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Acceptability of Bread Varieties made from Wheat, Corn and Yam Flours

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Abstract

This study assessed the acceptability of varieties of bread produced using wheat, corn and yam flours. A total of 50 panellists were selected or the sensory evaluation of the products, and several techniques were adopted in producing the flours into bread. The result of sensory analysis revealed that for the different products, there was a substantial difference in the treatments measured. Wheat bread had the best taste, texture, colour, taste, and overall acceptance. The study revealed the benefit of wheat flours in the bread-making process. It is suggested that since wheat bread is widely accepted by taste panel, the government should encourage widespread wheat production in order to meet public demand and lower the high cost of wheat flour in the economy. Farmers should be well-equipped, and wheat farmers should be provided incentives such as agricultural implements and seeds to encourage them to grow wheat.

Keywords: Bread, corn, flour, wheat, yam.

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1. Introduction

Bread is an important, consistent food that is well known in Nigeria and beyond; sufficient evidence suggests that it has existed since antiquity; it is easily consumed and satisfying by all populations (Ijah, Auta, Aduloju, & Aransiola, 2014). It includes both main (carbohydrate, protein, fat) and minor (minerals, vitamins) nutrients necessary for human health. Wheat is the principal raw material used to make bread in Nigeria, which is consumed in most homes, restaurants, and public places (Ijah, *et. al.,* 2014). However, because the climatic conditions and soil did not allow wheat to be cultivated locally, the wheat flour needed to make bread had to be imported (Seibel, 2011). Because of changing eating patterns, a consistently expanding population, and the fact that a major percentage of overall higher revenues may now be spent on consumables, bread consumption has steadily increased in many developing countries (Seibel, 2011).

Wheat (Triticum aestivum) is a member of the Poaceae family and Order Poales. It is one of the most widely cultivated crops in the world, with about 237 million acres yielding about 420 million tonnes (Oyewole, C. 2016; Isitor *et al.*, 1990; Langer and Hill., 1991; Olabanji *et al.*, 2004). It accounts for not less than 20% of the calorie consumption of man (Oyewole *et al.*, 2016; Ohiagu *et al.*, 1987). Throughout the world, it is one of the important grains along with corn and rice, it is a significant grain that is high in nutrients and is used to make bread, biscuits, crumpets, muffins, noodles, pasta, pastries, and other confectionaries. (Oyewole, C. 2016). Wheat production in Nigeria is limited, thus it is imported, which is costly owing to the foreign currency rate. (Ijah, U. J. J., Auta, H. S., Aduloju, M. O., & Aransiola, S. A. 2014).

Corn, barley, cassava, and chickpea flours are among the most commonly examined for use in composite flour breads (Bushuk & Hulse, 1974; Almazan, 1990; Defloor et al., 1993; Petrofsky and Hoseney, 1995; Ali *et al*., 2000; H). Corn is a useful crop that benefits both humans and animals; it is a key ingredient in animal feed, as well as in the confectionary industry, where it is used to make bread, popcorn, cornflakes, cake, and corn oil, among other things (Kotancilar *et al.*, 2018). According to research, cornflour alone should not be utilized to form a robust dough structure because cornflour lacks gluten protein, which is the principal storage protein in wheat. (Kotancilar *et al.*, 2018; Islengu *et al.*, 2009).

Yam (Discorea spp.) is a member of the Discoreae family that includes both edible and non-edible species (Amandikwa , Iwe, Uzomah, Olawuni 2015), because some of these yam types are underutilized, product variation with Yam tuber (Discoreae) is limited, it is vital to evaluate the ability of this tuber (Yam) i.e. its flour in creating bread. (Amandikwa et al 2015). The goal of this research is to make bread from three different flours (wheat, corn, and yam) and determine the acceptability, nutritional value, and organoleptic features of the finished product.

2. Materials and Methods

The research was conducted in Hospitality Management Demonstration kitchen Ogun state. The research was qualitative in nature and involved selected staff in Hospitality Management Demonstration kitchen workers from The Federal Polytechnic in Ilaro, Ogun State.

In this study, a total of 50 respondents/panellists were employed, the information needed for the primary source was gathered using a sensory evaluation sheet using Nine (9) point's Hedonic scale, mean and standard deviation was used for the significant difference of the samples.

Processing of Yam into Flour

Yam flour is a fine powder made from the tuber of the yam after it has been processed. Harvesting, sorting, peeling, slicing, washing, blanching, drying, and milling are all steps in the yam flour production process (Adejumo *et al.*, 2013; Soro *et al.*, 2020). Yam is gathered, sorted into different sizes, peeled, the sizes of the sorted yam are decreased by slicing, the yam is then washed and blanched in boiling water for 5 minutes, the pieces of the precooked yam are then permitted to cool for 25 minutes, the yam is then dried, and finally milled. (Soro *et al.*, 2020).

