Title: CALCIUM AND IRON PHOSPHATE SOLUBILIZATION BY ENDOPHYTIC FUNGI FROM *Butia purpurascens* GLASSMAN ROOTS

Authors Pessoa, M.M. [1]; Silva, C.F. [2]; Silva, H.M. [1]; Costa, L.C. [1]; Souchie, E.L. [1]

Institution [1] Instituto Federal Goiano - Câmpus Rio Verde, (Rod. Sul Goiana Km 01, Cx. P. 66, Rio Verde – GO); [2] Universidade Federal de Goiás (IPTSP - Instituto de Patologia Tropical e Saúde Pública, Rua 235 s/n, Setor Universitário, Goiânia - GO)

Abstract:

Since phosphorus (P) is commonly involved in adsorption and precipitation reactions in soil, it is the nutrient which presents the lowest mobility rate among the essential nutrients for plants. Consequently, soil P concentration is generally low despite high total P content. Fungi are important components of soil microbiota typically constituting more of the soil biomass than bacteria, depending on soil depth and nutrient conditions. A wide range of soil fungi are reported to solubilize insoluble P making it available to plants. Strains of *Aspergillus* and *Penicillium* are the most common fungi capable of phosphate solubilization. This mechanism can be used to maximize the seedling growth of *Butia purpurascens* Glassman under nursery conditions. *B. purpurascens* Glassman is a typical tropical palm known as “palmeira-jataí” with high landscaping potential, biofuel production and urban forestation of tropical regions. It is found mainly in Goiás Southwest region and currently is under extinction risk, due to anthropic actions and low seed percentage germination. This work aimed to quantify the calcium and iron phosphate solubilization in liquid culture by endophytic fungi isolated from “palmeira-jataí” roots. Thirteen fungi isolates were grown in potato dextrose agar media for three days at 30 °C in a static oven. Subsequently, a disk with 5 mm of diameter with mycelial growth was inoculated in penicillin flask (one disc per flask). The isolates were incubated in GL liquid medium at 30 °C with shaking at 90 rpm for 72h, in triplicates. Then, pH and soluble P in liquid medium were determined. The phosphate solubilization evaluation was carried out using the vitamin C colorimetric method, in spectrophotometer (725 nm). 54% were capable to solubilize $CaHPO_4$ and only 15% $FePO_4$ solubilized. Only *Penicillium purpurogenum* BP16EF was able to solubilize both P sources. Most of isolates showed higher acidification potential in culture medium incubated with $CaHPO_4$ than $FePO_4$. Consequently, higher P soluble values were detected in medium with $CaHPO_4$ with medium. The potential mechanism for phosphate solubilization might be acidification either by protone extrusion associated with ammonium assimilation or by organic acids production and proton extrusion. Among the fungi isolates tested, *Penicillium purpurogenum* BP16EF has the highest potential to increase the seedling growth of *Butia purpurascens* due to its highest ability to solubilize both P sources.

Keywords: plant growth promotion, “palmeira-jataí”, P-solubilizing fungi

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