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**Original Research Article**

# Production and Analysis of Bread Produced From Composite Flour Blends of Wheat and Local Rice Bran

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**Abstract:** The purpose of the study was to develop an acceptable recipe for the production of bread from composite rice bran and wheat flour. The study considered an experimental approach with three samples of treatment combinations. The first sample (A) was considered as the control where the flour was 100% wheat. The second sample (B) was a combination of 80% wheat flour and 20% rice bran whereas the third sample (C) comprise of a composition of 20% wheat flour and 80% rice bran. Using sensory evaluation approach from respondents, the analysis of variance approach was used to analyse the data obtained in order to determine whether there was a difference between the three treatment samples. The study found that the three bread samples were statistically difference at the 5% level of significance. Comparing the different treatment groups using the Turkey's method, all the treatment groups were statistically different from each other at the 5% level of significance except for the fat content in the bread flour. The results of the study also identified bread sample B (a composite of 80% wheat flour and 20% rice bran flour) as the most preferred bread based on its sensory characteristics. However, the taste of the bread contributed significantly to the choice of the bread sample. It can be concluded from the study that the standard recipe for the production of bread from a composite of wheat and rice bran include wheat flour (80g), rice bran flour (20g), half teaspoon of salt, half teaspoon of yeast, 5g of margarine, 5g of sugar, half teaspoon of Nutmeg, and 65ml of water.

**Keywords:** bread, composite flour, recipe, rice bran, wheat.

## INTRODUCTION

One of the staple nourishment that is broadly produced and consumed around the world to more than half of the world's populace is rice. Concurring to world rice generation, paddy rice was produced around 678 million metric tons (MMT) in 2014 (USDA, 2015). Rice is the most common staple nourishment which is devoured by half of the World's human populace. According to (FAOSTAT, 2012), it is the third most elevated agrarian product with the around the world generation after sugarcane and maize. Asia, Africa and America are the unmistakable rice growing continents. Rice (*Oryza sativa*) is the second driving cereal trim and staple nourishment of half of the world's populace. This staple nourishment is developed in at least 114 nations with worldwide generation of 645 million tons as indicated by Sharif (2009). Rice bran, an imperative by item of rice processing handle is commonly identified as a brown external layer of rice part primarily comprised of pericarp, aleurone, subaleurone layer and germ. It contains calculable sum of supplements like protein, fat and dietary fibre. Inclusion of antioxidants like tocopherol, tocotrienols and ϒ -oryzanol brighten prospects of rice bran's utilization for people (Gong and Yao, 2001; Moldenhauer, *et al.*, 2003). The successful utilization of bran can also be done by deactivating the lipase chemical capable for hydrolytic debasement of rice bran constituents (Martin, 1994). Stabilization is a compelling treatment turning rice bran into a profitable dietary constituent. Microwave warming is considered as a successful stabilization strategy for the inactivation of lipase, dependable for rice bran debasement (Ramezanzadeh *et al.*, 1999; Ramezanzadeh *et al.*, 2000). Rice bran is the item of rice processing. The defatted residue of rice bran contains 15.4% protein (Hamada, 2000). Rice boycott protein is hypoallergenic, broadly accessible, of a tall dietary esteem, and reasonable; be that as it may, rice bran is as it were utilized as a cheap creature

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bolsters (Saunders, 1990; Hamada, 2000; Lima *et al.*, 2002).

Rice bran is a wealthy source of proteins, vitamins, strands, cancer prevention agents and has a few wellbeing benefits. Due to its useful nutritive and natural impacts, it can be consolidated into useful nourishments, but it is still under-utilized due to lipase protein. Lipase chemical in the rice bran hydrolyses the oil substance into glycerol and free greasy acids. Due to this transformation, the quality of rice bran gets diminished. It produces foul scent and gives sharp taste. Since it has a rancidity issue, rice bran gets to be unacceptable for human utilization and most of the rice bran utilized as high protein creature bolster or as fuel (Tao *et al.*, 1993; Lakkakula *et al.*, 2004). With this oxidation, quality of oil is unfavourably influenced. To overcome this issue, stabilization gets to be essential. The handle of stabilization is pointed at devastation or restraint of lipase chemical activity.

