

Proximate Composition and Functional Properties of Wheat and Yeast Fermented Rice Bran Flour Blends

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Introduction

Recently, there is growing demand for healthy food such as products with high fiber content and low calorie [1]. Dietary fiber has a number of important physiological and metabolic functions in the human body [2]. Cereal brans are functional ingredients with high nutritive and potential health properties [3]. Fermentation of bran with baker's yeast improved the nutritional, physical and flavour properties of bran, and could be incorporated as a functional ingredient in refined wheat flour [4].

Yeast fermented rice bran flour is rich in bioactive ingredients [5]. However, there is paucity of information on the proximate composition and selected functional properties of wheat and yeast fermented rice bran flour blends. Therefore, this study investigated the effect of substitution of yeast fermented rice bran in wheat flour on the proximate composition and some selected functional properties of the flour blends

Materials and Methods

Rice brans were procured from a commercial rice milling plant in Minna, Niger State, Nigeria while wheat flour (Golden penny) was purchased from Minna, Central market, Minna, Nigeria. Yeast fermented rice bran flour was prepared at optimized conditions as reported by Chinma et al.^[5]. Wheat and yeast fermented rice bran flour were blended at different proportions (100:0; 90:10; 80:20 and 70:30 %) where 100 % wheat flour served as control. Proximate composition and functional properties of flour blends were determined using standard methods. Data obtained were subjected to analysis of variance (ANOVA).

Results and Discussion

The proximate and functional properties of wheat and yeast fermented rice bran flour blends are presented in Table 1. Substitution of yeast fermented rice bran flour in wheat flour significantly increased the protein, ash, crude fiber and fat contents of composite flours while carbohydrate content decreased. The significant increase in protein, ash, fat and crude fiber contents of the composite blends could be attributed to addition effect, since 100 % yeast fermented rice bran flour contained higher fat, crude fiber and ash contents than 100 % wheat flour. The composite blends could be used in food formulation considering their high protein, ash and low carbohydrate content. Similarly, substitution of yeast fermented rice bran flour in wheat flour significantly increased the water and oil absorption capacity, foam capacity and emulsion activity of the flour blends. The increased functional properties of composite flour compared to 100 % wheat flour could be due to higher protein content of the composite blends compared to 100 % wheat flour.

Conclusion

Wheat and yeast fermented rice bran flour blends have improved proximate and functional properties which are desirable in baked products.

References

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Table 1: Proximate composition and selected functional properties of wheat and yeast fermented rice bran flour blends

	100WF	100YFRB	90WF:10YFRB	80WF:20YFRB	70WF:30YFRB
Proximate composition					
Moisture (%)	10.05+0.33 ^c	11.78+0.20 ^b	11.10+0.10 ^{ab}	11.46+0.42 ^a	12.75+0.05 ^c
Protein (%)	12.20+0.12 ^c	18.57+0.34 ^b	14.81+0.10 ^d	17.07+0.54 ^c	19.50b+0.23 ^a
Ash (%)	1.64+0.04 ^c	6.50+0.11 ^a	2.02+0.03 ^d	2.42+0.15 ^c	3.15a+0.06 ^b
Crude fiber (%)	1.12+0.10 ^e	7.03+0.04 ^a	2.50+0.05 ^d	3.55+0.10 ^e	4.70+0.40 ^b
Fat (%)	3.17+0.04 ^e	11.28+0.10 ^a	5.90+0.15 ^d	6.13+0.10 ^e	7.40+0.60 ^b
Carbohydrate (%)	71.82+0.50 ^a	44.84+0.43 ^e	62.67+1.03 ^b	61.37+0.77 ^c	56.48+0.84 ^d
Functional properties					
Water absorption capacity (g/g)	1.14+0.03 ^c	4.82±0.11 ^a	2.46+0.09 ^d	3.10+0.12 ^c	3.68+0.05 ^b
Oil absorption capacity(g/g)	1.03+0.01 ^c	3.85±0.08 ^a	1.91+0.03 ^{ab}	2.45+0.01 ^b	2.51+0.02 ^b
Foam capacity (%)	15.29+0.71 ^c	33.20±0.15 ^a	18.75+0.55 ^d	21.19+0.47 ^c	22.40+0.89 ^b
Emulsion activity (%)	52.90+0.84 ^b	75.13±0.22 ^a	51.77+0.50 ^c	49.60+0.80 ^d	47.51+0.65 ^e

Mean and standard deviation of three determinations

Values in the same row with different superscript are significantly ($p \leq 0.05$) different

100WF= 100 % wheat flour

100YFRB= 100 % Yeast fermented rice bran flour

90WF:10 YFRBF = 90 % wheat flour: 10 % Yeast fermented rice bran flour

80WF: 20YFRBF = 80 % wheat flour: 20 % Yeast fermented rice bran flour

70WF: 30YFRBF= 70 % wheat flour: 30 % Yeast fermented rice bran flour