Phosphate solubilizing bacteria from the rhizosphere of *Theobroma grandiflorum* (Willd. ex Spreng.) Schum. and *Bactris gasipaes* H.B.K.: Potential for plant growth promotion

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Despite high total phosphorus (P) concentrations in many tropical soils P deficiency may limit plant growth. P availability is low due to formation of insoluble P salts and/or sorption of P to Fe/Al oxides and hydroxides as well as to the organic matter. Productivity of crop plants may be increased by inoculation with mycorrhiza or P solubilising microorganisms. While the use of mycorrhizal fungi is widespread inoculation P solubilising microorganisms is still uncommon. However these microorganisms may have a potential to increase plant growth particularly in combination with mycorrhizal fungi. Plant growth promotion is often increased not only by P solubilisation but also N_2 fixation and production of phytohormones.

We have isolated bacteria from the rhizosphere of two perennial crop plants (*Bactris gasipaes* and *Theobroma grandiflorum*) growing on the SHIFT experimental site near Manaus. More than 70% of the isolates were capable to grow in the presence of Fe and Al phosphate as a sole P source. The two bacteria chosen for further studies were identified as *Bacillus sp.* and *Gordonia sp.* An in vitro study showed that the P solubilisation by the organisms is probably due to the excretion of organic acids. Organic acids increase P solubilisation by chelation of Fe and Al and by displacement of P from the binding sites. However most of the P solubilized was taken up by the cells and the P concentration in the medium remained low.

Results of green house experiments with tomato were ambiguous. In one experiment both organisms increased plant growth on Fe/Al phosphates compared to the not inoculated control while this was not the case in the second experiment. Possible explanations for these conflicting results are differences in inoculum survival and light intensity. It is planned to repeat the experiments and to include mycorrhizal fungi.