ABSTRACT

Endophytes are a group of microorganisms that infect the internal tissues of plant without causing any immediate visible symptom of infection and/or manifestation of disease, and live in mutualistic association with plants for at least a part of their life cycle. In the last decade, discovery and characterization of potent endophytes producing bioactive natural products have led to the possibility of exploring the potential benefits of these microorganisms in agricultural and pharmaceutical sectors.

The objective of this study was to isolate, identify and assess the biocontrol efficacies of fungal and bacterial endophytes harbored in *Cannabis sativa* L. plants and the liverwort *Radula marginata*. Despite significant production of cannabinoids, the major secondary metabolites of *C. sativa* L. plants, numerous phytopathogens are able to attack different parts of the plant leading to disease. Thus far, the host–specific phytopathogens were challenged with the endophytes by devising dual culture antagonistic assays resulting in varying degrees of pathogen inhibition concomitant to a plethora of endophyte-pathogen antagonistic interactions.The overall biodiversity of endophytes distributed among the tissues were further evaluated using detailed statistical calculations to correlate with their functional traits. Additionally, using the rationale that structurally similar cannabinoids are produced by phylogenetically unrelated *C. sativa* and *R. marginata*, similar and discrete functional traits of endophytic community were explored.

This study also provides fundamental insights into the antivirulence strategies used by bacterial endophytes of *C. sativa* L. A combination of HPLC-ESI-HRMS^n and MALDI-imaging-HRMS was used to quantify and visualize the spatial distribution and quenching of four different AHLs (*N*-acyl-L-homoserine lactones) used by *Chromobacterium violaceum* for violacein-mediated quorum sensing. MALDI-imaging-HRMS was further used for visualizing the spatial localization of each AHL by *C. violaceum* and the concomitant selective impediment of the AHLs by bacterial endophytes.

The results reported in this thesis underline the defensive functional traits of selected endophytes and opens new avenues towards further exploitation of endophytes harbored in *C. sativa* L. plants and *R. marginata*.