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Research Article

DEVELOPMENT AND SENSORY EVALUATION OF MUSHROOM FORTIFIED NOODLES

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ABSTRACT
The present study was conducted to prepare the mushroom fortified noodles as influenced by different levels of mushroom powder. Mushroom fortified noodles were prepared by fortifying mushroom powder in different levels to the Noodle flour, whereas noodles prepared out of noodle flour were kept as control. Among the different treatments 10 per cent mushroom powder along with 0.2 percent vanilla flavour recorded highest scores for organoleptic parameters like colour and appearance, flavour, crispness, taste and overall acceptability even upto 30 days of storage. Whereas it is on par with fortification of 10 percent mushroom powder along with 0.2 percent strawberry flavour. 10 percent mushroom powder along with 0.2 percent vanilla or strawberry flavour was better for fortification in preparation of mushroom fortified biscuits.

INTRODUCTION
Mushrooms containing about 90 per cent are a rich source of proteins having most of the essential amino acids in good proportions (Matilla *et al*., 2002), besides minerals and vitamins. In India, white button mushroom (*Agaricus bisporus)*, Oyster mushroom (*Pleurotus sajor-caju)* and the paddy straw mushroom (*Volveriella volvaceae)* are commercially grown. White button mushrooms contributes 90 per cent of the total production (Kaushal and Sharma, 1995) Agaricus on fresh weight basis contains 2.9 per cent crude protein 5 percent carbohydrate, 0.9 per cent crude fibre, 0.8 per cent ash and 0.3 per cent fat (Rai, 1995) K and P are the dominant elements among the minerals. K to Na ratio found in mushrooms is desirable for hyper tension patients (Chang and Miles, 1989).

Mushrooms are highly perishable because of their high moisture content and delicate nature and cannot be stored for more than 24 hour at ambient temperature (25 to 30^0C). The white button mushrooms are low in calorie, where the carbohydrates are stored as glycogen.Chitin, Hemicellulose instead of starch (Matilla *et al.,* 2002). Mushrooms are deliciously paetable non-conventional source of protein, which can bridge the protein gapping in Indian diet. The study was undertaken to see the effect of incorporation of mushroom powder on sensory quality of noodles.

MATERIALS AND METHODS
Pre-treated oyster mushrooms with one per cent KMS, along with 0.5 per cent citric acid were dried for 10 hours and ground into powdered form, grounded mushroom powder were used for fortification in noodle flour. The treatments for preparation of mushroom fortified noodles were as follows.

Treatment Details

T_1 - Noodle flour + 5% mushroom powder
T_2 - Noodle flour + 10% mushroom powder
T_3 - Noodle flour + 15% mushroom powder
T_4 - Noodle flour + 20% mushroom powder
T_5 – Noodle flour (control)

The mushroom fortified noodles were prepared by mixing the noodle flour with specified amount of mushroom powder as mentioned in the treatments. All the ingredients were dry mixed and kneaded with water (78%) into dough. The dough was covered with wet muslin cloth and kept at 28 to 30^0C for 30 minutes for seasoning. Then dough was passed through manual vermicelli machine (200g capacity with

hole size 3 mm) sun dried and packed in a HDPE polythene bags (400 gauges). The dried and cooked noodles were kept for organoleptic evaluation. The ingredients and method for preparation of cooked noodles by taking 100g of dried noodles for each treatment were boiled in 2 tea spoonful of noodle masala (Kwality), 2 tea spoonful of refined oil, a pinch of salt and chili powder were added to the water for preparation. Organoleptic evolution of mushroom fortified noodles were carried out by a panel 10 semi trained judges including teachers and post graduate students of Kittur Rani Chennamma College of Horticulture Arabhavi. The organoleptic characters *viz.*, colour and appearance, texture, taste and overall acceptability of dried mushrooms and mushroom fortified noodles, whereas colour and appearance, texture, taste and overall acceptability of mushroom fortified noodles were evaluated on five point hedonic scale (Ranganna, 1986). The mean score given by ten judges were used for statistical analysis.

RESULTS AND DISCUSSION

The data pertaining to the organoleptic evaluation of mushroom fortified noodles was influenced by different treatments were presented in Table 1.

Table 1: Organoleptic evaluation of mushroom fortified noodles for colour, flavour, crispiness, taste and overall acceptability (scores out of 5)

Treatments	Colour and appearance	Texture	Taste	Overall acceptability
T_1 - Noodle flour + 5% mushroom powder	3.80	3.40	3.40	3.45
T_2 - Noodle flour + 10% mushroom powder	3.70	3.60	3.65	3.60
T_3 - Noodle flour + 15% mushroom powder	3.60	4.10	4.30	4.15
T_4 - Noodle flour + 20% mushroom powder	3.20	3.95	4.10	4.05
T_5 – Noodle flour (control).	4.50	2.90	3.00	2.90
Mean	3.76	0.38	0.39	0.38
S.Em±	0.12	0.12	0.12	0.12
CD @1%	0.56	0.54	0.55	0.54

The data on texture reveals that there were significant differences among the treatments. Significantly higher score for texture was recorded in noodle flour along with fortification with 15 per cent mushroom powder (4.10), which was on par with noodle flour along with fortification with 20 per cent mushroom (3.95) whereas lowest score were recorded in control (2.90). Significantly higher score for taste was recorded in noodle flour along with fortification with 15 per cent mushroom (4.30), which was on par with noodle flour along with fortification with 20 per cent mushroom (4.10) whereas lowest score were recorded in control (2.90).

The data on overall acceptability of mushroom fortified biscuits revealed that there were significant differences among the treatments. Significantly higher score for overall acceptability was recorded in noodle flour along with fortification with 15 per cent mushroom (4.15), which were on par with noodle flour along with fortification with 20 per cent mushroom (4.05) lowest score were recorded in control (2.90).

Organoleptic evaluation of mushroom fortified noodles was influenced by different levels of fortification of oyster mushroom powder (Table 1). Higher score for colour and appearance (4.50) was obtained in control prepared by noodle flour alone. Whereas, higher score for texture (4.10), taste (4.30) and overall acceptability (4.15) was observed in treatment containing noodle flour along with 15 per cent mushroom

powder, followed by noodle flour along with 20 per cent mushroom powder. Higher concentration of mushroom powder which gave bitter taste after eating exhibited lower score for colour, while lower concentrations did not shown any difference in organoleptic evaluation, these results are in agreement with the results of Devina *et al.,* (2008) reported that mushroom noodles of good organoleptic qualities were obtained in the treatment containing 20 g mushroom powder, 38 g wheat flour, 20 g of potato flour, 0.2 g of baking powder and two ml of edible oil in the preparation of button mushroom noodles.

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