

Wood Decay Fungal Strains Useful for Bio-Composite Material Production

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Abstract : Interest on wood decay fungi (WDF) has been increasing in the last year's thanks to the potentiality of this kind of fungi; research on new WDF strains has increased as well thus pointing out the key role of the culture collections. One of the most recent biotechnological application of WDF is the development of novel materials from natural or recycled resources. Based on different combinations of fungal species, substrate, and processing treatment involved (e.g. heat pressing), it is possible to achieve a wide variety of materials with different features useful for many industrial applications: from packaging to thermal and acoustic insulation. In comparison with the conventional ones, these materials represent a 100% natural and compostable alternative involving low amounts of energy in the production process. The purpose of the present work was to isolate and select WDF strains able to colonize and degrade different plant wastes thus producing a fungal biomass shapeable to achieve bio-composite materials. Strains were selected within the mycological culture collection of Pavia University (MicUNIPV, over 300 strains of WDF). The selected strains have been investigated with regards their ability to colonize and degrade plant residues from the local major cultivations (e.g. poplar, alfalfa, maize, rice, and wheat) and produce the fungal biomass. The degradation of the substrate was assessed by Thermogravimetric analysis (TGA) and Fourier Transform Infrared Spectroscopy (FTIR). Chemical characterization confirmed that TGA and FTIR are complementary techniques able to provide quality-quantitative information on compositional and structural variation that occurs during the transformation from the substrate to the bio-composite material. This pilot study provides a fundamental step to tune further applications in fungus-residues composite biomaterials.

Keywords : bio-composite material, lignocellulosic residues, sustainable materials, wood decay fungi

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