# What it takes to be a plant growth promoter: characterization of two strains of soil saprotrophic fungi *Minimedusa polyspora* and *Chaetomium globosum*

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The development of new nature-based solutions for the cultivation of food and medicinal crops is a key strategy to promote environmentally sustainable agriculture. Fungi can promote plants' growth through different mechanisms, such as improvement of nutrition, biostimulation, bioprotection and soil bioremediation from toxic compounds or altered functions (Owen et al. 2015). Therefore, it is crucial to identify and characterize fungal strains with plant growth promotion abilities. This study focused on the characterization of two strains of saprotrophic soil fungi: *Minimedusa polyspora* (Hotson) Weresub & P.M. LeClair and *Chaetomium globosum* Kunze. In order to characterize these strains, we evaluated the growth kinetics and the phenotypic profile. Phenotype microarray system allowed, through measurements of respiration and biomass production, to assess strains' ability to use and metabolize a wide range of different substrates. Furthermore, siderophores production is considered an important function related to plants' nutrition improvement and bioprotection. Fungi producing siderophores can promote the dissolution of insoluble minerals and the transfer of iron (Fe), or other cations, into the soil solution as chelates, making them available to plants. Additionally, siderophores play a significant role in the biological control of phytopathogens, since they behave as competitors in Fe uptake (Ahmed, Holmström 2014). Therefore, we also evaluated the production of siderophores of the tested fungal strains by means of the chrome azurol S assay (Milagres et al. 1999). The results of the study showed that the two fungal strains have a high growth rate, which makes them suitable for a biotechnological application. Both of them were able to grow on a wide range of substrates (respectively 50 for *C. globosum* and 29 for *M. polyspora*) as resulted from the phenotypic profiles, therefore not requiring particular nutritional conditions. Finally, the chrome azurol S assay showed that both strains can produce siderophores. However, at the same growth-time, siderophores of *C. globosum* showed a higher chelation activity than those of *M. polyspora*. In conclusion, the results of this study show that these strains have promising characteristics for plant growth promotion applications, and therefore will be further tested on plants.

**References**

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