Rice bran has a few interesting properties that render its reasonableness for specialty markets like nutraceutical and pharmaceutical industry. One such highlight is the nearness of critical levels of minor-elements such as oryzanol, tocotrienol and phytosterols that have an expansive nutraceutical application. They are utilized in the improvement of value-added sound items Anonymous (Ocean Handbook, 2009). Gamma oryzanol has been found to have higher antioxidant activity in comparison with tocopherol. Gamma oryzanol comprises of ferulic corrosive esters of sterols and triterpene alcohols. The ferulic acid esters are campesterol, stigmasterol, and beta-cytosterol and the triterpene alcohols are cycloartenol, cycloartanol, 24-methylenecycloartanol and cyclobranol (Bucci *et al.*, 2002; Piironen *et al.*, 2000). Due to its antioxidant activity, it is drawing colossal intrigued in investigate world as a food added substance.

Composite flours are very distinctive from the ready-mixed flours recognizable to mill operators and dough punchers. Though ready-mixed flours contain all the non-perishable constituents of the formula for a certain heated item, composite flours are as it were a blend of diverse vegetable flours wealthy in starch or protein, with or without wheat flour, for certain bunches of pastry kitchen items (Chatelanat, 1973). This gives rise to the taking after definition: “Composite flours are a blend of flours from tubers wealthy in starch (e.g. cassava, yam, potato) and /or protein-rich flours (e.g. soy, shelled nut) and /or cereals (e.g. maize, rice, millet, buckwheat), with or without wheat flour.”

Rice bran has numerous nourishment applications in prepared nourishments, nutraceuticals, and useful nourishments. A few of the common applications of rice bran are in nibble nourishments, pastry shop items, cereals, saltines, pasta items, mixture conditioners, refreshments, gluten-free nourishments, and therapeutic nourishments. The USDA in association with a non-profit organization gives a nutritious rice bran drink to pre-school children in the Latin American nations. Rice-bran-containing refreshment base can be utilized for isotonic drinks, frosted tea drinks, upgraded juices, mineral supplements, and sports refreshments. "Rice Drain" non-dairy elective to drain is made from naturally developed rice. Sound dinner substitution drinks made from stabilized rice bran are being presented in the market.

## MATERIAL AND METHODS

### Source of Raw Materials

Wheat flour, salt, sugar, brown rice and dry yeast were purchased from a local market in Bolgatanga. Brown rice was sent to a rice mill for destoning. Equipment such as blender, mixer, kneader, bowl, knife, digital weighing scale, measuring cylinder, boiler, baking pans, stirrer and oven were obtained in the food practical laboratory of Bolgatanga Polytechnic.

### Processing of Rice Bran

The brown rice was sifted to remove substances such as dirt, wood and insects to make the samples free from filths. A destoner was used to separate impurities such as Stone, Glass, Metal pieces from the rice. The principle of this machine is to lift the material by vacuum, over an inclined vibrating screen covered deck. The bran (chaff) was then separated from the rice.

### Rice Bran Stabilization and flour processing

The bran was stabilized in a hot oven belonging to the department of Hotel, Catering and Institutional Management to reduce or inhibit the activity of lipase enzyme. This process intensified the shelf-life of the rice bran and killed bacteria, moulds and insect eggs that may cause further spoilage. The rice bran was blended using Philips blender into powder or flour and sieved through an 80cm mesh sieve. The smooth flour free from granules was then packaged into small plain polythene bags for use. The two composite samples were prepared by mixing rice bran flour and wheat flour in different proportions using a Philips food mixer. The mixing was done to ensure a standardized mixture of the samples.

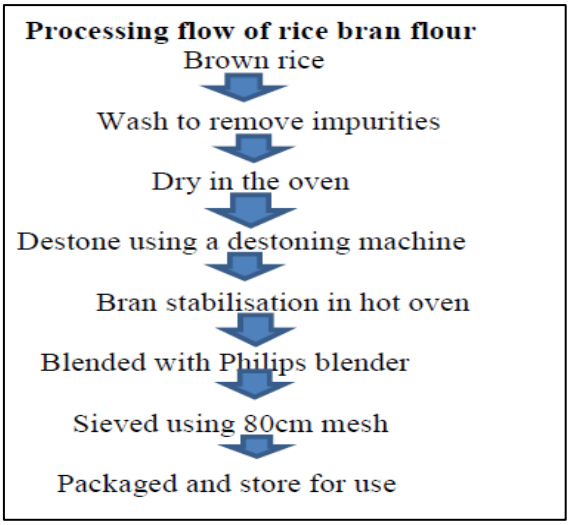


**Figure 1: Processing flow of rice bran flour (Rodge *et al.*, 2012), Modified.**

**Formulation of Composite Flour and other Ingredients for Bread Production**

Three different samples of bread were produced and coded as A, B, and C. Sample A served as the control and contained 100% wheat. Samples B, and C consisted of wheat/rice bran flours and the other ingredients for bread production are presented in Table 1.

