

# Quality evaluation of maize and edible mushroom based formulated food products

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## Introduction

Sprouting and/ or natural fermentation have been employed for improving the nutritional and keeping quality of some traditional food products (1,2,3). Legumes such as soybeans and cowpeas have higher lysine and sulphur amino acids content than most cereals and have been used to complement maize in diets for human nutrition. The high local and industrial demands for these legumes have resulted in their scarcity and high price. The edible mushroom (*Preuotus ostreatus*), which can be grown easily on simple substrata and at both industrial and home scale, has protein quality and quantity that is comparable with those of some of the legumes. The objective of this study therefore was to evaluate the physiochemical, nutritional, microbiological and sensory properties of mixtures of edible mushroom and sprouted and/or naturally fermented maize.

## Materials and Methods

Four products consisting of sprouted-fermented maize + mushrooms (SFMR), non-sprouted fermented maize+ mushroom (NSFR), sprouted non-fermented maize + mushroom (SNFMR) and non-sprouted non-fermented maize+ mushroom (NSNFMR) were each prepared to contain about 16g protein/100g sample. Protein efficiency ratios (PER), net protein ratios (NPR), taste, overall acceptability, total plate counts, and yeast + mould counts were evaluated.

## Results and Discussion

From Table 1, it can be seen that sprouting and/or natural fermentation of maize when mixed with edible mushroom resulted in significant ( $p < 0.05$ ) increase in PER, NPR and apparent digestibility of the formulation. As expected, the bulk density and microbial load of products from NSNFMR were higher than those containing sprouted and/or fermented maize. The SNFMR was rated higher than the other products in terms of taste and overall acceptability.

## Conclusion

Sprouting and/or natural fermentation of maize could be used to improve the nutritional quality of maize and edible mushroom based formulated food products.

## References

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**Table 1. Quality parameters of various maize plus edible mushroom products**

Quality Parameter	NSNFMR	NSFMR	SNFMR	SFMR
Moisture (g/100g solid)	10.4 <sup>a</sup>	9.7 <sup>a</sup>	9.8 <sup>a</sup>	9.8 <sup>a</sup>
Protein (g/100g solid)	16.3 <sup>b</sup>	16 <sup>d</sup>	16.1 <sup>b</sup>	16.2 <sup>b</sup>
Crude Fat (g/100g solid)	3.4 <sup>c</sup>	3.2 <sup>c</sup>	3.0 <sup>c</sup>	2.8 <sup>c</sup>
Ash (g/100g solid)	1.4 <sup>d</sup>	1.4 <sup>d</sup>	1.3 <sup>d</sup>	1.2 <sup>d</sup>
Total Carbohydrate (g/100g solid)	68.5 <sup>e</sup>	69.3 <sup>e</sup>	69.8 <sup>e</sup>	70.0 <sup>e</sup>
Pack bulk density (Kg/m <sup>3</sup> )	0.63 <sup>f</sup>	0.40 <sup>g</sup>	0.42 <sup>g</sup>	0.38 <sup>h</sup>
PER	0.83 <sup>i</sup>	1.12 <sup>k</sup>	1.05 <sup>k</sup>	1.87 <sup>k</sup>
NPR	2.35 <sup>l</sup>	2.56 <sup>m</sup>	2.60 <sup>n</sup>	2.83 <sup>n</sup>
Apparent Digestibility (%)	64 <sup>p</sup>	70 <sup>q</sup>	75 <sup>r</sup>	88 <sup>t</sup>
Total Plate Count (cfu/g)	1.8 x 10 <sup>5</sup>	2.8 x 10 <sup>6</sup>	1.5 x 10 <sup>6</sup>	1.0 x 10 <sup>6</sup>
Yeast + Mould (cfu/g)	2.2 x 10 <sup>4</sup>	1. x 10 <sup>5</sup>	0.5 x 10 <sup>5</sup>	0.2 x 10 <sup>5</sup>
*Flavour	3.3 <sup>a</sup>	3.5 <sup>a</sup>	3.6 <sup>a</sup>	3.3 <sup>a</sup>
*Taste	3.8 <sup>c</sup>	4.4 <sup>b</sup>	4.9 <sup>b</sup>	3.9 <sup>c</sup>
*Over all Acceptability	3.8 <sup>v</sup>	3.7 <sup>v</sup>	5.0 <sup>w</sup>	4.8 <sup>y</sup>

Values with common superscript letters within each row are not significantly ( $p > 0.05$ ) different.

NSNFMR = Non sprouted non fermented maize + mushroom  
 NSFMR = Non sprouted fermented maize + mushroom  
 NFSMR = Non fermented sprouted maize + mushroom  
 SFMR = Sprouted and fermented maize + mushroom as 7 = excellent

\* Based on a scale of 1 to 7 with 1 = very poor, and 7 = excellent

high blood pressure  
 anti bacterial.  
 cholesterol reducer.  
 immuner enhancer e.t.c.