

Nutritive Value Evaluation of Mushroom Fortified Indian Recipes

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Abstract

Mushrooms are a high valued source of nutrition and mineral constituents which are of paramount importance in the present age. Mushroom powder was prepared by oven dried method. After that two products mathari and rava idli were prepared using mushroom powder. Bio-chemical analysis of rava idli and mathari revealed that 20% fortification of mushroom powder in these products retained high amount of protein and fibre and low amount of fat and carbohydrate than control sample. Idli and mathari are famous Indian dish and mushroom fortification improve there nutritive value as high in protein content, appreciable amount of fat, energy value and fibre content. So, both can be suggested for pre-schooler and school going children in their tiffin box and for fever, burn, trauma, diabetic and heart and post operative patients because of its high nutritive value.

Keywords: Oyster mushrooms (*Pleurotus sajor caju*); Indian recipes; Fortification; Malnutrition; Nutritive value; Rava; Besan; Refined flour.

Introduction

Mushrooms have been recognized as most loved vegetarian food, rich in nutrition, particularly protein. With their flavour, texture, nutritional value, very high productivity per unit area and time, less dependence on land and ability to grow on a variety of residual agricultural wastes, mushrooms have rightly been identified as a food source to fight malnutrition in developing countries.[1] Mushrooms are of excellent food value as they provide a full protein food containing all the twenty one amino acids besides containing useful amount of fats, vitamins and minerals. Mushroom protein being easily digestible (70-90%) is considered superior to vegetable proteins.[2] Two essential

amino acids lysine and tryptophan are enormously present in mushrooms which are not found in cereals. Being low in caloric value (300 – 390 Kcal/100 g dry wt), low fat and high protein, they are considered as 'delight of diabetic patients'.[3] Folic acid and Vitamin B-12 which are normally absent in vegetarian foods are present in mushrooms (3 g fresh mushroom can supply 1 micro g vitamin B12, recommended for daily uptake).[4]

The present study was carried out in the Department of Food Science and Nutrition, M.A.B. college of Home Science, C. S. Azad University of Agriculture and Technology, Kanpur.

Research Methodology

Development of Products

1. *Preparation of Rava Idli:* Fortified rava idli in which rava+besan was replaced by mushroom powder at different levels as 5%, 10%, 15% and 20% were prepared.

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Method:

- Rava and besan (2:1 ratio) was taken in a bowl.
- 2 tsp. of curd was added in it and also water if necessary.
- Slurries was combined to form a thick batter and mixed well.
- Salt for seasoning (Approximately 1% v/v) was added in batter.
- Then, the batter was kept at room temperature over night for fermentation. After desired fermentation, the batter was poured into small cups in idli cooker.
- Then it was steamed for 10 minutes.

2. *Preparation of Mathari:* Fortified mathari in which refined flour was replaced by mushroom powder at different levels as 5%, 10%, 15% and 20% were prepared.

Method:

- Refined flour was taken and sieved.
- Salt and ajwain was added in flour.
- Then hydrogenated fat was added and mixed well.
- All ingredients were kneaded into soft dough using required water and then equal sizes of balls were made by them.
- Balls were made into different shape as like and then deep fried.

Nutritive Value of Prepared Products

The prepared samples were analyzed for nutritive value as protein, fat, carbohydrate, fiber and ash using standard procedure.

Statistical Analysis

The data obtained in the present investigation were tabulated statistically by using CRD (Completely Randomized Design).

Research findings and Discussion*1. Mean Score of Nutritive Value of Mushroom Fortified Rava Idli*

The data of mean score were tabulated and analyzed statistically; result and discussion has been presented in Table 1.

Protein Profile: Table 1 shows that mean score of protein content in control sample was 11.76, while the mean value of protein of T₁(5%), T₂(10%), T₃(15%) and T₄(20%) fortified products were 12.57, 12.89, 13.44 and 13.98 respectively. T₄(20%) sample was found highly significant in respect to protein content than control and other fortified products. It is clear from the table that protein content of 20% fortified product was higher than control and other fortified products which means that the protein content of products were increases as the level of fortification of mushroom powder increased in rava idli.

