. From Table 3 and 4 it was clear that the comments of panel members Formulation – A is the best product than Formulation – B because the Formulation – A is biologically raised and Formulation – B is chemically raised cracker biscuits.

Table 4. Test result of 2nd team (group member rearrange randomly with 1st team)

TEAM -2	VOTE	Result (%)	
		Formula-A	Formula-B
Group 1	Formula A	83.33	16.66
Group 2	Formula B		
Group 3	Formula A		
Group 4	Formula A		
Group 5	Formula A		
Group 6	Formula A		

Conclusion

The biscuits were prepared with two different formulas. As per results of test report of physical, chemical and organoleptic (panel test) test, Formulation – A was the best biscuits than Formulation – B. Formula – A is biologically raised and Formula – B is chemically raised formula.

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