Quenching of quorum coordination by potent endophytic bacteria harbored in *Cannabis sativa* L. plants

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What are endophytes?

Endophytes are microbes that colonize living, internal tissues of plants without putatively causing any immediate, overt negative effects and might live in symbiotic/mutualistic association with the host plant.

Why endophytes?

Understanding and elucidating the multifaceted cost-benefit trade-offs between endophytes harbored in *Cannabis sativa* L. and interacting organisms that lead to desired biological functions.

Quenching of quorum coordination in the biosensor strain *Chromobacterium violaceum* by potent endophytic bacteria: Investigation by matrix assisted laser desorption ionization imaging high-resolution mass spectrometry (MALDI-imaging-HRMS)

(a,d): Microscopic images of untreated *C. violaceum* showing visible production of violacein (violet color)

(b,e): Microscopic images of *C. violaceum* after spraying with suitable matrix showing the crystals of uniform matrix covering the colony and its periphery

(c): Localization of C6-HSL

(f): Localization of C8-HSL

(g): Localization of C10-HSL

(h): Localization of 3-oxo-C10-HSL

(i): Microscopic image of *C. violaceum* treated with endophytic extract (CFS); No visible production of violacein

(j): Remnants of C6-HSL after being quenched

(k): Remnants of C8-HSL after being quenched

(l): Remnants of C10-HSL after being quenched

(m): Remnants of 3-oxo-C10-HSL after being quenched

(a) Representative LC-FTMS extracted ion chromatograms of detected AHLs; and

(b) Representative MS/MS spectra showing comparison of C10-HSL in authenticated standard (top) and in the control biosensor strain (bottom)

Outlook:

Our work emphasizes on the association of *Cannabis sativa* L. plants with endophytic microorganisms under various biotic and abiotic selection pressures, leading to an assortment of cost-benefit mutualisms, and further to the development of certain phenotypic or functional ‘traits’ in the interacting organisms. One such trait is the ‘quorum quenching’ ability of endophytes to thwart invading pathogens without introducing resistance-mediating selection pressures. These traits could be exploited in agriculture and medicine by utilizing endophytes as tools for biological control of bacterial phytopathogens and as antivirulence agents in clinical therapies.

References:


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