ABSTRACT

Grapevine plant, *Vitis vinifera*, is sensitive to a large spectrum of pathogens like downy mildew, grey mould or powdery mildew. Alternative strategies to control grape diseases include stimulation of defenses which relies on the application of inducers of resistance.

In this work, we study the mechanism of action of sulfated laminarin, PS3, in grapevine plants. Using grapevine cell suspensions, we demonstrate that PS3 does not induce a wide array of defense responses except variation in the plasma membrane potential. However, grapevine foliar treatment with PS3 significantly reduces significantly *Plasmopara viticola* infection, which is a downy mildew pathogen. This resistance can be observed via microscopic approach which shows a drastic diminution of the colonization of the pathogen *in planta* and the inhibition of the oomycete sporulation. By complementary approaches, we demonstrate that the efficiency of this sulfated β-glucan is associated with priming of the defense responses, including salicylic acid production, callose and phenol depositions, phytoalexins synthesis and H_2O_2 production. This work is focused on the determination of the molecular mechanisms for the establishment of the PS3-induced resistance in grapevine plants against *Plasmopara viticola*. Transcriptomic and pharmacological approaches lead us to identify the genes determining the induced resistance which depends on the ion channel activity and reactive oxygen species production.

Key words : sulfated laminarin, grapevine, defense reponses, priming, transcriptomic, induced resistance.