Effects of Diffusible Molecules Produced by *Bacillus* spp. Isolated from the Grapevine Leaf Microbiome on Different Pathogens

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With the wide-ranging use of pesticides, multiple problems such as contamination of drinking water and soils as well as harming beneficial organisms have arisen. A promising approach towards sustainable and economically-friendly disease control in agronomy is biocontrol. In this Master thesis, the activity of four *Bacillus* strains and one *Variovorax* strain on different pathogens' mycelia was examined by conducting diffusible dual assays and volatile dual assays. The four *Bacillus* strains and the *Variovorax* strain drastically reduced mycelial growth of *Botrytis cinerea*, *Phytophthora infestans* and, to a lesser extent, *Rhizoctonia solani* and *Fusarium solani* in direct dual assays. Volatile organic compounds produced by the five bacterial strains did not or only marginally have an impact on the mycelial growth of *B. cinerea*, *P. infestans*, *F. oxysporum*, *F. solani* and *R. solani*. Further, the effect of the bacterial cultures and their cell-free filtrate on *Botrytis cinerea* spore germination and early mycelial growth was explored and the cause for the activity was sought. Bacterial cells and the cell-free filtrate of five *Bacillus* strains (four strains chosen for this project and one additional strain) caused abnormal growth of *B. cinerea* spores and partly diminished spore germination. Moreover, the cell-free filtrate and bacterial cells of these strains had similar effects on *B. cinerea* early mycelium. Putative active molecules from two *Bacillus* strains were extracted and tested against *B. cinerea* mycelium with agar overlay bioautography experiments and with diffusible dual assays. Activity of the extracted molecules against *B. cinerea* mycelium was detected in diffusible dual assays with filter disks. Surfactins were isolated from the extract of the cell-free filtrate of two active *Bacillus* strains. Being interesting candidates, the effect of surfactins on *B. cinerea* mycelial growth could be tested as a next step. In future, such active molecules could possibly be used to fight phytopathogens as an alternative to pesticides.

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