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Differential Expression of *alp* Gene and Sporulation Pattern of *Glomus* with Ri T-DNA Transformed Hairy Roots

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Abstract

After nitrogen, phosphorous (P) is second most limiting element for plants growth. It is a major component of fundamental macromolecules, plays an important role in energy transfer, regulation of enzymatic reactions and different metabolic pathways. P is taken up by plant roots as phosphate (Pi), which is one of the least available nutrients in the soil even after application of P-fertilisers. Plants have evolved a variety of adaptive strategies for Pi-acquisition which involves altered root morphology, exudation of organic acids, phosphatases and nucleases for solubilising Pi from organic resources and the establishment of a symbiosis with arbuscular mycorrhizal fungi (AMF).

Alkaline Phosphatase gene (*alp*) is an AMF specific, considered to reflect fungal activity within the symbiotic system and not reported in uncolonised roots as it is expressed only under symbiotic conditions.

In this study the Ri T-DNA transformed roots were grown *in vitro* with *Glomus intraradices* as root organ cultures and analysed for the variations in patters for sporulation, alp gene expression and nutrient growth profiling. It was demonstrated that *alp* gene regulating the production of alkaline phosphatases was host dependent. For the nutrient analysis, the phosphorus concentrations obtained were similar to those obtained in the real time expression study with a maximum for *Daucus carota* var pusa kesar (carrot), followed by *Trifolium subterraneum* (egyptian clover), followed by *Daucus carota* var Berlicummer (carrot) with 0.9993 correlation factor.

This study helps in the selection of appropriate inoculum as a biofertiliser, based on its enzymatic ability to solubilise the phosphates and aiding better nutrient uptake in agricultural crops.

Keywords: Alp gene, biofertilisers, inocula, nutrient growth profiling, phosphorus, real time expression, sporulation

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