Geophysical Research Abstracts
Vol. 18, EGU2016-14099, 2016
EGU General Assembly 2016

Discrimination of fungal infections on grape berries via spectral signatures

Daniel Molitor (1), Michaela Griesser (2), Erich Schütz (2), Marie-Therese Khuen (2), Christa Schefbeck (1), Franz Kai Ronellenfitsch (1), Martin Schlerf (1), Marco Beyer (1), Katharina Schoedl-Hummel (2), Ulrike Anhalt (2), and Astrid Forneck (2)

(1) Environmental Research and Innovation Department, Louxembourg Institute of Science and Technology, Belvaux, Luxembourg, (2) Division of Viticulture and Pomology, Department of Crop Sciences, University of Natural Resources and Life Sciences, Vienna, Austria

The fungal pathogens Botrytis cinerea and Penicillium expansum are causing economic damages on grapevine worldwide. Especially the simultaneous occurrence of both often results in off-flavours highly threatening wine quality. For the classification of grape quality as well as for the determination of targeted enological treatments, the knowledge of the level of fungal attack is of highest interest. However, visual assessment and pathogen discrimination are cost-intensive. Consequently, a pilot laboratory study aimed at (i) detecting differences in spectral signatures between grape berry lots with different levels of infected berries (B. cinerea and/or P. expansum) and (ii) detecting links between spectral signatures and biochemical as well as quantitative molecular markers for fungal attack. To this end, defined percentages (infection levels) of table grape berries were inoculated with fungal spore suspensions. Spectral measurements were taken using a FieldSpec 3 Max spectroradiometer (ASD Inc., Boulder/Colorado, USA) in regular intervals after inoculation. In addition, fungal attack was determined enzymatically) and quantitatively (real-time PCR). In addition, gluconic acid concentrations (as a potential markers for fungal attack) were determined photometrically.
Results indicate that based on spectral signatures, a discrimination of P. expansum and B. cinerea infections as well as of different B. cinerea infection levels is possible. Real-time PCR analyses, detecting DNA levels of both fungi, showed yet a low detection level. Whereas the gluconic acid concentrations turned out to be specific for the two fungi tested (B. cinerea vs. P. expansum) and thus may serve as a differentiating biochemical marker.
Correlation analyses between spectral measurements and biological data (gluconic acid concentrations, fungi DNA) as well as further common field and laboratory trials are targeted.