Evaluation of bacterial and fungal load in fresh, frozen and dried food mushrooms

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The analysis carried out by Dorese and colleagues1 and Venturini and colleagues2 on the total bacterial load tested in wild and cultivated fresh mushrooms highlighted values ranging between 3.7 and 9.3 log UFC/g. Due to the absence of pathogens, the microbiological quality of mushrooms analyzed by the above-mentioned authors has been considered good. On the basis of data reported in literature we have also extended the observations with frozen and dried mushrooms in order to evaluate the mesophilous bacterial and fungal load. In particular we focused on absence of Escherichia coli (Migula,1895) Castellani & Chalmers, 1918, Salmonella spp. and Listeria monocytogenes (Murray et al., 1926) Pirie 1940 was analyzed. The aim of this paper is also to evaluate the quality and safety of mushrooms daily consumption by consumers. Thirty samples of mushrooms (10 cultivated fresh mushrooms identified with letter A 1-10; 10 dried mushrooms identified with letter B 1-10 and, 10 frozen mushrooms identified with letter C 1-10) were taken from large-scale distribution markets, mini-markets and small markets owned by migrants. The frozen mushrooms were contained in packages of Agaricus bisporus (J.E. Lange) Imbach 1946 and packages of Boletus edulis Bull. Besides mixed packages of A. bisporus, Pholiota aurivella (T. Fisch.) S. Ito & S. Inoue, Boletus lutesus L., Pleurotus ostreatus (Jacq.) P. Kumm. and, Lentinula edodes (Berk.) Pegler were analyzed. Other analyzed frozen mushrooms were a mixture of A. bisporus, Agrocybe aegerita (V. Brug.) Singer, P. ostreatus and, P. cormiciapae (Paulet) Rolland and a mixed package of A. bisporus and P. ostreatus. The fresh mushrooms (A. bisporus and Pleurotus ostreatus) were purchased from the grocery store. Dried mushrooms (L. edodes) were purchased from shops owned by Chinese migrants. The microbiological analysis was carried out in the laboratory of the Center of Mycological Control belonging to the Sanitary Agency of the province of Palermo (southern Italy). The total bacterial load was analyzed in 25 g of mushrooms (1:10 dilution) according to the rule ISO 4833:2004.2 Moulds and yeasts were analysed according to the report ISTISAN 96/03.5 Salmonella sp. was checked through the criteria of analysis ruled by UNI EN ISO 6579:2008.3 The methodology of ISO 16549:2:20017 was used to test the Escherichia coli positive beta-galactosidase, Listeria monocytogenes was tested according to the rule ISO 11290:1:2005.6 The total count in Petri dishes was made using the formula reported in ISO 7218:2007.7 The culture media were provided by the concern Lickson srl (Vicari, province of Palermo). The nomenclature follows the List of Prokaryotic Names with Standing in Nomenclature (LPSN). L. monocytogenes and Salmonella spp. were not found in the analyzed mushrooms. On the contrary a sample of fresh mushrooms from a supermarket of the town of Palermo was polluted by E. coli. The count of E. coli positive beta-galactosidase correspond to 1.7 10^6 cfug. The value of total bacterial count in all the mushrooms analysed varies from a minimum of 3.8 10^2 cfug found in dried mushrooms (L. edodes) to a maximum 2.6 10^9 cfug in a fresh sample of mixed mushrooms (A. bisporus and P. ostreatus) in the supermarket. As regards moulds and yeasts the value varies from zero in dried mushrooms (L. edodes, B. edulis) to 4.4 10^4 cfug in fresh mushrooms (A. bisporus). The results obtained showed that an analyzed sample of mushroom had a high pollutant load of E. coli. As known this bacterium is responsible of intestinal infections that can result in serious extra-intestinal infections. Besides E. coli is involved in drug resistance and thus have a significant impact on human health. Since the packaging of fresh mushrooms polluted by E. coli was purchased from a supermarket belonging to the mass distribution highlights the need and importance of sanitary controls for the protection of the consumers. The recent warning from the EFSA (European Food Safety Authority) that Italy is the second country in the EU as largest food borne diseases (especially salmonellosis) reinforces the need to respect to the parameters set out in Regulation 2073/2005 but also the checking of the proper handling of mushrooms during cultivation and packaging, including compliance with good hygienic practices by insiders.

References


