

FORMULATION AND ORGANOLEPTIC PROPERTIES OF MUSHROOM ROLLED BREAD

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Abstract

There are a lot of breads available in the market but none of these uses locally produced but nutritious mushroom. Maximizing the utilization of mushrooms in the form of bread does not only benefit the consumers of the new product but may contribute to the income of the mushroom growers in the locality. This alternative bread, whose one main ingredient is mushroom could provide additional rich choice among bread lovers. The study was conducted to determine the feasibility of using oyster mushroom powder in baking the rolled bread. This study determined the best formulation in the preparation of Mushroom Rolled Bread. It determined the sensory qualities of the mushroom rolled bread in terms of Appearance, Aroma, Taste, Texture and Color and finally, it also evaluated the level of acceptability of the rolled mushroom bread. The researcher utilized the experimental design. The oyster mushroom was incorporated at different levels to the formula. The three formulas were subjected to organoleptic evaluation using the 9-point Hedonic Scale while to evaluate the general acceptability of rolled mushroom bread, the bakers made used of the 5-point Likert Scale. Samples of rolled mushroom bread were evaluated by 30 panelists composed of 15 students and 15 bakers. Findings revealed that that from the two sets of taste panelists, it showed that formula 2 was evaluated the best formulation with a mean of 7.8. Based on the sensory evaluation, formula 2 had the highest score of 7.85 based on the 9-point Hedonic scale in terms of appearance, taste, aroma, texture, and color. Formula 2 was also preferred by the sensory panel with overall acceptability score of 4.1.

Keywords: Rolled Mushroom Bread, Oyster Mushroom Powder, Formulation

INTRODUCTION

Mushrooms have long been valued as food and medicine besides their key ecological role. They represent one of the world's greatest unexploited resources for nourishment and palatable food products. They thrive well on wood and agro waste products like straws, corn, corn cobs, sugarcane bagasse and coffee residues (Petre and Petre, 2013). Oyster mushrooms are more popular because they are easiest and least expensive to cultivate besides their nutritional and medicinal value (Stamets, 2008).

Beside the therapeutic properties of mushrooms, they are also of considerable interest because of their organoleptic merit, and economic significance. They are generally used in home cooking as appetizers in marinated form, used as an ingredient in soups, sauces, salad, stuffing and meat dishes (Achremowicz et al, 1983). Aside from their unique taste, mushrooms come with incredible array of health benefits. Mushrooms are rich in protein, non-starchy carbohydrates, and dietary fiber, minerals, and B-vitamins, essential amino acids and have no cholesterol, and has negligible amount of fat. (Sadler, 2003). According to several studies, substances such as lectins, glucan, glycopeptides, β -D-Glucan (pleuran), polysaccharides and lovastatin have been identified from *Pleurotus* species (Cohen et al. 2002). These compounds

generally act as antioxidants, immunomodulating, antitumor, antibiotic, antiviral, anti-inflammatory and anticholesterolic agents (Cohen et al. 2002). For this reason, mushrooms are considered as functional food and are more often used to increase the nutritional or health-promoting value of various food products. Today's consumer is looking for not only convenient food, but above all health-promoting food. According to scientific literature, it describes the possibility of using both mushroom extracts as well as dried mushrooms in ground form for food fortification.

To use the health-promoting potential of mushrooms, they are added to staple foods that are consumed by a large part of the general population. This type of food includes bakery products. Scientific literature describes the possibility of using mushrooms, mainly in a dried and ground form, in the supplementation of breads, cakes, cookies, biscuits, breadsticks, and water extracts in muffins.

Food fortification of foods is of current interest because of increasing nutritional awareness among consumers. Food industries respond to this by striving to formulate a healthier food option.

Baking technique is the earliest and oldest of all other techniques and is still going stable over food processing field. Bakery products have played a key role in the development of mankind, being a principal source of convenience, variety and a healthy nutrition component to modern lifestyles. Bakery breads are very popular, ready to eat, convenient, inexpensive and also an important product in human diet and are usually eaten with hot drinks. It is also used as a snack in school for the school going children who are often underweight. It may be used as a nutrient supplement during emergency situation (Baljeet et al., 2010)

Bread is a food product that is universally accepted as a convenient product form of food that has desirability to all population rich and poor, rural and urban (Malomo et al, 2012). Bread is a cereal product that is naturally low in protein and nutritionally not a balanced diet because it is low in lysine, an essential amino acid (Giamiet al., 2003, Aguet al., 2010. White bread lacks vitamin B which helps the body cells to convert carbohydrates into the required energy. Also, lack of fiber in white bread exposes one to constipation problems due to slow intestinal food movement. However, nutritional content of bread will be increased by addition of mushroom with its numerous benefits (Matilla, 2001, Barros et al., 2008).