Harvested Yam Tuber

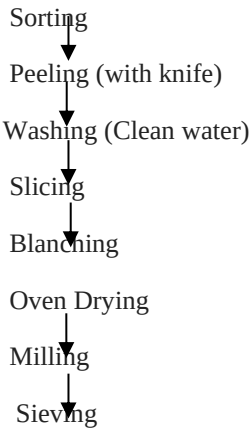

Fig. 1. Flow chart for production of yam into flour (Modified from Ayanogu, 2013 & Ukpabi, 2010).

Processing of Corn into Flour

Maize flour is a golden powder formed from dried corn that has been finely processed (Streit Lizzie, 2019). Cleaning, conditioning, and milling are all steps in the process of turning maize into flour. To avoid contamination, cleaning is done to remove all foreign elements. Conditioning is the process of adding moisture to it and allowing it to soak for a period of time in order to speed up the peeling of the bran. Prior to flour milling, the maize is de-germinated and polished. This is how germ meal, endosperm, and bran are separated. The maize is ground into flour during milling. (Ayang, 2021)

Maize
↓
Cleaning
↓
Conditioning
↓
De germination
↓
Milling

Fig 3: flow chart for production of corn flour, (Modified from Ayang; 2021;Jordaan, 2020)

Processing of Wheat into Flour

The processes involved in milling of wheat will be subsequently explained, it includes, cleaning, conditioning and milling. Cleaning removes unwanted materials and prevents contamination; conditioning toughens the germ so it can be separated from the endosperm more easily.

Wheat
↓
Cleaning
↓
Conditioning
↓
Milling

Fig 4: flow chart for production of wheat flour

Wheat flour recipes

(i) 500g wheat all-purpose plus extra for dusting.
(ii) 100g sugar
(iii) 2 tsp salt.
(iv) 7g yeast.
(v) 100g margarine.
(vi) 300ml water.
(vii) Pinch of salt.

Method of Preparation of Samples

A combination of 500g corn flour, 2 teaspoons of salt, 100g sugar, and 7g of yeast was mixed in a large stainless (mixing) bowl. A well was made in the centre of the mix and 3 tablespoon of olive oil and 300 millilitres of $H2_0$ were

added to stir. The mixture was kneaded for 10 minutes on a lightly floured work surface. The mixture was covered with a baking parchment for one hour to rise to about double of its original size. The baking oven was preheated to 2200◦F after which the dough is dusted with flour and cut with a sharp bread knife to carve to 6cm long into loaves. The dough is baked for 25-30 minutes for a golden-brown colour with a hollow when tapped at the rear. The bread is allowed to cool completely on a wire rack.

Corn Flour Recipe

(i) 500g corn flour plus extra for dusting.
(ii) 100g sugar
(iii) 2 tsp salt.
(iv) 7g yeast.
(v) 100g margarine.
(vi) 300ml water.
(vii) Pinch of salt.

Yam Flour Recipe

(i) 500g yam plus extra for dusting.
(ii) 100g sugar
(iii) 2 tsp salt.
(iv) 7g yeast.
(v) 100g margarine.
(vi) 300ml water.
(vii) Pinch of salt.

3. Results and Discussion

Table1: organoleptic analysis of the samples

Treatment	Appearance	Colour	Texture	Taste	Flavor	Overall acceptability
T1	8.32±1.02^{a}	7.80±1.77^{a}	7.88±1.17^{a}	8.24±1.20^{a}	7.96±1.43^{a}	8.24±1.42^{a}
T2	8.04±1.06^{ab}	7.52±1.39^{a}	7.28±0.89^{ab}	7.68±1.21^{b}	7.60±1.58^{a}	7.60±1.33^{a}
T3	7.52±1.29^{a}	7.40±1.66^{a}	7.12±1.39^{a}	6.84±1.57^{b}	7.32±1.89^{a}	7.52±1.71^{a}

T1=Wheat flour, T2=Corn flour, T3=Yam flour

Values are means and standard deviation (±) of three determinations (n=3) Means followed by the same letter within the same column are not significantly (p>0.05) different according to test.

Appearance

Across all treatments, all values were substantially different (P < 0.05). T1 had the greatest value (8.32±1.02), followed by T2 (8.04±1.06) (P > 0.05), and T4 had the lowest value (7.84±1.16). The lowest value (7.52±1.29) was obtained by T3. This means that the bread samples had a considerable difference in appearance.

Colour

All values were statistically significant (P< 0.05) across all treatments. T1 had the highest value (7.80±1.77), whereas T2 (7.52±1.39) compared favourably (P > 0.05) to T3, which had the lowest value (7.40±1.66). This means that there was no discernible change in the color of the bread samples.