**Table 1: Formulation of Composite Flour and other Ingredients for Bread Production**

| SAMPLES | | | |
|---|---|---|---|
| INGREDIENTS | A | B | C |
| Wheat flour (strong) | 100 | 80g | 20g |
| Brice bran | 0 | 20g | 80g |
| Salt | ½ tsp | ½ tsp | ½ tsp |
| Yeast | ½ tsp | ½ tsp | ½ tsp |
| Margarine | 5g | 5g | 5g |
| Sugar | 5g | 5g | 5g |
| Nutmeg | ½ tsp | ½ tsp | ½ tsp |
| Water | 65ml | 65ml | 65ml |

**Table 1: Preparation of composite Bread from Wheat and Rice Bran flours**

The control sample of bread (A) was prepared using only wheat flour (100%). The bread sample (B) was prepared using 80% of wheat flour and 20% of rice bran flour. The bread sample (C) was prepared using 80% of rice bran flour and 20% wheat flour. The method for preparation of wheat bread was adopted as per the method described by Rodge *et al.*, 2012) with minor modifications.

**METHOD**

- Strong wheat flour together with the rice bran flour was sifted and blended using a Philips food mixer. The purpose was to ensure a homogeneous mixture of the samples.
- Yeast was dissolved in a little amount of water.
- Sugar and salt were dissolved in another small quantity of water.
- Flour and margarine were put into the mixing bowl and salt and sugar solution added with the yeast mixture.
- All the ingredients were mixed together for 5-6 minutes and were kneaded to soft smooth dough.
- Dough was kept at approximately 30˚C for 50 minutes.
- The dough was knocked back to allow it to ferment at 30˚C for 40 minutes.
- The dough was moulded and Placed in greased bread tin and covered with a wet cloth for it to rise in the tin.
- It was then baked at 200˚C for 20 minutes in the oven.
- After 20 minutes, the bread was taken out from oven to allow it to cool.
- The baked loaves were carefully removed from the pans so that it can cool before package in polyethylene bags for analysis. The flow chart for bread production is shown in Figure 2.

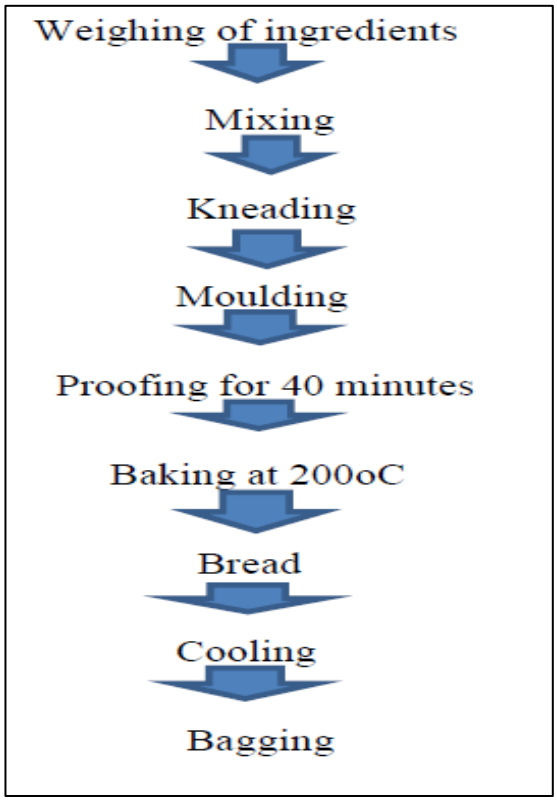


**Figure 2: The flow chart for bread production**

**Sensory Evaluation**

The three samples of bread were coded and presented to fifteen member panel of judges who are familiar with the product for sensory evaluation. The panellists scored the colour, flavour, taste, texture and overall acceptability of the bread using a scale ranging

from 1 to 5 with 1 representing the least score (dislike extremely) and 5 the highest score (like extremely). Analysis of Variance (ANOVA) was performed on the data gathered to determine differences, while the least significant test according to Ihekoronye and Ngoddy, (1985) was used to detect differences among the means. Proximate analysis of samples was determined according to AOAC (1990; 2000). The samples were analysed for moisture content, ash, protein, fat, crude fibre.

