

Metabolomics of Fhb1-mediated resistance against Fusarium head blight in wheat: An isotope-assisted LC-HRMS approach

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Abstract

Fusarium Head Blight (FHB) is a fungal disease caused by *Fusarium graminearum* (Fg), producing mycotoxins and negatively affecting yield and quality of small grain cereals such as wheat. Resistance of wheat against FHB is mediated by more than 100 different quantitative trait loci (QTLs), with Fhb1 being located on chromosome 3B and constituting one of the major resistance QTLs. Despite considerable recent research efforts, the molecular mechanism underlying Fhb1 mediated resistance in wheat remains still elusive. According to a recent study, Fhb1 is involved in the regulation of the phenylpropanoid pathway and cell wall reinforcement to prevent fungal spread inside the infected host plant. In the present study, we challenged this hypothesis by the use of ^{13}C labeled phenylalanine (Phe) as metabolic precursor of phenylpropanoids and other phenolic secondary metabolites. To this end, flowering wheat ears of different near isogenic wheat lines, differing in the presence of Fhb1, were treated with Fg, deoxynivalenol or mock (as a control) in a time course experiment. After harvest and sample preparation, LC-HRMS measurement and automated data processing about 1000 plant metabolites including more than 100 Phe-derived metabolites were detected. The presentation will illustrate our isotope-assisted metabolomics approach and will focus on metabolites of the Phe-derived submetabolome and their putative association with Fhb1 mediated resistance or susceptibility to FHB in wheat.

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Biography

Maria Doppler is a PhD student at University of Natural Resources and Life Sciences, Vienna (BOKU). She is working in a research project which is dealing with metabolomics of Fusarium head blight and the molecular mechanisms underlying plant resistance against this disease. She is focusing on the investigation of secondary plant metabolites by the application of stable isotope

labeling and LC-HRMS. She has experience in the field of Metabolomics and received her Master's degree in Biotechnical Processes at Austrian Biotech University of Applied Sciences after an internship working on the challenging field of identification of plant metabolites with LC-HRMS.