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Effect of the mycorrhizal-like fungus *Piriformospora indica* and phosphorus fertilization on rock phosphate solubilization and growth of tomato

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**Background:** The *Piriformospora indica* is an endophytic fungus that was isolated in India. In contrast to the obligate biotrophic mycorrhizal fungi, *P. indica* can be cultivated easily on synthetic media. Earlier works established that *P. indica* increased biomass in several host plants belonging to a wide range of taxa. The
enhanced biomass results from improved nutrient status. In particular, *P. indica* mediate phosphorous supply. The objective of this study is to evaluate the role of *P. indica* in solubilizing rock phosphate and enhancing growth of tomato.

**Methods:** Young germinations of tomato (Campbell 33) were grown on inert substrate containing 5g of rock phosphate and inoculated or not with *P. indica*. Cultures were irrigated with Hoagland solution where phosphorus concentration was reduced to 0%, 25%, 50% or 100%.

**Results:** Results obtained showed that the ability of *P. indica* to colonize roots of tomato was negatively affected by soluble phosphorus concentration. The highest intensity of root colonization (45%) was observed with nutrient solution strongly P-deficient (25%). *P. indica* significantly increased (~40%) plant height, shoot and root fresh weight, leaf number and shoot and root dry weight. This positive effect was more spectacular under sever P-deficiency. Without any soluble phosphorus, P contents of leaves and roots were two time higher in inoculated plants. Moreover, the phosphorus use efficiency and the foliar content of K and Na were significantly higher in inoculated plants. Similarly, high acid phosphatase activity and high sugar and protein contents were observed in inoculated plantlets.

**Conclusion:** *P. indica* seems well suited for solubilizing phosphate and enhancing tomato plant growth and is more efficient under P-deficiency.

**Keywords:** Tomato, *Piriformospora indica*, phosphate solubilization, Growth, phosphatase.