Cheese whey valorization by *Trametes versicolor* through submerged cultivation

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Abstract

Cheese whey management has been 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 valuable products, including microbial lipids and organic acids, among others. In all these cases an additional downstream step is essential to recover the microbial metabolites. Mushroom cultivation using cheap agro-industrial by-products as substrate, offers the advantage of easier product recovery without complicated downstream processes. Besides the conventional mushroom solid-state cultivation, mycelial mass could be also produced via submerged fermentation mode. *Trametes versicolor*, a non-edible mushroom, has been employed in many applications for the amelioration of highly toxic environments, whereas its mycelial mass extracts have been identified as a source of polysaccharides with potential health benefits.

This study evaluated the capability of *Trametes versicolor* ATHUM 9921, an isolated strain from Kefalonia island, to grow on agro-industrial substrates. Initial experiments evaluated the linear growth rate of *Trametes versicolor* during solid-state fermentation on a potato dextrose agar (PDA) substrate. Results showed a high growth rate of 8 mm/day. Subsequently, submerged fermentations using lactose-based media were performed at 26 °C. *Trametes versicolor* growth was studied in both static and agitated submerged fermentations, using pure lactose and cheese whey-based media as well. The obtained results showed that *Trametes versicolor* consumed lactose in both cases; in a slower rate at agitated cultures, as compared to static cultures, showing a maximum biomass production of 26 g/L. Conclusively, this study presents preliminary results regarding the ability of *Trametes versicolor* to valorize cheese whey for mycelial mass and polysaccharides production. Future studies will focus on the properties of polysaccharide-rich extracts, in order to provide an integral viewpoint regarding potential applications of *Trametes versicolor*.

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