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Optimization of mushroom fortified noodles on their sensory attributes

[1] Vimal Archana, [2] Singh Neetu

[1] Student, Department of Food Science and Technology, School for Home Science, Babasaheb Bhimrao Ambedker University, Lucknow, Uttar Pradesh, India

[2] Assistant Professor, Department of Food Science and Technology, School for Home Science, Babasaheb Bhimrao Ambedker University, Lucknow, Uttar Pradesh, India

Abstract
For centuries, mushrooms have been used as a part of the human diet and also as medicinal ingredients because they are a good source of nutrients and have biological activities. Mushrooms were directly added to various products to increase the quality characteristics and beneficial health effects of processed foods. 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 Whole wheat flour, whereas noodles prepared out of noodle flour were kept as control. Among the different treatments 20 per cent mushroom powder recorded highest scores for organoleptic parameters like colour and appearance, flavour, crispness, taste and overall acceptability even up to 30 days of storage.

Keywords: mushroom powder, whole wheat flour, sensory evaluation, hedonic scale

Introduction
Noodles are a value added item made from flour. Amongst processed cereal products in India, noodles have a share of about 45% in terms of output and constitute the largest segment in this sector of the processed food market. Noodles are relatively more popular in the north-eastern region where in some states they are consumed as regular breakfast item. In states like Mizoram, Meghalaya and Nagaland, noodles are popular food item.
Mushrooms have been used as a part of the human diet and also as medicinal ingredients because they are a good source of nutrients and have biological activities. Mushrooms were directly added to various products to increase the quality characteristics and beneficial health effects of processed foods. Indirectly, mushrooms were used as a substitute for enzymes or other functional compounds.
Mushrooms containing about 90 per cent are a rich source of proteins having most of the essential amino acids in good proportions, besides minerals and vitamins. Mushrooms are good source iron, copper, calcium, potassium, vitamin D, folic acid, zing, etc.

Materials and Method
Pre-treated button mushrooms with one per cent salt 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
T1 - Noodle flour + 20% mushroom powder
T2 - Noodle flour + 30% mushroom powder
T3 - 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 300C for 30 minutes for seasoning. Then dough was passed through manual noodle machine. Sun dried and packed in a polythene bags. 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 0f 5 judges including teachers of BBA University, lucknow. 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 nine point hedonic scale. The mean score given by five judges were used for statistical analysis.

Result 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

Treatments	Flavour and Taste	Body and Texture	Colour and Appearance	Overall acceptability
T1 - Noodle flour + 20% mushroom powder	41	41	39	40
T2 - Noodle flour + 10% mushroom powder	36	35	34	35
T5 – Noodle flour (control).	30	30	33	31

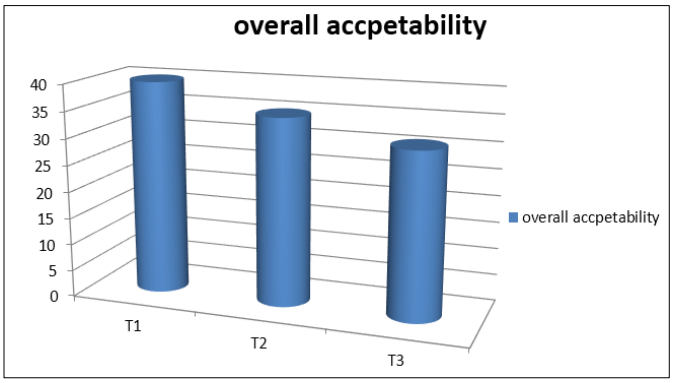

Fig 1: Graphical Representation- Overall acceptability

From the above graph it shows that the sample T1 is most accepted overall among the sensory panellist members and it gets highest scoring, then after sample T2 and T3 respectively.
The overall quality of noodle with 20% mushroom was the most acceptable in all the parameters of quality.

Overall Calculation

Overall calculation are done to know most acceptability of the product in all terms of quality by sensory evaluation scoring given by the panellist members, in this all scoring of texture, colour, flavour and taste are calculated in the table, by this we get do statistical analysis and obtained standard deviation, average and other calculations.

Table 2: Overall Calculation

Parameters	T1	T2	T3
Flavour and Taste	41	36	30
Body and Texture	41	35	30
Colour and Appearance	39	34	33
Overall acceptability	40	35	31
Total	161	140	124
Average	40.25	35	31
Standard Deviation	1.58	1.47	1.39

In this table of overall calculation we got the average of T1, T2 and T3 as 1.58, 1.47 and 1.39 respectively.
Sample T1 with highest average and standard deviation is most accepted statically, hence T1 is most accepted.

Summary and Conclusion

The sensory evaluation of the mushroom fortified noodles was done by using 9- point hedonic scale by a panel of 5 members. The scoring for each of the samples of noodles by various parameter i.e. flavour, taste, texture, colour, appearance and overall acceptability. There were 2 samples of different percentage of ingredients and one control sample, but by sensory evaluation card the sample T1 with (20% Mushroom and 80% whole wheat flour) fortified noodles was most accepted among the three.

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