

Development and evaluation of oyster mushroom value added products

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ABSTRACT

Development of some novel value-added products was undertaken from the fresh/dried oyster mushrooms. A good quality of crunchy oyster mushroom biscuits, comparable with commercially available biscuits in terms of appearance and taste were successfully prepared. Besides, pickle mushroom soup, mushroom jam, mushroom patties and normal pakoda were successfully prepared from fresh oyster mushroom.

Key words: *Pleurotus* spp., value added product, mushroom biscuits, soup, jam, pickle, patties, mushroom pakoda

Oyster mushroom is highly perishable and starts deteriorating after few hours depending upon the storage conditions. Shelf life of this mushroom varies from 1-2 days at the ambient temperature due to its high moisture content, delicate texture and unique physiology (Sexena and Rai, 1990). Hence, it is necessary to develop suitable post harvest techniques for its prolonged preservation and usage. Indian fresh mushroom market is largely contribution of marginal and small growers with limited resources have to depend on local market for sale of their produce. Many times grower faces problem of over saturation of market and distress sale at highly non-remunerative prices. The retention of fresh mushrooms at various level such as grower, whole seller, retailers and consumers further results in deterioration in quality of the produce and

economic loss. Presently, long-term preservation of mushroom by drying, canning and pickling are in vogue (Chandrasekar *et al.*, 2002). But, surplus mushroom production during peak harvesting periods can be checked by adapting appropriate post-harvest technology to process surplus mushrooms in the form of novel value added products rather going only for drying and canning. These value added products not only reduces the post harvest losses but also enhances the additional incomes to the mushroom growers and provide nutraceutical low fat, protein rich food to the consumers (Arumuganathan *et al.*, 2005). Present study deals with the development of value added products such as mushroom biscuits, mushroom soup, mushroom pickle, mushroom patties and pakoda from the oyster mushroom.

Mushroom biscuits

Delicious and crunchy mushroom biscuits were prepared by using the oyster mushroom powder and various ingredients viz., maida (3.0 kg), sugar (1.2 kg), ghee (bakery fats) (300.0 g), mushroom powder (300g), Milk Powder (200 g), Coconut powder (500 g), baking powder (300g), ammonium bichromate (2 g) and water 500 ml. For making biscuits entire ingredients were finely ground using Electric Mixture and cleaned with the help of fine sieve separately. The ingredients viz., ghee and sugar were well mixed for 5-7 minutes using Dough kneeder to make the mixture homogenous. These ingredients were added to dough kneeder for dry mixing of 20-25 minutes. Thereafter, 500 ml water was added to kneeder to make dough cohesive and homogenous and continued for next 10-15 minutes. After that dough was kept for 10 minutes under the wet cloth to make it cool. Thereafter, thin sheets of dough (1.25 cm thick) were made and cut into different shapes of biscuits using different steel dies. These raw cut biscuits were kept in the steel trays in systematic manner and shifted to hot oven (180°C) for baking purpose. After 20 minutes, baking trays were removed from the hot oven and after cooling the biscuits were ready to serve and packaging (Fig.1).



Mushroom soup

Various ingredients used for making mushroom soup were oyster mushroom (1 kg), tomato (½ kg), maida (100 g), salt (20 g), gram masala (20 g), roasted bread pieces (100 g), garlic (10 g), ginger (20 g) and ghee (50 g). Fresh oyster mushroom whole/slices and various ingredient viz., tomato, onion, garlic, gingers were boiled with 2% salt in hot water for 10-15 minutes (Table 2). All ingredients were removed from the hot water and after partial cooling all the ingredients were fine ground for making homogenous mixture through Electric Mixture. Thereafter, with help of fine cloth fine particles of ingredients were filtered out. The extract obtained was boiled again. Fried spices with oil and maida powder were added to get desirable taste and flavour. Soup was ready to serve by adding small amount ghee cream and roasted bread pieces.

Mushroom jam

For making 2 kg Jam freshly harvested oyster mushrooms whole/slices (1 kg) were blanched with 2% salt for 10-15 minutes. Cold blanched mushroom whole/slices were used for making pulp through pulping machine. Thereafter, the mushroom pulp was heated slowly till got boiled and other ingredient viz., citric acid (6 g), sugar



Fig.1: Oyster mushroom biscuits

powder (750g) and pectin (20g) added to it. Boiling was continued to get desired brix level (68 Brix) of pulp mixture. After that pulp mixture was cooled at room temperature and other ingredients viz., apple ASS color (10 g) and sodium benzoate (20 g) were added to get desired colour, flavour and taste (Fig.2).

Mushroom pickle

One and half kg freshly harvested oyster mushrooms were graded based on size and washed thoroughly in clean water to remove the foreign matters adhering on the surface for making 1 kg pickle. The cleaned mushrooms were cut into small pieces and blanched immediately by dipping them in boiling solution of 0.05% KMS+0.1% of citric acid and 2% brine solution for 10 minutes (Rai and Arumuganathan, 2008). The blanched mushrooms were subjected to salt curing process in 10% NaCl and kept for overnight. Next day the excess water oozed out from mushrooms was removed and appropriate preservatives (acetic acid and sodium benzoate), salt (90 g) black mustard seed powder (rai) (35.0 g), turmeric powder (20.0 g), red chilly powder (10.0 g), cumin seed powder (1.5 g), fennel seed powder (100.0 g), garlic (1.5 g), carom seed (ajwain) (10.0 g), nigella seed (kalonji) (50.0 g), turmeric powder (20 g) and mustard oil (200 ml) were mixed to get organoleptically acceptable mushroom pickle (Fig.3).