Fat Profile: It is evident from the table1 that the mean score of fat content in control sample of rava idli was 2.5 whereas the mean score of fat for T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 2.46, 2.39, 2.30 and 2.24 respectively. A perusal of data presented in table indicates that control and mushroom fortified products were significant to each others. The fat content of fortified products was decreased in some amount with increase in level of mushroom fortification. 20% fortified sample had contain less amount of fat than control and other fortified products.

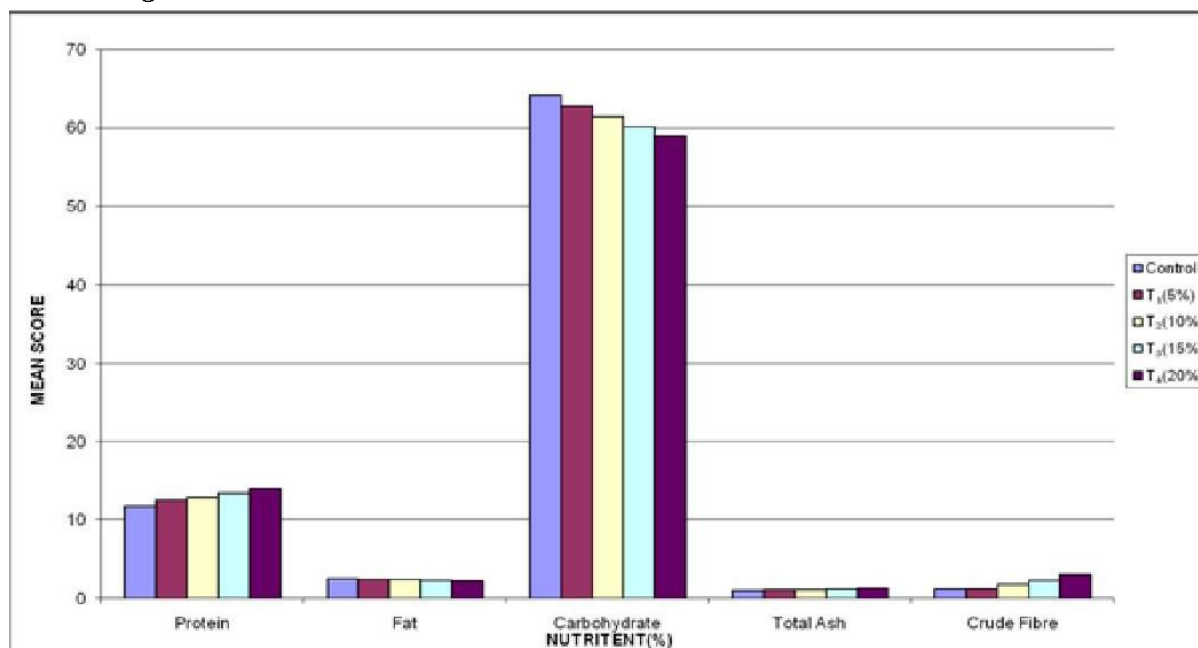
Carbohydrate Profile: Table 1 indicates that the mean score of carbohydrate content in control sample was 64.10 whereas for T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 62.69, 61.4, 60.40 and 60.12 respectively. The above table shows that control and fortified products were highly significant at the level of 5% critical difference. Table reveals that as the level of fortification of mushroom powder in rava idli increased, the carbohydrate content of products was decreased. It means that carbohydrate content

Table 1: Mean Score of Nutritive Value of Mushroom Fortified Rava Idli. (In per 100g)