**Statistical Analysis**

All analytical determinations were conducted in duplicates. Means and standard deviations were calculated. Data obtained was subjected to analysis of variance (ANOVA) where significant differences exist; Turkey's test was used in separating the means.

## RESULTS AND DISCUSSION

**Table 2: Correlation analysis of bread samples**

| | Moisture | Ash | Fat | Protein |
|---|---|---|---|---|
| Ash | 0.74* | | | |
| Fat | 0.66 | 0.88 | | |
| Protein | -0.36 | 0.36 | 0.35 | |
| Crude fiber | 0.79* | 0.99* | 0.91* | 0.27 |

* $p < 0.05$, ** $p < 0.01$

*Table* 2 presents the correlation analysis of the features of bread sample mixtures. It was observed that the moisture content was statistically associated with the ash content and crude fibre amount in the samples at the 5% level of significance. The amount of crude fibre in the samples was also associated to the ash content and the fat content. However, the percentage of protein that was discovered in the bread flour samples was not correlated with any of the other characteristics measured at the 5% level of significance.

## ANALYSIS OF VARIANCE (ANOVA)

**Table 3: ANOVA testing effects of concentration**

| | Mean square | | | | |
|---|---|---|---|---|---|
| Source of variation | Moisture | Ash | Fat | Protein | Crude |
| Treatment | 22.15** | 33.21** | 51.67** | 40.05** | 150.22** |
| Error | 0.05 | 0.00 | 4.93 | 0.04 | 0.49 |
| Total | 5.57 | 8.30 | 16.61 | 10.04 | 37.93 |

* p < 0.05, ** p < 0.01

Testing the effect of the treatment (bread flour samples) on the moisture content, ash, fat, protein and crude fibre amount, the results indicated that the treatment groups were statistically different in five difference characteristics measured at the 1% level of significance (*Table* 3).

**Table 4: Mean comparison of treatment groups**

| Comparison Group | Moisture | Ash | Fat | Protein | Crude Fiber |
|---|---|---|---|---|---|
| 2 – 1 | 2.77 ** | 6.34 ** | 7.99 * | 4.49 ** | 13.10 ** |
| 3 – 1 | -2.67 ** | 1.42 ** | 2.05 | 7.24 ** | 1.92 * |
| 3 – 2 | -5.53 ** | -4.92 ** | -5.94 | 2.75 ** | -11.18 ** |

* p < 0.05, ** p < 0.01

Based on the results of the ANOVA test in *Table* 4, a post-hoc analysis was necessary to discover the treatment groups that were significantly high or otherwise. As presented in *Table* 4, all the treatment groups were statistically different from each other at the 5% level of significance except for the fat content in the bread flour. Specifically, the fat content in the sample that contained 100% wheat flour was not significantly different from the sample that contained the 20% flour and 80% bran flour. This implies that the 100% wheat flour could contain the same amount of fat as a nearly 100% bran flour since the amount of bran flour in the third sample was four times more than the percentage of wheat flour.

It was noted that amount of moisture in the sample that contained 80% wheat flour and 20% bran flour was than the 100% wheat flour sample and the one that contained 80% bran flour. In terms of ash content, the second sample (80% wheat flour and 20% bran flour) was discovered to contain more ash than the first and third samples. Whilst a similar conclusion can be drawn from the crude fibre amount in the samples, the amount of protein was higher in the third sample (80% bran flour and 20% wheat flour) than the first and second samples.