Texture

Across all treatments, all values were substantially different (P< 0.05). T4 had the highest value (8.18±0.49) in this study, followed by T1 (7.88±1.17), with no difference between T2 (7.28±0.89) and T3 (7.12±1.39). T3 has the smallest value of 7.12±1.39. This means that there was a major textural difference in the sampled bread.

Taste

Across all treatments, all values were substantially different (P <0.05). T1 received the highest score of 8.24±1.20 as a result of this. T3, on the other hand, had the lowest value of 6.84±1.57. This revealed a substantial taste variation between the breads.

Flavour

All values were statistically significant (P <0.05) across all treatments. T1 had the greatest score of 7.96±1.43, while T3 had the lowest score of 7.32±1.89. This suggests that there was no discernible flavor difference between the breads.

General Acceptability

Across all treatments, all values were statistically identical (P 0.05). T3 (7.52±1.71) has a better score than T2 (7.60±1.33). T1 had the highest value of 8.24±1.42 points.

DISCUSSION

The research examines the organoleptic qualities of bread made from wheat, corn, and yam flour mixtures. Descriptive statistics, such as mean and standard error, were used to analyse the data. Furthermore, at a 5% level of significance, also known as Completely Randomized Design (CRD), was performed to see if there was a significant difference in the treatments for any of the parameters. The results of the sensory evaluation's analysis revealed that there was a significant difference in the treatments tested for some of the parameters in this study (i.e. P < 0.05). It can be deduced from this research that the wheat bread colour is highly acceptable by the respondents in this research study and is closely or relatively the same colour using all-purpose flour. Also it was revealed in this study that T1 which is wheat flour has a fine texture followed by the corn flour which is T2 in this research came out with a good texture when compared with other samples used in this study. Furthermore, across all treatments, all values were substantially different in the taste. Wheat flour representing T1 in this study has the highest and the greatest value making it more acceptable by the respondents to be used as flour blends or as substitute flour in bread making for human consumption. The taste of the wheat flour which represents T1 in this study tends to come out better and finer compared to other samples with bland or no taste which is in conformity with (Bibiana Dooshima Igbabul *et al.,* 2019) findings. Lastly, wheat flour is generally accepted by the respondents in all ramifications; this finding corroborates with the findings of (Bibiana Dooshima Igbabul *et al.,* 2019) that wheat flour is most preferred in all sensory attributes.

4. Conclusion

Finally, in terms of apperance, color, texture, taste, and flavor, wheat flour bread has the best overall acceptability. As a result of this, producers should focus more on wheat growing for mass consumption thereby increasing its utilization in bakeries and industries for consumer.

References

Abdelghafor, R. F., Mustafa, A. I., Ibrahim, A. M. H., & Krishnan, P. G. (2011). Quality of bread from composite flour of sorghum and hard white winter wheat. *Advance Journal of Food Science and Technology* 3, 9-15.

Ahmed, A. R., Mohammed, I., & Senge, B. (2012). Oscillation measurement and creep test of bread prepared from wheat-lupin flours and wheat flour-lupinfibre dough's blends. *Annual Transactions of the Nordic Rheology Society* 20.

Akanbi, T. O., Nazamid, S., Adebowale, A. A., Farooq, A., & Olaoye, A. O. (2011). Breadfruit starch-wheat flour noodles: preparation, proximate compositions and culinary properties. *International Food Research Journal* 18, 1283-1287.

Ali. H. K., Esam H. M., and Fathy M. D. 2000. Influence of malt on rheological and baking properties of wheat cassava composite flours. Lebensmittel-Wissenschaft and Technological 33, 159-164

Amandikwa, C., Iwe, M.O., Uzomah, A., & Olawuni, A.I. (2015) Physico-chemical properties of wheat-yam flour c omposite bread, Nigerian *Food Journal*, 33(1), 12-17.

Alfin F. (2020). Wheat Conditioning and Tempering retrieved on 19th October from http://millermagazine.com/english/wheat-conditioning-and-tempering/

Adejumo, B. A., Okundare, R. O., Afolayan, O. I., & Balogun, S. A. (2013). Quality attributes of yam flour (elubo) as affected by blanching water temperature and soaking time. *Int J Eng Sci*, *2*(1), 216-221.

Almazan, A.M. 1990. Effect of cassava flour variety and concentration on bread loaf quality. Cereal Chemistry 67, 97-99.

Ayang, Best Complete Machinery (2021) retrieved from http://www.flourmillmachine.com

Begum, R., Uddin, M. J., Rahman, M. A., & Islam, M. S. (2013). Comparative study on the development of maize flour based Composite bread. *Journal of the Bangladesh Agricultural University*, 11(1), 133–139.