S. No.	Study Group Products	Nutrients					Mean
		Protein (%)	Fat (%)	Carbohydrate (%)	Total Ash (%)	Crude Fibre (%)	
1.	Control	11.76	2.5	64.1	0.98	1.2	16.11
2.	T ₁	12.57	2.46	62.69	1.07	1.26	16.01
3.	T ₂	12.89	2.39	61.4	1.15	1.79	15.92
4.	T ₃	13.44	2.3	60.12	1.22	2.37	15.89
5.	T ₄	13.98	2.24	58.84	1.29	3.02	15.87
	Mean	12.93	2.39	61.43	1.14	1.93	

NOTE: T₁: 5% level of mushroom fortification,
T₃:15% level of mushroom fortification,

T₂: 10% level of mushroom fortification
T₄:20% level of mushroom fortification

Figure 1: Mean Score of Nutritive Value of Mushroom Fortified Rava Idli

of fortified products was lower than control sample.

Crude Fibre Profile: It is evident from the table 1 that the mean score of crude fibre content in control sample was 1.2 whereas for T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 1.26, 1.79, 2.37 and 3.02 respectively. The above table shows that crude fibre content of control and fortified samples were highly significant. The fibre content of 20% fortified product was higher than control and other fortified products which reveals that the fibre content of products were significantly increased as the level of fortification of mushroom powder was increased in rava idli.

Total Ash Profile: Table 1 shows that mean

score of total ash content in control sample was 0.98, while the mean score of T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 1.07, 1.15, 1.22 and 1.29 respectively. The above table indicates that there were slight differences in total ash content between control and fortified products but the mean score of total ash content was high in T₅(20%) sample. It is concluded that T₄(20%) mushroom fortified rava idli had highest ash content.

2. Mean Score of Nutritive Value of Mushroom Fortified Mathari

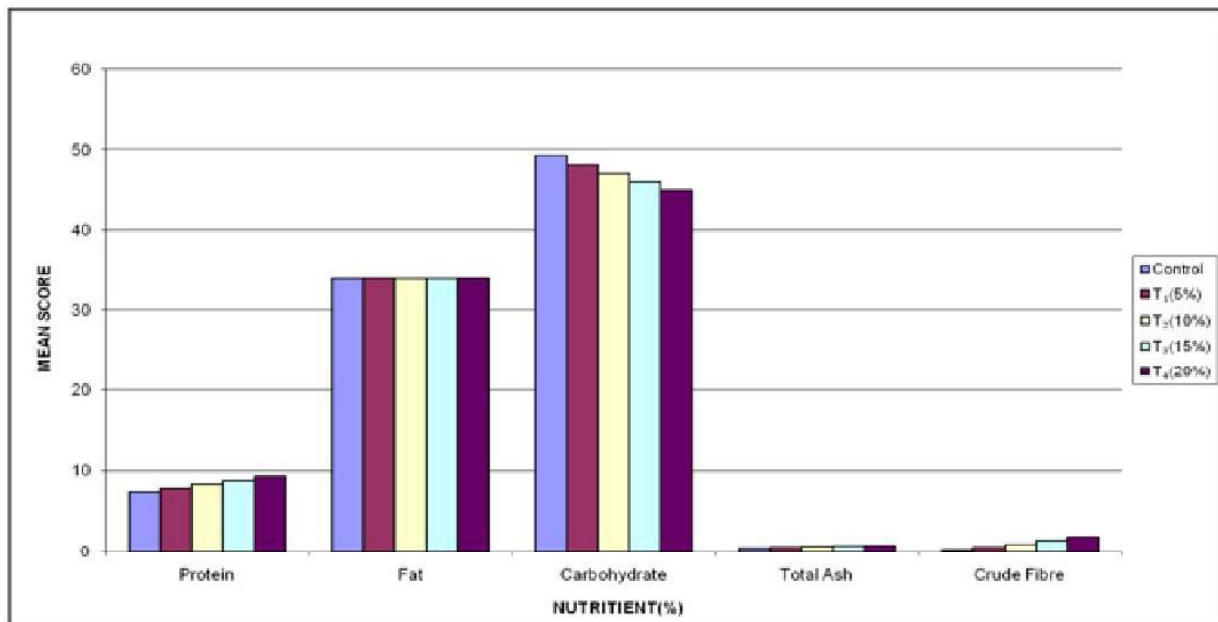
The data of mean score were tabulated and analyzed statistically; result and discussion has

