

Volatile Organic Compound markers of *Botrytis cinerea* infection in artificially inoculated intact grape berries

Pietro Emilio Nepi^{1*}, Claudia Pisuttu², Cristina Nali², Elige Salame¹, Pietro Tonutti¹, Stefano Brizzolara¹

¹Crop Science Research Center, Scuola Superiore Sant'Anna di Studi Universitari, Piazza Martiri della Libertà, 33, 56127, PISA, ITALY;

²Department of Agriculture, Food and Environment, University of Pisa, Via del Borghetto 80, 56124, PISA, ITALY. (Left-aligned, italic, Arial 9)

*Corresponding author: pietroemilio.nepi@santannapisa.it

Abstract (250 words)

The addition of partially dehydrated grapes to enrich must composition for producing complex dry/sweet wines represents a traditional practice in several regions of the world. However, the environmental conditions of dehydration chambers may facilitate the infection of *Botrytis cinerea* Pers. by promoting disease and provoking large grape losses. *B. cinerea* attack can induce alterations in the profile of volatile organic compounds (VOCs), which could be detected by sensors specifically trained to detect infection/disease-related compounds. These sensors could facilitate the early detection of the infection, consequently allowing to adjust some dehydration parameters. To deepen the understanding on alterations induced by *B. cinerea* on intact grape VOCs profile, berries from Sangiovese and Corvina cultivars were collected and analysed by SPME-GC-MS as such and following artificial inoculation with a spore suspension of *B. cinerea* (10 µl, 10⁵ spores ml⁻¹) or mock inoculation by using the same volume of sterile growth medium (control). Preliminary results have shown that high levels of a set of primary and secondary alcohols appeared to be emitted by inoculated berries. Some of these molecules are already reported as correlated with *B. cinerea* infection, while others are not mentioned as infection markers yet. Moreover, the dynamics of the emission of some of these compounds during the *in vitro* development of *B. cinerea* cultures have also been studied. Setting up sensors capable of detecting the identified volatile markers in the dehydration chambers represents an ambitious goal for reducing spoilage and grape losses via targeted interventions.

Keywords: grape, grey mould, VOCs, sensors, sustainability.