**SENSORY ANALYSIS**

**Table 5: Demographic features of panellists**

| | Number of responses | Percentage (%) |
|---|---|---|
| Sex of respondents | | |
| *Male* | 50 | 53.19 |
| *Female* | 44 | 46.81 |
| Age group of respondents | | |
| *Less than 20* | 8 | 8.00 |
| *20 – 30* | 51 | 51.00 |
| *31 – 40* | 29 | 29.00 |
| *41 – 50* | 9 | 9.00 |
| *51 - 60* | 3 | 3.00 |
| Marital status of respondents | | |
| *Single* | 50 | 50.00 |
| *Married* | 43 | 43.00 |
| *Divorced* | 7 | 7.00 |
| Occupation of respondents | | |
| *Baker* | 15 | 15.00 |
| *Banker* | 3 | 3.00 |
| *Farmer* | 6 | 6.00 |
| *Nurse* | 2 | 2.00 |
| *Student* | 33 | 33.00 |
| *Teaching* | 11 | 11.00 |
| *Trading* | 26 | 26.00 |
| *Others* | 4 | 4.00 |

Source: Field survey, 2018

Out of the 94.0% of the respondents that indicated their biological sex on the questionnaire, 53.19% of them were male whilst the female respondents constituted 46.81% of the total non-missing sample. The age group of the respondents as presented in

**Table** 5 indicates that majority of the respondents (51.0%) were between the ages of twenty (20) and thirty (30) inclusive whereas 29.0% were between the age group of 31 – 40. Whilst 50.0% of the respondents indicated that there not married or single, 43.0% reported that they were married whereas 7.0% had divorced at the time of the study (

**Table** 5).The study captured a cross-section of the working population in the sensory evaluation. Both panellists from the food and non-food industries were all represented in the study sample. As shown in

**Table** 5, traders (26.0%) constituted the majority of the study sample followed by students (33.0%) whereas the bakers represented 15.0% of the study sample.

**Table 6: 100% wheat flour**

| | Disliked much (%) | Disliked (%) | Liked (%) | Liked much (%) | Liked very much (%) | Total (%) |
|---|---|---|---|---|---|---|
| Colour | - | 1.00 | 10.00 | 27.00 | 62.00 | 100.00 |
| Aroma | - | 1.00 | 10.00 | 18.00 | 71.00 | 100.00 |
| Texture | - | - | 8.00 | 41.00 | 51.00 | 100.00 |
| Taste | - | 4.00 | 10.00 | 15.00 | 71.00 | 100.00 |
| After taste | 1.00 | 7.00 | 10.00 | 11.00 | 71.00 | 100.00 |

Source: Field survey, 2018

The sensory evaluation of bread made from 100% wheat flour revealed that more than 70% of the panellists or respondents very much liked the bread because of its aroma, taste and after taste. However, only 51.0% and 62.0% of the respondents very much liked the bread because of its texture and colour respectively (*Table* 6).

**Table 7: 80% wheat flour and 20% bran flour**

| | Disliked much (%) | Disliked (%) | Liked (%) | Liked much (%) | Liked very much (%) | Total (%) |
|---|---|---|---|---|---|---|
| Colour | - | 2.00 | 26.00 | 54.00 | 18.00 | 100.00 |
| Aroma | - | 5.00 | 20.00 | 38.00 | 37.00 | 100.00 |
| Texture | - | 4.00 | 27.00 | 44.00 | 25.00 | 100.00 |
| Taste | - | 4.00 | 14.00 | 34.00 | 48.00 | 100.00 |
| After taste | 2.02 | 6.06 | 14.14 | 29.29 | 48.48 | 100.00 |

Source: Field survey, 2018

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As compared to the ratings of the bread made from 100% wheat flour, the 80% wheat and 20% bran flour mixture did not receive much interest by the respondents. Whilst most respondents very much liked after taste of bread sample two, most of them indicated that they liked the bread. However, the percentage ratings were very low (*Table* 7).

**Table 8: 20% wheat flour and 80% bran flour**

| | Disliked much (%) | Disliked (%) | Liked (%) | Liked much (%) | Liked very much (%) | Total (%) |
|---|---|---|---|---|---|---|
| Colour | 48.48 | 14.14 | 9.09 | 12.12 | 16.16 | 100.00 |
| Aroma | 25.25 | 35.35 | 7.07 | 8.08 | 24.24 | 100.00 |
| Texture | 45.45 | 27.27 | 7.07 | 8.08 | 12.12 | 100.00 |
| Taste | 49.49 | 15.15 | 10.10 | 12.12 | 13.13 | 100.00 |
| After taste | 54.55 | 16.16 | 12.12 | 5.05 | 12.12 | 100.00 |

Source: Field survey, 2018

The results of the sensory evaluation revealed that respondents did not like the bread that contained 80% of the bran flour as evidenced in *Table* 8. In all categories of the sensory ballot, high percentages of the ratings were recorded against "disliked much" by the respondents.

