

Utilization of *Trametes versicolor* biomass for functional edible films production: a bioprocessing scheme based on cheese whey valorization

A. Papadaki¹, V. Kachrimanidou¹, A.-M. Theodosi-Kapsampeli¹, I.K. Lappa¹, Z. Gkonou², N. Kopsahelis^{1,*}

¹Department of Food Science and Technology, Ionian University, Argostoli, 28100, Kefalonia, Greece

²Department of Ecology and Systematics, Faculty of Biology, National and Kapodistrian University of Athens, Athens, Greece

Keywords: food waste valorization, cheese whey, medicinal mushroom, functional food, edible films

Presenting author email: kpapadaki@ionio.gr

***Corresponding author email:** kopsahelis@ionio.gr

Abstract

Cheese whey management is being of major importance primarily due to its adverse environmental impact. Up-to-date, many studies have been conducted, focusing on the biotechnological conversion of cheese whey in various microbial products. Cheese whey valorization through microbial fermentations utilizes only the lactose stream, whereas the protein fraction remains mostly unexploited. In this study, *Trametes versicolor*, a non-edible medicinal mushroom was employed in submerged fermentations using the lactose rich stream of cheese whey, whereas the protein rich stream was utilized for edible films production. The mycelial mass of *T. versicolor* has been identified as a source of polysaccharides with many health benefits. Hence, the target of this study was the supplementation of edible films with the fungal biomass of *T. versicolor*, targeting to develop an integrated valorization scheme of cheese whey. *T. versicolor*, isolated from Kefalonia island, was cultivated on deproteinized cheese whey at 26 °C under static conditions. The collected fungal biomass was freeze-dried and then grounded to the form of fine powder. Whey protein concentrate, isolated from cheese whey was used for edible films production. Films were supplemented by 5% (w/w) fungal biomass and were tested concerning their physical and antioxidants properties, using a biomass-free film as the control. Results showed that films supplemented by *T. versicolor* biomass presented higher swelling index (about 15.8%), whereas film transparency and solubility were not affected by the supplementation. Noteworthy, films supplemented with *T. versicolor* biomass exhibited higher antioxidant capacity than the control ones. This study demonstrated the potential utilization of whole biomass of medicinal mushrooms for the production of functional edible films with improved properties.

Acknowledgements

We acknowledge support of this work by the project “Monumental forests of the Ionian Islands as resource areas of biodiversity and high added-value mushrooms: mapping, recording, evaluation, networking, preservation and sustainable exploitation” (MIS 5033680) which is implemented under the Action “Protection of the environment and sustainable development” funded by the Operational Programme “Ionian Islands 2014-2020” and co-financed by Greece and the European Union (European Regional Development Fund).