There are a lot of breads available in the market. None of these uses locally produced but nutritious mushroom. Maximizing the utilization of mushrooms in the form of bread does not only benefit the consumers of the new product but may contribute to the income of the mushroom growers in the locality.

This alternative bread, whose one main ingredient is mushroom could provide additional rich choices among bread lovers. For a healthier snack option, the researcher thought of making a delicious bread yet healthier by enriching it with Oyster Mushroom to promote a vegetable bread in a blind manner.

STATEMENT OF THE PROBLEM

This study aimed to determine the feasibility of utilizing oyster mushroom into a rolled bread and test for it's for its level of acceptability. Specifically, this study sought to answer the following questions:

1. What is the best formulation for Mushroom Rolled Bread?
2. What are the sensory qualities of the Mushroom rolled bread in terms of the following:
 - a) Appearance
 - b) Taste
 - c) Color
 - d) Texture
 - e) Aroma
3. What is the level of acceptability of Mushroom Rolled Bread?

METHODOLOGY

Research Design

The researcher used experimental method. The researcher used three ratios and different forms and portions of oyster mushroom in developing the baked product. It also determined the sensory evaluation and level of acceptability.

Research Participants

A total of thirty participants who served as taste panelists are the participants of this study. The group composed of fifteen BSHM students of Andrews's campus and fifteen Bakers who worked in Bakeshops around Tuguegarao City. A set of criteria was used in selecting the members of the taste panelist. Only Bakers and students who do not have colds or other illnesses which may impair taste or smell sensation, are non-smokers, with complete teeth and who are not very hungry nor full during the sensory evaluation.

Research Instrument

A sensory evaluation score sheet was used to evaluate the sensory attributes of the different treatments. Samples of rolled mushroom bread from the different treatments were evaluated by thirty taste panelists. The parameters that were evaluated are color, appearance, taste, aroma and texture using a Hedonic Scale with "9"- equaling to "like extremely" and "1 "-equaling to "dislike extremely" and 5-point Likert scale for the level of acceptability.

9 - Point Hedonic Scale

Scale	Interval	Descriptive value
9	8.12-9.0	Like extremely
8	7.23-8.11	Like very much
7	6.34-7.22	Like moderately
6	5.45-6.33	Like slightly
5	4.56-5.44	Neither like or dislike
4	3.67-4.55	Dislike slightly
3	2.78-3.66	Dislike moderately
2	1.89-2.77	Dislike very much
1	1.0-1.88	Dislike extremely

Level of Acceptability

Descriptive Scale	Mean	Range
5- Highly Acceptable	4.20	4.99
4- Acceptable	3.4	4.19
3- Moderately Acceptable	2.6	3.39
2- Fairly Acceptable	1.8	2.59
1- Not Acceptable	1	1.79

Research Procedures

The experiment was divided into three phases. Phase one is on the preparation of raw materials and preparation oyster mushroom.

Phase 1: Raw Materials and Preparation

Oyster mushrooms were purchased from the wet market. Other wet and dry ingredients were procured from the grocery store.

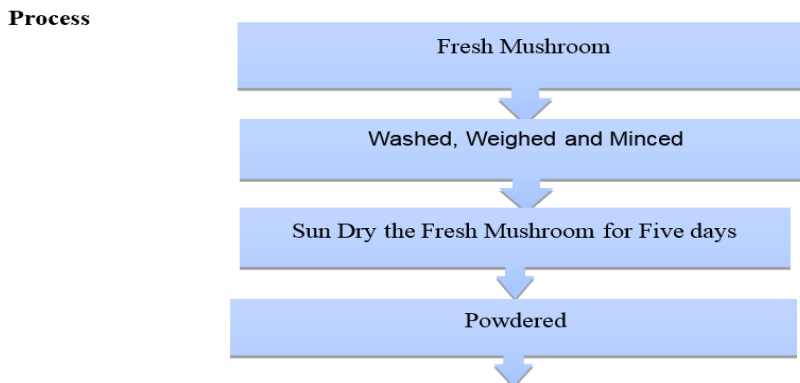
Bread Formulations and Development

Several trials were done to produce a satisfactory product utilizing different forms and portions of oyster mushroom. Forms of oyster mushroom tried including fresh, semi-dried and dried oyster mushroom. Of the three forms, the powdered oyster mushroom was the most feasible form to use in the preparation of the bread, hence, this was the form pursued in the production of the rolled mushroom bread. The other two forms made the bread unacceptable.

Preparation of the powdered oyster mushroom

The fresh mushroom samples are washed thoroughly, weighed, and minced. It was dried for five days then the dried samples were ground into powder through a grinding machine.

