OP-17
Deciphering the molecular mechanisms behind essential oil treatement against downy mildew in grapevine

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Downy mildew, *Plasmopara viticola*, was accidentally introduced from North America and spread rapidly throughout all European winegrowing regions in the late XIXe century, strongly impacting grape quality and yield. To maintain economically sustainable yields and quality, winegrowers rely on high amount of copper and/or synthetic fungicides. On the long run, both of these strategies cause environmental damages, threaten consumer and producer health, as well as, for some synthetic pesticides (QoI), promote the emergence of resistant strains of *P.viticola*. To guarantee an environmentally sustainable and consumer friendly viticulture, natural fungicides need to be developed to reduce the dependency on synthetic pesticides and copper. Most essential oils are composite blends of volatile compounds exhibiting antimicrobial properties against a variety of micro-organisms. Rienth et al. (2019) highlights the effect against *P.viticola* of Oregano Essential Oil vapor phase (OEO) as a potential biological pesticide. The underlying molecular mechanisms of OEO on *P.viticola* and on *V. vinifera* as a potential elicitor remain unclear. We performed leaf disk experiments to investigate and discriminate between the potential direct antifungal and elicitor effects. We highlight that OEO strongly impacts *P. viticola* sporulation when leaf disks were treated after inoculation. OEO induced plant defense-related genes in *V. vinifera* for a short period enhancing its overall defenses against *P.viticola*. To deepen our understanding of OEO mode of action, we aim to decipher the molecular mechanisms behind its action combining RNA-seq and metabolomics approaches. Data from these experiments will help us to harness the potential of OEO and might provide clues to support alternative solutions to manage *P.viticola*.