Degradation of olive mill waste waters by two wood-rot fungi and their effect on the induction of extracellular ligninolytic enzymes.

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Olive oil production on Greece, one of the main producers of Europe, results in the formation of liquid olive oil mill waste (OOMW). OOMW is usually rich in lipids, polysaccharides and organic acids, but mostly comprises of phenolic compounds and exhibits a high organic load, properties responsible for its high toxicity against plants, soil microorganisms and marine organisms. Deposition of OOMW in landfills, a typical procedure in Greece, leads to emission of strong odour and to the environmental as well as aesthetic degradation of the surrounding area. Biological treatment of OOMW is a promising alternative to the problem, as it could also lead to the formation of high added-value microbial products. Up to date, Basidiomycetes fungi seem to be the best degraders of phenolic compounds among the known microbial species. Basidiomycetes seem to produce and secrete a potent mixture of enzymes, capable of mineralizing complex phenolic networks such as the lignin fraction of plant walls. The use of these microorganisms can lead to the degradation of OOMW phenolics and result to the detoxification of the effluent. Microbial growth on OOMW as the substrate can also lead to the production of enzymes with great biotechnological potential and valuable polysaccharides with applications in the pharmaceutical and/or nutritional industry.

In the present work, degradation of OOMW was obtained with the use of two native Greek strains, *Pleurotuscitrinopileatus* and *Irpexlacteus.* The tested strains were found to be robust producers of oxidative enzymes, with enzyme titers exceeding 1000 UL^{-1} for laccases, 800 UL^{-1} for manganese-independent peroxidases and 200 UL^{-1} for manganese-dependent peroxidases in the culture supernatant. This significant enzyme factory seems to be effective in the OOMW degradation, resulting in more than 80% decolourization of the effluent and 90% reduction in phenols concentration. Moreover, mycelial biomass formed was found to contain relevant levels of valuable polysaccharides, namely α- and β- glucans, in 3,1% (w/w) and 10,9% (w/w) of dry weight for *P. citrinopileatus* and in 0,4% (w/w) and 5,9% (w/w) of dry weight for *I. lacteus* respectively. The results of the present work illustrate the potential of *Pleurotuscitrinopileatus* and *Irpexlacteus* in the bio-valorization of OOMW, a highly toxic waste, through the production of biotechnologically relevant enzymes and biologically active polysaccharides.