**Table 9: ANOVA, testing for group difference between treatment mixtures**

| Source | SS | df | MS | F | *p*-value |
|---|---|---|---|---|---|
| Treatment | 250.44 | 2 | 125.22 | 144.79 | 0.000 |
| Error | 255.99 | 296 | 0.86 | | |
| Total | 506.43 | 298 | 1.70 | | |

Source: Field survey, 2018

Based on the preliminary results as shown in *Table* 7, *Table* 8, and *Table* 9, there is a necessary to perform an analysis of variance to test the hypothesis of no significant mean difference between the three bread samples. According to

**Table** 9, the null hypothesis of no difference is rejected. Hence, there is enough evidence to conclude that the sensory evaluation by the respondents differed by the three bread samples at the 1% level of significance. Therefore, there is the need to perform a further analysis to determine which bread sample was most liked by the respondents.

**Table 10: Post-hoc analysis of treatment differences**

| Treatment | Mean | Standard error | Turkey |
|---|---|---|---|
| 100% wheat flour | 4.74 | 0.09 | A |
| 80% wheat flour and 20% bran flour | 4.45 | 0.09 | A |
| 80% bran flour and 20% wheat flour | 2.67 | 0.09 | B |

Source: Field survey, 2018

Means sharing a letter in the group label are not significantly different at the 5% level. The results indicate that the first and second samples that contained more of wheat flour were liked more than the sample containing more of the bran flour.

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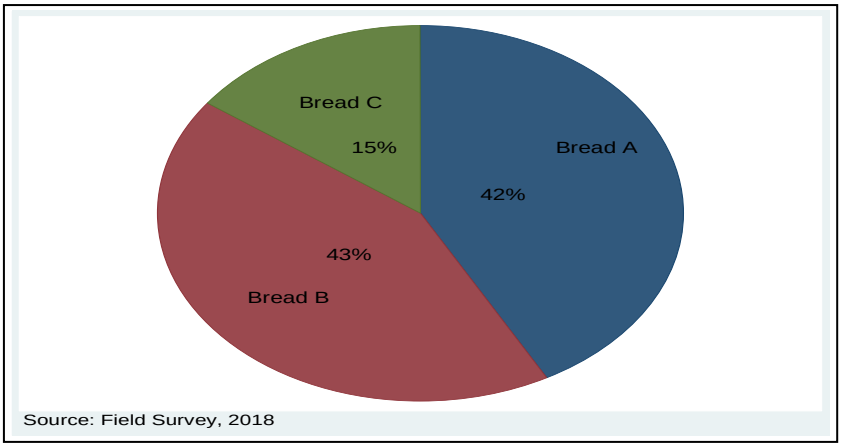


**Figure 3: Bread preference by respondents**

As presented in *Figure* 3, bread B (43%) and bread A (42%) were the most preferred bread to the third category that was made from 80% bran flour and 20% wheat flour. It is implied that the wheat contains much of the desired sensory features than the bran flour that reflected in the end product.