Figure: Schematic Diagram for oyster mushroom processing



Phase 2: Preparation of the Rolled Bread using Powdered Mushroom

Procedure of the Mushroom Rolled Bread

Sponge Method:

Combine yeast, sugar and lukewarm water in a bowl for 10 - 15 minutes.

Dough:

1. Measure and sift all dry ingredients.
2. Combine all dry ingredients together then mix it.
3. Add the 200 grams shortening and cut in the shortening until mixed thoroughly.
4. Make a well at the center. Pour in the eggs and the sponge mixture.
5. Combine till it forms a dough.
6. Knead the dough with the remaining 150 grams of flour until smooth and elastic. Ferment for 1-2 hours.
7. After one hour when the dough doubles in volume. Punch down to expel produced carbon dioxide.
8. Transfer the dough into a lightly floured table and roll to make a log.
9. Cut the dough following a weight of 25 grams each to ensure evenly sized dough.
10. Flatten the dough with a rolling pin then put the mushroom fillings following the formulations then roll the dough.
11. Proof the dough for about 15 minutes and bake until brown for about 20 - 30 minutes.

Phase 2: Preparation of Mushroom Rolled Bread Formulation

INGREDIENTS	Lot 1	Lot 2	Lot 3
Yeast	10 grams	10 grams	10 grams
Oyster mushroom	5 grams dried powdered oyster mushroom	10 grams dried powdered oyster mushroom	15 grams dried powdered oyster mushroom
Flour	250 grams	250 grams	250 grams
Dough Conditioner	15 grams	15 grams	15 grams
Shortening	200 grams	200 grams	200 grams
Low fat milk	30 grams	30 grams	30 grams
Salt	5 grams	5 grams	5 grams
Eggs	2 whole eggs	2 whole eggs	2 whole eggs
Sugar	200 grams	200 grams	200 grams
Fillings			
Bread Crumbs	30 g	30 g	30 g
Oyster Mushroom	10	15 g	20 g
APF	10 g	10 g	10 g
Water	28 g	28 g	28g
Sugar	100 g	100 g	100 g
Salt	0.5 g	0.5 g	0.5 g
Butter	56 g.	56 g	56 g

Phase 3: Sensory Evaluation

A sensory evaluation score sheet was used to evaluate the sensory attributes of the different treatments. Samples of rolled mushroom bread from the different treatments were evaluated by 30 panelists composed of 15 BSHIM Students and 15 bakers in the different bakeshops in Tuguegarao City. The parameters to be evaluated were appearance, color, taste, aroma, texture and general acceptability of the rolled bread using 9-point Hedonic Scale. All three food samples are randomly arranged, and number coded for proper identification and was given to each taste panelist. A sample sensory evaluation sheet is shown in the appendices. The taste panelists were instructed on how to evaluate the rolled mushroom bread. Each panelist was advised to drink water after tasting of each treatment to rinse their mouth so that the assessment of the taste would be accurate. A simple individual sensory booth was prepared to avoid unusual type of odors and other disturbances which may affect the sensory evaluation of the taste panelist.

Statistical Tool and Data Analysis

Weighted mean was used to assess the sensory acceptability of the rolled mushroom bread in terms of appearance, texture, aroma, taste, color and general acceptability of the baked product using the Hedonic Scale with “9” equaling to “like Extremely” and “1” equaling to “Dislike Extremely” while to evaluate the general acceptability of rolled mushroom bread, the bakers made used of the Likert Scale with “5” equaling to “highly acceptable” and “1” equaling to “not acceptable”.

9 - Point Hedonic Scale		
Scale	Descriptive value	Interval
9	Like extremely	8.12-9.0
8	Like very much	7.23-8.11
7	Like moderately	6.34-7.22
6	Like slightly	5.45-6.33
5	Neither like or dislike	4.56-5.44
4	Dislike slightly	3.67-4.55
3	Dislike moderately	2.78-3.66
2	Dislike very much	1.89-2.77
1	Dislike extremely	1.0-1.88

Descriptive Scale	Mean Range
5- Highly Acceptable	4.2 - 4.99
4- Acceptable	3.4 - 4.19
3- Moderately Acceptable	2.6 - 3.39
2- Fairly Acceptable	1.8 - 2.59
1- Not Acceptable	1 - 1.79

RESULTS AND DISCUSSION

This part presents the analysis and interpretation of the gathered data from the respondents as reflected in the questionnaire.

