Session Cross-cutting: April 13th 09.00 hrs

5s4a: : Waste reduction and novel resources for sustainable production of safe food or feed

Developing a platform for myco-validation of lignocellulosic waste streams.

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Lignocellulose is a vast and renewable resource, representing a large number of agricultural and industrial side streams. Within lignocellulose, lignin is often a major access-limiting factor to other valuable components like sugars and proteins, and more recently lignin itself is gaining interest for various applications. Wood-rot fungi are known for their ability to modify and degrade lignocellulose in specific and environmental friendly manners. However, wood-rot fungi can't currently compete economically with existing physical-chemical treatments, and improvements in their efficiency will be required. This means not only improvement of their lignocellulose modifying capacities, but also their growth in, and suitability to, industrial scale solid state fermentations. Breeding can be a valuable tool for improving combinations of complex traits. Major prerequisites for such breeding include understanding the genetics and control of the fungal life cycle, as well as an accurate and high-throughput phenotyping system. Especially white-rot fungi open up the lignocellulosic structure while preserving most of the cellulose. The WR Mushroom Research Group of Plant Breeding possesses a unique collection of wood degrading fungi, from which the particularly specific lignin degrading white-rot fungus Ceriporiopsis subvermispora was selected. For this fungus we developed methods to complete the life cycle, assess its genetics, select offspring, and measure lignocellulose modification in a manageable sized system. At the moment we are testing the phenotyping of the first offspring population, from which we expect to infer information on heritability of lignocellulose modification in this species and the prospects for future strain improvements in general. If demonstrated to be feasible, this platform could be used for a broad range of fungal species, increasing the economic viability of fungal lignocellulose modifications. This should give way to a whole new approach; breeding of improved fungal strains for dedicated sdie stream modifications and downstream products.

Keywords: basidiomycete, mushroom, fungi, lignocellulose , bio-based