

Chemical and technological studies on the production of mushroom and the possibility of processing some products

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It is well established that there is a great increase in food requirements accompanied with a great decrement in food production. Besides the over population all over the world. It is also well known there is a huge amount of agricultural and food processing wastes. This is lead us to try to investigate the possibility of utilization of aforementioned wastes in production of protein high nutritional value and animal feeding. This would be achieved by growing fungi of mushroom. The object to investigate the suitable substrates and factors affecting for growth and production of three mushroom culture strains (oyster, button and shiitake) from China were tried to be cultivated under Egyptian conditions. Besides, evaluation of the chemical constituent of the fruit bodies production and the effect of some processing techniques (canning and drying) and storage on some physicochemical characteristics of the tested of the three mushroom strains were determined. Results obtained could be summarized as follows:- Measuring the growth rate of three strains of mushrooms *Pleurotus ostreatus*, *Agaricus bisporus* and *Lentinus edodes* on some traditional mycological media and grain media supplemented with salt mixtures. Potato dextrose yeast extract agar medium was the best tested medium for both rate and amount of fungal growth of all tested mushroom strains, grain media supplemented with salt mixtures medium was the best. Summary and Conclusion: 1- Tested medium for both rate and amount of fungal growth of all tested. 2- Wheat straw, rice straw, sawdust wastes, mixed with wheat straw + rice straw, wheat straw + sawdust and rice straw + sawdust were used for oyster mushroom cultivation, after preparation and pasteurization in soaking hot water at 90°C for 2 h. rice straw, wheat straw and mixed with wheat straw + rice straw showed high productivity for oyster mushroom fruit bodies. Wheat straw, rice straw and mixed with wheat straw + rice straw were used for button mushroom cultivation after fermentation with chicken manure, gypsum powder and water, heap was turned upside down once each three days and watered if necessary, this process is 21 days. Live steam was introduced to raise the temperature of compost up to 58°C for 8 hour, and lower temperature slowly to 25°C period in 7-9 days. The highest fresh weight (yield) of fruit bodies was occurred in the case of button mushroom on wheat straw, mixed wheat straw + rice straw was the second tested organic substance, while rice straw was the third. The basic substrates used for shiitake mushroom cultivation were sawdust, wheat straw and sawdust + wheat straw, after preparation and soaked in water (moisture content 65%), the sterilized according to using autoclave at 121 °C for 2 hours. Sawdust showed higher fresh weight (yield) of fruit bodies shiitake mushroom. 3- Chemical composition of fresh oyster, button and shiitake mushroom contained 89.94%, 87.8% and 90.35% moisture, 30.41%, 32.15% and 31.42% protein, 58.28%, 57.19% and 57.31% carbohydrate, 3.35%, 3.23%, 2.13% total sugars, 2.65%, 2.48% and 1.42% reducing sugars, 11.38%, 12.73% and 17.92% fibers, 4.59%, 3.34% and 3.16% fat, 6.72%, 7.32% and 8.11% ash and 64.35, 27.55 and 8.30 mg/100 g ascorbic acid respectively, on dry weight bases. 4- Amino acid analysis of oyster, button and shiitake mushroom- of fruit bodies protein showed all the essential and non-essential amino acid except cystine and incthionine as they contained high contents of leucine, lysine, isoleucine, phenylalanine and valine which constituted the major essential amino acid constituents, i.e. 39.12%, 38.79% and 36.60% of the total amino acid

in oyster, button and shiitake mushroom, respectively. The protein of mushrooms could be considered as a rich source as concerning essential amino acids, which are present in higher amount than those required by the FAO/WHO (1973) recommendation. 5-Minerals content were determined by atomic absorption and it found that the oyster, button and shiitake mushroom fruit bodies studied contained high. 6-Fatty acid analysis of fruit bodies oyster, button and shiitake mushroom of fat showed all the essential unsaturated fatty acids, as they contained high contents. Summary and Conclusion 138 of linoleic, oleic and palmitic which constituted the linoleic fatty acid constituent i.e. 55.49%, 57.35% and 61.25% of the total fatty acids in oyster, button and shiitake respectively. 7-Thermal processing caused generally a considerable decrease in ascorbic acid reached 84.29, 85.05 and 82.53% for oyster, button, shiitake mushroom canned in 2% NaCl and 0.2% citric acid respectively. In contrary a slight decrease was recorded in protein, total sugars, reducing sugars, fat and ash, while the slight increase of fiber content during thermal processing. No considerable changes were observed for different physicochemical constituent of canned mushroom during 12 months of storage at room temperature (25°C). 8-The essential amino acids decrease reached 20.37, 21.06 and 18.58% after canning of oyster, button and shiitake mushroom respectively. 9-A decrease in potassium, calcium, magnesium, iron, zinc manganese, copper and phosphorus, while an increase in sodium was noticed on canned of the oyster, button and shiitake mushroom. 10-Oven and sun drying process caused a slight decrease in protein, total sugars, reducing sugars, fat, total acidity and ascorbic acid and a slight increase in fiber and ash was noticed on dried of oyster, button and shiitake mushroom. Sun drying improved the constituent intensity of dried mushroom during drying compared with oven drying. 11 Storage of oven and sun drying mushroom for 12 months at room temperature caused a continuous slight increase in moisture content for all dried oyster, button and shiitake mushroom. In contrary a gradual decrease was recorded in ascorbic acid during storage. 12-The essential amino acid decrease reached 12.04, 12.83 and 10.05% after drying of oyster, button and shiitake mushroom, respectively. 13-No considerable changes were observed for mineral contents was noticed of dried oyster, button and shiitake mushroom. 14-Different pretreatments and oven drying process caused a slight decrease in protein, total sugars, reducing sugars, fat, total acidity and ascorbic acid of dried oyster and button mushroom and it was more pronounced in blanched dried materials. 15-Storage of different treated dried mushroom for 12 months at room temperature caused a continuous slight increase in moisture and fiber content for all dried materials. In contrary a gradual decrease was recorded in ascorbic acid during storage. 16-Rehydration ratios of dried mushroom (g rehydrated samples/g dehydrated sample) were higher generally in oven drying from sun drying. A continuous pronounced decrease in rehydration ratio was observed for all dried oyster, button and shiitake mushroom during storage for 12 months. 17-Rehydration ratios of oven dried mushroom were higher generally in untreated or sulfitted treated mushroom while blanched samples recorded low rehydration ratio. A continuous pronounced decrease in rehydration ratio was observed for all dried oyster and button mushroom during storage for 12 months. 18-Sensory evaluation of the processed mushroom samples indicated that canned samples were of top quality, sun dried samples were of quality when compared to dried samples. Generally, untreated oven dried samples had poor taste than other samples, the treated with sulfitted and 0.2% citric acid + sulfitted were the best among all other treatment, while, blanched samples had poor flavor but superior color. 19-Neither mesophilic nor thermophilic bacteria were detected in any mushroom cans during storage period. While, blanching of mushroom samples prior to drying was necessary for reducing the initial microflora of different mushrooms during storage period. Summary and Conclusion Cultivation production and processing of shiitake mushroom might be recommended, to make use of its benefits with regard to tumor fighting and due to its content of some antibiotics. Mushroom production is a very good method for solving not only problems of agro-wastes but also food shortage in Egypt with low costs and producing a good healthy food.