Bibiana, I., Grace, N., & Julius, A. (2014). Quality evaluation of composite bread produced from wheat, maize and orange fleshed sweet potato flours. *American Journal of Food Science and Technology*, *2*(4), 109-115.

Bushuk, W. and Hulse, J.H. (1974). Dough development by sheeting and its application to bread production from composite flours. *Cereal Science Toda,y* 19: 424-427.

Defloor, I., Nys, M. and Delcour, J. A. (1993). Wheat starch, cassava starch, and cassava flour impairment of the bread making potential of wheat flour. *Cereal Chemistry*, 78, 525–530.

Ijah, U. J. J., Auta, H. S., Aduloju, M. O., & Aransiola, S. A. (2014). Microbiological, nutritional, and sensory quality of bread produced from wheat and potato flour blends. *International journal of food science*, *2014*.

Isitor, S.U., Poswal, M.A.T., Shebayan, J.A.Y., & Yakubu, R.Y. (1990). The accelerated wheat production programme in Nigeria: A case study of Bauchi State. In: Olabanji, O.G., Omeje, M.U., Mohammed, I., Ndahi, W.B. & Nkema, I. (2007). Wheat In Cereal Crops of Nigeria: Principles of Production and Utilization, xxii, 337 (Idem, N.U.A. and F.A. Showemimo edited) pp 230 – 249.

İşleroğlu H, Dirim, S.N.,& Ertekin FK (2009). Gluten İçermeyen, Hububat Esaslı Alternatif Ürün Formülasyonları ve Üretim Teknolojileri. GIDA, 34, 29-36.

Kihlberg, I. (2004). Sensory quality and consumer perception of Wheat bread: Towards sustainable production and consumption. Effects of farming system, year, technology, information and values (Doctoral dissertation, Acta Universitatis Upsaliensis).

Jordaan J. (2020). A simple breakdown of milling process, Retrieved on 19th of October, 2021 from http://blog.roff.co.za/blog/maize.

Kotancılar, H. Güdük, H and Seyyedcheraghi, K "The effect of the using corn flour level and additive type on qualit y of corn bread", *Dicle Üniversitesi Fen Bilimleri Enstitüsü Dergisi*, 7(3), 102-115

Langer, R.H.M and Hill, G.D (1991). Physiological Basis of Yield: Agricultural Plants, Cambridge University Press,

Mepba, H., Eboh, L., and Nwaojigwa, S. U. 2011. Chemical composition, functional and baking properties of wheat-plantain composite flours. *African Journal Food, Agriculture, Nutrition and Development* 7, 1–22.

Ohiagu, C.E., Ahmed, A. Orakwe, F.C., Maurya, P., Ajayi, O., Falaki, A. & Kaul, N. (1987). A National Wheat Production Strategy: 1987 – 1996. Prepared by Cereal Research Programme, IAR, ABU, Zaria for FACU 67pp

Olabanji, O.G., Omeje, M.U., Mohammed, I., Ndahi, W.B., & Nkema, I. (2007). Wheat. In Cereal Crops of Nigeria: Principles of Production and Utilization, xxii, 337 (Idem, N.U.A. and F.A. Showemimo edited) pp 230 – 249.

Oyewole, C. (2016). *The wheat crop* (pp. 1-16). Technical report, Department of Crop production, Faculty of Agriculture, Kogi state University.

Papageorgiou, M., & Skendi, A. (2018). Introduction to cereal processing and by-products. In Sustainable Recovery and Reutilization of Cereal Processing By-Products. *Woodhead Publishing*, 1-25

Petrofsky, K.E. and Hoseney, R.C. 1995. Rheological properties of dough made with starch and gluten from several cereal sources. *Cereal Chemistry*, 72, 53-58.

Soro, S., Kouassi, K. J. D., Konan, H. K., & Kouadio, E. J. (2020). Appropriate Ratio of Wild Yam (D. praehensilis) Flour To Add To Wheat Flour For Breadmaking Process. *European Journal of Biology and Biotechnology*, *1*(2).

Streit Lizzie, (2019) Corn starch vs Cornfour. Retrieved on 18th from http://www.health.com>nutrition.

Siebel, W. (2011). Future of flours – composite flours.*Downloaded from www.muehlenchemie.de/ downloads-future-of-flours/fof_kap_16.pdf on 3/12/2011*.

Ukpabi, U. J. (2010). Farmstead Bread Making Potential of Lesser Yam ('Dioscorea esculenta') Flour in Nigeria. *Australian journal of crop science*, *4*(2), 68-73.

Wronkowska, M., Troszyńska, A., Soral-Śmietana, M. and Wołejszo, A. 2008.Effects of buckwheat flour (*FagopyrumEsculentum*Moench) on the quality of gluten-free bread. *Polish Journal Food Nutrition Science* 58(2), 211-216.