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CONTROL OF GRAPEVINE DOWNY MILDEW BY PROTEIN HYDROLYSATES.

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Downy mildew, caused by *Plasmopara viticola*, is one of the most important grape pathogen in Europe and North America. Although the control is traditionally performed with fungicides, the appearance of resistant pathogen populations and the possible adverse effects on human and environment health are spurring the search for alternative means. In the present investigation, two protein hydrolysates of soybean (*soy*) and casein (*cas*) origin were successfully tested against *P. viticola*. On *Vitis vinifera* cv. Marselan plants, the application of *soy* and *cas* reduced the infected leaf surface by 76 and 63%, as compared to the untreated control, respectively. Since both hydrolysates seemed to trigger the plant immunity, we investigated their effect on selected grapevine defense responses. On treated grapevine cell suspensions, a different free cytosolic calcium signature was recorded for each hydrolysate, whereas a similar transient phosphorylation of two MAP kinases of 45 and 49 kDa was observed. These signalling events were followed by transcriptome reprogramming, including the up-regulation of genes encoding pathogenesis-related (PR) proteins and the enzyme stilbene synthase responsible for the biosynthesis of resveratrol, the main grapevine phytoalexin. Liquid chromatography analyses confirmed the production of resveratrol and its dimer metabolites, δ- and ε-viniferins. Overall, *soy* effect was more pronounced than *cas* one. Both hydrolysates proved to be able to enhance grapevine immunity against pathogen attack.