Reactive oxygen species (ROS) activity of grapevine berry upon anthracnose attack

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Anthracnose an important disease that occurs regularly in in grapevine areas where conditions during the growing season are usually humid and warm with frequent rains during spring months. The pathogen, *Elsinoe ampelina*, infects primarily young tissues, such as shoots and leaves, but also attacks fruits. Most grapevine cultivars grown around the world are susceptible to this pathogen. However, some new bred cultivars of a group denominated PIWI (pilzwiderstandsfähige Rebsorten) show tolerance to anthracnose attack but the mechanism of resistance is not yet clear. Often, the resistance against fungal diseases is linked with ROS (reactive oxygen species).

The aim of this work was to study ROS production linked with grapevine resistance against anthracnose attack of berries. The experiment was designed based on a bifactorial trial (5x2) using five genotypes, 'Aromera', 'Bronner', 'Felicia', 'Helios' and GF24 and analyzing berries with or without anthracnose symptoms. Four bunches with symptoms from natural anthracnose infection were collected with three replications, at the phenological stage of berry formation. Disease severity was evaluated using images and the software Quant, measuring the percentage of disease. ROS enzymatic activity, superoxide dismutase, catalase, ascorbate peroxide and guaiacol peroxidase, were measured using skins peeled off from berries. All data were used for bifactorial variance analyses followed by Tukey´s test to analyze the relation between genotypes and berries with and without symptoms. Based on the disease severity observed, the genotypes were classified into different resistance levels. GF24 and 'Helios' were grouped as resistant, 'Aromera' and 'Bronner' as moderately resistant and 'Felicia' was considered as susceptible. ROS production showed no interactions between the factors genotypes and berries. Corroborating, the berries with and without symptoms did not show differences for ROS studied. However, resistance and moderately resistance genotypes showed higher ROS activity than the susceptible cultivar. The generation of ROS in mitochondria plays an important role as a signal for HR-induced cell death in plants. These results suggest that the resistance of berries against anthracnose is linked with ROS production. However, the complete ROS route need to be studied in more detail.