Table 1: Best Formulation in the Production of Mushroom Rolled Bread as evaluated by the Participants

LOT	CHM Students		Bakers		Average Mean	Descriptive Value
	Mean	Descriptive Value	Mean	Descriptive Value		
1	6.9	Like Moderately	7.1	Like Moderately	7	Like Moderately
2	8.3	Like Very Much	7.3	Like Moderately	7.8	Like Very Much
3	6.4	Like Slightly	7.3	Like Moderately	6.85	Like Moderately

Table 1 shows the best formulation in the production of mushroom rolled bread as evaluated by CHM students and bakers. As gleaned from the table, the highest mean score of 8.3 indicates that the CHM students “liked very much” Lot 2 followed by Lot 1 with a mean of 6.9 with a descriptive value of “liked moderately” and lastly, Lot 3 with a mean of 6.4 with a descriptive value of “liked slightly”. On the other hand, based on the bakers Lots 1, 2, 3 were “liked very much” with a weighted mean of 7.3 both for lot 2 and 3 and 7.1 for Lot 1 with a descriptive value of “liked moderately”. It further revealed that from the two sets of taste panelist based on the average weighted mean, it showed that lot 2 was evaluated the best formulation with a mean of 7.8 with a descriptive value of “liked very much” followed by lot 1 with a weighted mean of 7 and lastly, lot 3 with a weighted mean of 6.8 with a descriptive value of “liked moderately”.

Table 2: Summary on the Sensory Evaluation of Mushroom Rolled Bread with Different Formulations

Sensory Evaluation	LOT 1	Descriptive Value	LOT 2	Descriptive Value	LOT 3	Descriptive Value
Color	7.40	Like moderately	7.80	Like Very Much	6.7	Like moderately
Aroma	5.80	Like Slightly	7.70	Like Very Much	2.4	Dislike very much
Taste	3.70	Dislike Slightly	8.40	Like Extremely	7.9	Like very much
Texture	5.0	Neither like or dislike	7.60	Like Very Much	1.5	Dislike Extremely
Appearance	7.40	Like moderately	7.75	Like Very Much	3.6	Dislike Moderately
Average Mean	5.86	Like Slightly	7.85	Like Very Much	4.42	Dislike Slightly

Table 2 shows the summary of the sensory evaluation of the mushroom rolled bread showing the three formulations. The sensory evaluation on color revealed that scores of the mushroom rolled bread ranged from 7.40 - 7.80 with a qualitative rating of “liked moderately” for Lot 1 and “liked very much” for Lot 2 while Lot 3 obtained a lower score of 6.7 with a qualitative rating of “liked moderately”. Based on the aroma of the evaluated samples, lot 2 obtained the highest score of 7.70 with a qualitative rating of “liked very much” while lot 1 obtained a score of 5.80 with a qualitative rating of “liked slightly”. Lot 3 obtained the lowest score of 2.4 with a qualitative rating of “disliked very much”.

The sensory evaluation on taste of the evaluated samples of mushroom rolled bread shows that lot 2 and lot 3 obtained the highest scores of 8.40 with a qualitative rating of liked extremely and liked very much respectively. While lot 1 obtained the lowest score of 3.70 with a qualitative rating of dislike slightly. Based on the texture of the evaluated samples, lot 2 obtained the highest score 7.60 with a qualitative rating “liked very much” while lot 1 obtained a score of 5.0 with a qualitative rating of “neither liked or disliked”. Lot 3 obtained the lowest score of 1.5 with a qualitative rating of “dislike moderately”.

The sensory evaluation on appearance revealed that scores of the mushroom rolled bread ranged from 7.40 - 7.75 with a qualitative rating of “liked moderately” for Lot 1 and “liked very much” for Lot 2 while Lot 3 obtained a lower score of 3.6 with a qualitative rating of “disliked moderately”. Comparison among means showed that Lot 2 obtained the highest score of 7.85 with a qualitative rating of “liked very much” followed by lot 2 with a score of 5.86 with a qualitative rating of liked slightly. While lot 3 obtained the lowest score of 4.42 with a qualitative rating of “disliked slightly”. This implies that lot 2 was the acceptable formula in terms of their sensory qualities.

Table 3: Level of Acceptability of Mushroom Rolled Bread by the respondents.

Evaluation	Item Mean	Descriptive Value
Lot 1	3.0	Moderately Acceptable
Lot 2	4.1	Acceptable
Lot 3	3.28	Moderately Acceptable

Table 3 shows the level of acceptability of mushroom rolled bread by the respondents. The table shows that the three formulations are accepted but among the three Lot 2 is the most acceptable having the highest mean of 4.1.

CONCLUSION AND RECOMMENDATION

From the findings of the study, the following conclusions were drawn:

- Dried mushroom powder can be added as one of the ingredients in bread preparation.
- In general, rolled mushroom bread were accepted by the respondents.
- The result for best formulation of rolled mushroom bread is lot 2 with a weighted mean of 7.57.

Based on the result of this product, the following recommendation is hereby given:

- A follow-up study be conducted to further investigate the usefulness of the mushroom.
- More researches along this line may be conducted using other variables, respondents and test the proximate nutritive value, packaging and shelf life.
- The best formulation can apply for commercial utilization.

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