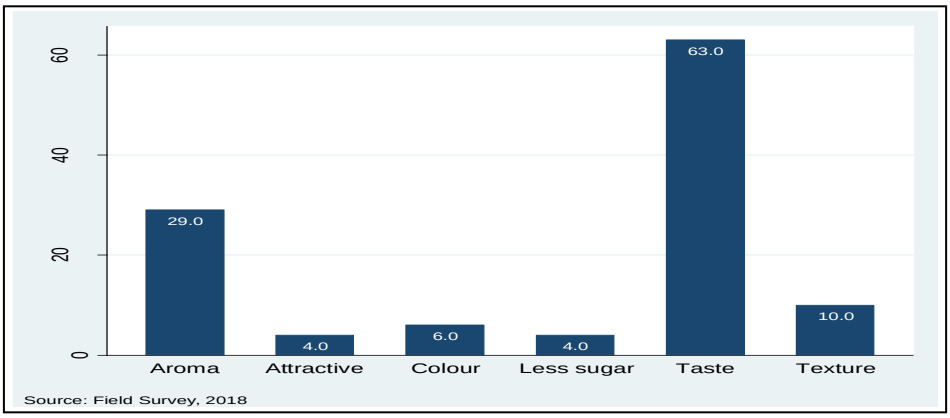


**Figure 4: Reason for the most preferred bread**

According to the respondents they preferred bread type A and B largely because of its taste (63.0%) and aroma (29.0%) as evidenced in *Figure* 4. Though not significant enough, the texture and colour of the bread also contributed to the preference by the respondents.

**Table 11: Test for association between demographic features and bread preference**

| Demographic features | Chi-square statistic |
|---|---|
| Sex of respondents | 1.27 |
| Age group of respondents | 7.57 |
| Marital status | 2.09 |
| Occupation | 13.14 |

**Table 12: Test for association between demographic features and reason for preferred bread (taste and aroma)**

| | Chi-Square Statistic | |
|---|---|---|
| Demographic features | **Aroma** | **Taste** |
| Sex of respondents | 9.00 | 3.90 |
| Age group of respondents | 19.81 | 16.65 |
| Marital status | 9.92 | 9.09 |
| Occupation | 36.92 | 26.04 |

* $p < 0.05$, ** $p < 0.01$

The results presented in

**According** to the respondents they preferred bread type A and B largely because of its taste (63.0%) and aroma (29.0%) as evidenced in *Figure* 4. Though not significant enough, the texture and colour of the

bread also contributed to the preference by the respondents.

**Table 11** and *Table* **12** shows the chi-square analysis of association between the demographic features and the type of bread preferred as well as the reason(s) for the choice of bread. At the 5% level of significance, both results do not show any significant relationship. Hence, it can be concluded that the choice of bread type as well as the reason(s) for the choices made is not influenced by the demographic characteristic of the respondent. The choices were purely made on individual basis and preference which is not linked to the social construction of the respondents neither is it linked to the biological transformation of the respondent.

**Summary of Findings**

The purpose of the study was to develop an acceptable recipe for the production of bread from composite rice bran and wheat flour. The study considered an experimental approach with three samples of treatment combinations. The first sample (A) was considered as the control where the flour was 100% wheat. The second sample (B) was a combination of 80% wheat flour and 20% rice bran whereas the third sample (C) comprise of a composition of 20% wheat flour and 80% rice bran.

Using sensory evaluation approach from respondents, the analysis of variance approach was used to analyse the data obtained in order to determine the identity as well as the difference between the three treatment samples. Of particular interest of the characteristics of the bread produced were the moisture, ash content, fat, protein and crude fibre content. Based on the correlational analysis of the characteristics of the bread produced, it was discovered that the moisture content of the bread was statistically associated with the ash content. On the other hand, the amount of crude fibre in the bread was also found to be statistically correlated to the moisture content, fat content as well as the ash content of the bread at the 5% level of significance.

There was statistical evidence to suggest that there was significant difference between the different treatment samples (A, B and C) with regards to the characteristics of the bread at the 1% level of significance. Comparing the different treatment groups using the Turkey's' method, all the treatment groups were statistically different from each other at the 5% level of significance except for the fat content in the bread flour. Specifically, the fat content in the sample that contained 100% wheat flour was not significantly different from the sample that contained the 20% flour and 80% bran flour. This implies that the 100% wheat flour could contain the same amount of fat as a nearly 100% bran flour since the amount of bran flour in the third sample was four times more than the percentage of wheat flour. It was discovered that amount of moisture in the sample that contained 80% wheat flour and 20% rice bran flour was more than the 100% wheat flour sample and the one that contained 80% rice bran flour.

With the sensory analysis, respondents of sex categories, age groups, marital status, and different categories of occupation were selected in order to have a randomised analysis of the taste, aroma, texture, colour and the taste of the bread after eating. The results of the study identified bread sample B (a composite of 80% wheat flour and 20% rice bran flour) as the most preferred bread based on its sensory characteristics. However, the taste of the bread contributed significantly to the choice of the bread sample.

