Investigation of the indigenous fungal community populating barley grains: Secretomes and xylanolytic potential

The indigenous fungal species populating cereal grains produce numerous plant cell wall-degrading enzymes including xylanases, which could play important role in plant-pathogen interactions and in adaptation of the fungi to varying carbon sources. To gain more insight into the grain surface-associated enzyme activity, members of the populating fungal community were isolated, and their secretomes and xylanolytic activities assessed. Twenty-seven different fungal species were isolated from grains of six barley cultivars over different harvest years and growing sites. The isolated fungi were grown on medium containing barley flour or wheat arabinoxylan as sole carbon source. Their secretomes and xylanase activities were analyzed using SDS-PAGE and enzyme assays and were found to vary according to species and carbon source. Secretomes were dominated by cell wall degrading enzymes with xylanases and xylanolytic enzymes being the most abundant. A 2-DE-based secretome analysis of Aspergillus niger and the less-studied pathogenic fungus Fusarium poae grown on barley flour and wheat arabinoxylan resulted in identification of 82 A. niger and 31 F. poae proteins many of which were hydrolytic enzymes, including xylanases.

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