Potential of bacterial phytases in promoting plant phosphate nutrition and growth in phosphate poor environments

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I. Abstract

Productivity of higher plants depends on the availability of various minerals in the soil, such as phosphorus (P), one of the essential macronutrients required for plant growth and it cannot be substituted by any other element to sustain plant life (Heuer *et al.*, 2017). Soil P is taken up by root systems from the rhizosphere, but is the most immobile and unavailable of all the macronutrients making P deficiency widespread stress in natural and agricultural environments. Consequently, the global agricultural crop production is largely dependent today on the intensive use of P-fertilizers originating from nonrenewable P rocks (Gilbert, 2009) and all experts acknowledge that the world will soon face P scarcity crisis that might affect global food security. The majority of the added P is transformed into organic phosphate (Po), of which up to 60–80% is inositol hexakisphosphate, also known as phytic acid or phytate (PA) that is not directly available to plants. Microbial phytases constitute a group of enzymes that are able to remobilize Pi from PA. Thus, the use of these phytases to increase the capacity of higher plants to remobilize Pi from PA is of agronomical interest. This conference will focus on the current status of knowledge gained on the functional properties of various phytases and gives an overview of the recent advances on their potential in improving plant P nutrition and plant growth under P limited conditions. Their use as innovative biotechnological tools for sustainable and environmentally friendly agriculture will be also discussed.

II. Image



This picture illustrates growth stimulation of tobacco (T) when co-cultivated with *Arabidopsis* (Col-0) seedlings secreting the bacterial phytase ePHY-US417. Tobocacco and Arabidopsis seedlings were grown together under hydroponic conditions in a medium containing phytic acid (*myo*-inositol-1,2,3,4,5,6-hexa*kis*phosphate) as sole P source.

III. References

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IV. Biography

Moez HANIN obtained his PhD in Biology in the Department of Botany and Plant Biology at the University of Geneva in 1998. From 1998-2002, he was a post-doctoral fellow at the Friedrich Miescher Institute in Basel (Switzerland), working on plant genomic recombination. In 2002, he was appointed as Assistant-Professor at the Institute of Biotechnology (University of Sfax) where he obtained a Professorship in 2012. He is also the director of the Functional Genomics and Plant Physiology Research Unit. M. HANIN has authored more than 40 publications in international peer-reviewed journals and book chapters (H-index =19). His research focuses on molecular mechanisms controlling plant tolerance to abiotic stresses, mainly drought, salinity and phosphate deficiency. Among the research topics, he is interested in exploring the potential of bacterial phytases to promote plant growth under phosphate starvation.

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