**CONCLUSION**

It can be concluded from the study that the standard recipe for the production of bread from a composite of wheat and rice bran include wheat flour (80g), rice bran flour (20g), half teaspoon of salt, half teaspoon of yeast, 5g of margarine, 5g of sugar, half teaspoon of Nutmeg, and 65ml of water. However, in the evaluation of preferred bread for consumers, the sensory characteristic to be considered is the taste. Though there were significant differences in the treatment groups of the bread samples, it can be concluded that consumers are satisfied with the composition of wheat and rice bran with the amount of wheat flour in the bread being four times more than the amount of rice bran.

**REFERENCES**

1. AOAC. (1995). Official methods of analysis of the Association of Official Analytical Chemists, Cunniff P, ed. Gaithersburg, Pa: AOAC International, vol XVI
2. Bucci, R., Magrì, A. D., Magrì, A. L., & Marini, F. (2003). Comparison of three spectrophotometric methods for the determination of γ-oryzanol in rice bran oil. *Analytical and bioanalytical chemistry*, *375*(8), 1254-1259.
3. Chatelanat, R., P. (1973). Composite flour programme, FAO, Rome/Italy.
4. FAOSTAT. (2012). Database of food and agriculture organization, Rome, Italy. Viewed from (http://faostat.fao.org). Assessed 12.01.17.
5. Gong, Y., & Yao, H. (2000). "Purification and identification of γ-oryzanol from rice bran", J. Chinese Cereals and Oils Assoc., 16, 30-34.
6. Hamada, J.S. (2000). Characterization and functional properties of rice bran proteins modified by commercial exoproteases and endoproteases. Journal of Food Science, 65, 305-310.
7. Ihekoronye, A.I., & Ngoddy, P.O. (1985). Integrated Food Science and Technology. Macmilian Publishers, New York, 296-301.
8. Martin, D., E. (1994). Extrusion stabilization and near infrared analysis of rice bran. M.Sc. Thesis, Louisiana State Uni. U.S.A

9. Moldenhauer, K.A., Champagne, E. T., Caskill M., C., & Guraya, H. (2003) Functional products from rice. In: Functional Foods (Ed. G. Mazza), Technomic Publishing Co., Inc. Lancaster, 71- 89.
10. Lakkakula, N. R., Lima, M., & Walker, T. (2004). Rice bran stabilization and rice bran oil extraction using ohmic heating. *Bioresource Technology*, *92*(2), 157-161.
11. Lima, I., Guraya, H., & Champagne, E. (2002). The functional effectiveness of reprocessed rice bran as an ingredient in bakery products. *Food/Nahrung*, *46*(2), 112-117.
12. Piironen, V., Lindsay, D. G., Miettinen, T. A., Toivo, J., & Lampi, A. M. (2000). Plant sterols: biosynthesis, biological function and their importance to human nutrition. *Journal of the Science of Food and Agriculture*, *80*(7), 939-966.
13. Ramezanzadeh, F. M., Rao, R. M., Windhauser, M., Prinyawiwatkul, W., Tulley, R., & Marshall, W. E. (1999). Prevention of hydrolytic rancidity in rice bran during storage. *Journal of agricultural and food chemistry*, *47*(8), 3050-3052.
14. Ramezanzadeh, F. M., Rao, R. M., Prinyawiwatkul, W., Marshall, W. E., & Windhauser, M. (2000). Effects of microwave heat, packaging, and storage temperature on fatty acid and proximate compositions in rice bran. *Journal of agricultural and food chemistry*, *48*(2), 464-467.
15. Rodge, A.B., Sonkamble, S.M., Salve, R.V. & Syed, I.H. (2012). Effect of hydrocolloid (guar gum) incorporation on the quality characteristics of bread. J. Food Process. Technol, 3 (2), 1-7.
16. Sharif, K. (2009). Preparation of fibre and mineral enriched pan bread by using defatted rice bran. International Journal of Food Properties, 9 (4), 623-636.
17. Saunders, R.M. (1990). "The properties of rice bran as a food stuff", Cereal Foods World, 35, 632-639,
18. Tao J, Rao T and Liuzzo Z, (1993). Microwave heating for rice bran stabilization, Journal of Microwave Power and Electromagnetic Energy, 28, 156-164.
19. USDA (2015). US Department of Agriculture. US Department of Health and Human Services. Dietary Guidelines for Americans. USDA, Washington.