

Title:

The influence of pathogenic fungi on the production of siderophores by bacteria isolated from grapevine

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Abstract (300 words maximum): :

Iron is a vital element for organisms' growth and for microorganisms' virulence. To obtain iron, some of these microorganisms produce small chelating molecules called siderophores which bind iron with high affinity and high selectivity. Recent research has shown that bacteria can reduce the growth and impact the fitness of pathogenic fungi by producing siderophores, thus limiting iron available for the pathogen in the environment.

The idea of this project is to understand which signals are exchanged between the siderophore-producing bacteria and the different fungi, that can lead to an increase in the production of siderophores. A screening among bacteria isolated from the grapevine microbiome was first performed to select strains producing siderophores. To carry out this selection, the CAS (Chrome Azurol S) method was used: when siderophores are produced, the iron ions bound to the CAS will be removed by the siderophores, which will involve a color change in the iron-depleted CAS. This method allows rapid visualization of the siderophore production, and a quantitative estimation can also be done.

The CAS solution was first added to liquid bacteria cultures for a first selection, then to strains grown on solid media to confirm the first selection results. From the 221 strains tested, 38 were found to produce siderophores, and they belonged to five different genera: *Bacillus* (25% of strains were positive), *Staphylococcus* (19%), *Cupriavidus* (29%), *Niella* (100%) and *Paenibacillus* (100%).

The second part of the project will consist of dual culture assays between bacteria and pathogenic fungi, to determine whether the presence of pathogenic fungi induces a change in siderophore production in the bacteria. More research on compounds produced by fungi will be done if a modification of the bacterial production of siderophores is observed.