Mushroom patties and mushroom pakoda

Various ingredients viz. maida flour (2 kg), ghee (1 kg), refined oil (200 ml), carom seed (*ajwain*) (20 g)

and salt (50 g) were mixed properly along with water. After homogeneous mixing of all ingredients dough was spread into thin sheets and folded it. Similar procedure (spreading and folding) was repeated for seven times with 10 minutes time interval. Thereafter, dough sheet cut into small pieces and fried mushrooms (1 kg) were filled into it for making patties. Small amount of milk powder (50 g) was used to avoid stickiness of dough pieces during handling. Raw pieces were kept in hot oven (180°C) for 10 minutes for making crunchy, crispy 100 pieces of patties.

Similarly, for making oyster mushroom *pakoda* fresh cleaned mushrooms were cut into small pieces. Various ingredients viz., *besan* (*chana dal* powder), onion, garlic, black and red chilli powder, turmeric powder, salt were added with water to make it pasty form. This paste was kneaded well and *pakoda* were made by frying the paste as small pieces in refined oil for 5-8 minutes.

The various value added product made from the fresh or dried oyster mushrooms viz., mushroom biscuits, mushroom soup, mushroom jam, mushroom pickle, mushroom patties and *pakoda* were evaluated for color, appearance, flavor, taste, texture and overall acceptability by using organoleptic evaluation on the Ten Point Hedonic Scale through panel of ten judges (Rangana, 1994). Data (Table 1) shows that mushroom biscuits and mushroom pickle rated the highest sensory score among the all value added product by the taste panel.

Table 1. Organoleptic evaluation of oyster mushroom value added products

Name	Color	Appearance	Flavor	Taste	Texture	Overall Acceptability	Mean	Storage period
Mushroom biscuits	8.2	7.7	8.2	8.6	8.4	8.7	8.3	12 months
Mushroom soup	6.9	6.2	7.7	7.6	6.9	7.8	7.2	--
Mushroom jam		7.8	8.0	8.4	7.9	7.8	8.2	8.06 months
Mushroom pickle	8.6	8.3	8.2	8.1	8.1	8.4	8.3	12 months
Mushroom patties	7.9	7.7	7.5	8.1	8.3	8.0	7.9	--
Mushroom Pakoda	8.4	8.2	8.5	8.6	7.5	8.1	8.2	--

As far as quality is concerned, oyster mushroom pickle was very good in color, quality, appearance, flavour, taste and texture. Similarly, mushroom biscuits were found better in terms of quality, crunchiness, taste, texture, flavour and colour. Shelf life of both mushroom pickle and mushroom biscuits, storage quality concern in general and colour, taste, texture and appearance in particular does not affected for a period of 12 months. The oyster mushroom jam, novel product was also liked by the panel of judges in both overall quality and storage concern and reported maximum storage life of up to 6 months. Taste and appearance of mushroom jam also did not changed during the course of study. Mushroom jam colour i.e. light brown, remained unchanged throughout the storage period. The other product mushroom patties and *pakoda* had excellent taste, flavour, taste and appearance and were also liked by panel of judges. Mushroom soup ranked the lowest sensory score rated from 6.2 to 7.8 with respect to colour, appearance, flavour, taste and texture. However, overall quality of mushroom soup was reported to be above the acceptability level by the panel of judges. With regard to taste,

the product named mushroom biscuits and mushroom *pakoda* ranked the highest and equal sensory score (8.6), mushroom pickle and mushroom patties ranked second the highest and equal sensory score (8.1). The mushroom jam and mushroom soup ranked third (7.9) and lowest sensory score (7.6), respectively. The texture and flavour of the products, which are a deciding factor of the products acceptability, were good in general and ranged from 6.9 to 8.4, 7.5 to 8.5; respectively. As far as the overall acceptability concerned, mushroom biscuits topped in list, followed by mushroom pickle, mushroom jam, mushroom *pakoda*, mushroom patties and mushroom soup. Thus preparation of mushroom value added products not only adds the value and returns the additional income to the mushroom growers but also provides protein rich nutritious food to the consumers.

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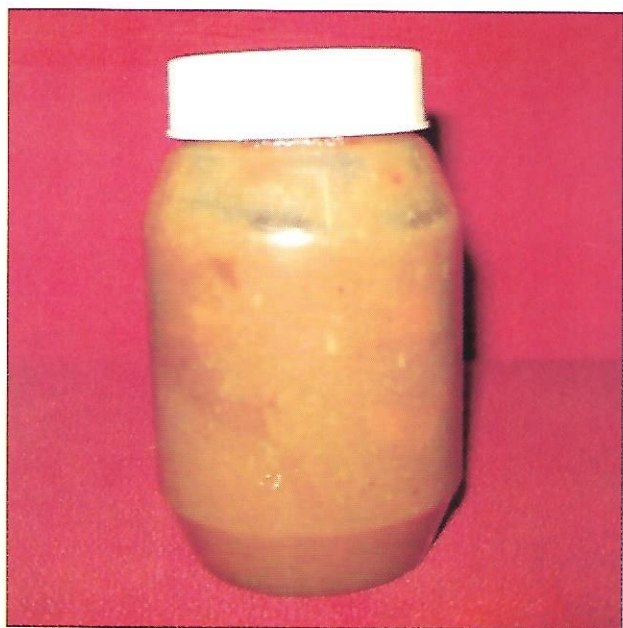


Fig.2: Oyster mushroom jam



Fig.3: Oyster mushroom pickle

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