Table 2: Mean Score of Nutritive Value of Mushroom Fortified Mathari (In per 100g)

S. No.	Study Group Products	Nutrients					Mean
		Protein (%)	Fat (%)	Carbohydrate (%)	Total Ash (%)	Crude Fibre (%)	
1.	Control	7.3	33.93	49.27	0.4	0.2	18.22
2.	T ₁	7.8	33.94	48.16	0.47	0.45	18.16
3.	T ₂	8.26	33.94	47.07	0.54	0.9	18.14
4.	T ₃	8.73	33.95	45.98	0.62	1.35	18.13
5.	T ₄	9.2	33.95	44.88	0.69	1.8	18.10
	Mean	8.26	33.94	47.07	0.54	0.94	

NOTE: T₁: 5% level of mushroom fortification,
T₃:15% level of mushroom fortification,

T₂: 10% level of mushroom fortification
T₄: 20% level of mushroom fortification

Figure 2: Mean Score of Nutritive Value of Mushroom Fortified Mathari

been presented in Table 2.

Protein Profile: Table 2 shows that mean score of crude protein content in control sample was 7.3, while the mean value of protein of T₁(5%), T₂(10%), T₃(15%) and T₄(20%) fortified products were 7.8, 8.26, 8.73 and 9.2 respectively. Table indicates that products were found significantly differed from each others. T₄(20%) sample was found highly significant in respect to protein content than control and other fortified products. It is clear from the table that protein content of 20% fortified product was higher than control and other fortified products.

Fat Profile: It is evident from the table 2 that the mean score of fat content in control sample was 33.93 whereas the mean score of fat for

T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 33.94,33.94,33.95 and 33.95 respectively. A perusal of data presented in table indicates that control and mushroom fortified products were highly non significant to each others.

Carbohydrate Profile: Table 2 indicates that the mean score of carbohydrate content in control sample was 49.27 whereas for T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 48.16, 47.07, 45.98 and 44.88 respectively. The above table shows that control and fortified products were significant at the level of 5% critical difference. Table reveals that as the level of fortification of mushroom powder in mathari was increased, the carbohydrate content of products was

decreased.

Fibre Profile: It is evident from the table 2 that the mean score of crude fibre content in control sample was 0.2 whereas for T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 0.45, 0.9, 1.35 and 1.80 respectively. The above table shows that crude fibre content of control and fortified samples were significant. It means that they were differed from each other. The fibre content of 20% fortified product was higher than control and other fortified products which reveals that the fibre content of products were increased as the level of fortification of mushroom powder was increased in mathari.

Total Ash Profile: Table 2 shows that mean score of total ash content in control sample was 0.4, while the mean score of T₁(5%), T₂(10%), T₃(15%) and T₄(20%) mushroom fortified products were 0.47, 0.54, 0.62 and 0.69 respectively. Table indicates that there were slight differences in total ash content between control and fortified products but the mean score of total ash content was high in T₄(20%) sample.

Conclusion

The nutrient analysis of products (Mathari and Rava Idli) concluded that the nutritive value of products can be increased with fortification of mushroom powder at different

increasing level as 5%, 10%, 15% and 20%. In all prepared products the protein and fibre content increases and fat and carbohydrate content decreases with increase in the mushroom powder fortification level. The substitution of mushroom powder showed significant contribution of amino acids and increases the Biological Value and Digestibility Coefficient. Hence the developed supplementary foods are recommended in the diet of vulnerable groups to overcome protein malnutrition. The study suggests that mushroom powder can be used for fortification in Indian traditional recipes because of its exotic flavour and nutritive value similar to the products which is prepared by fresh mushroom.

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