



PHOSPHATASE ACTIVITY AND PHOSPHORUS AVAILABLE BY MICROORGANISMS IN CULTURE MEDIUM CONTAINING DIFFERENT SOURCES OF PHOSPHATE

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The use of phosphate solubilizing bacteria (PSB) associated with organic mineral fertilizers is a promising alternative to increasing agricultural productivity of tropical soils. This technique reduces production costs associated with conventional phosphate fertilizers and reduces environmental impacts caused by the indiscriminate use of these fertilizers. The objective of this study was to analyze the activities of phosphatase enzymes and phosphorus solubilization by microorganisms cultured in liquid media enriched with organic and mineral sources of phosphorus. Aliquots containing 10^8mL^{-1} cells from three PSB (B30, B70 and B119), belonging to the collection of multifunction microorganisms of EMBRAPA Maize and Sorghum, were inoculated into culture medium containing different sources of phosphorus: poultry litter, organic compound (composting of cane, rocks and manure of cattle and poultry), sodium phytate and phosphate rock (Araxá phosphate) at pH 7.0. The incubation was performed at 28°C under stirring during 9 days. The activity of acidic and alkaline phosphatase enzymes and soluble phosphorus were determined after 3 and 9 days of incubation. The tests were performed in triplicate with a control treatment (without inoculum) for each culture medium composition. The data were submitted to analysis of variance (ANOVA) and the means were compared using the Scott-Knott test ($p \leq 0.05$). The results showed that B30 and B70 bacteria had greater capacity to solubilize phosphorus and reducing the pH of the medium. Additional available phosphorus concentrations were obtained by associating the B30 strain enriched with the Araxá phosphate (71.45 mg.L^{-1} , pH 3.6), poultry litter (21.70 mg.L^{-1} , pH 3.4) and the organic compound (15.33 mg.L^{-1} , pH 4.4). In the culture medium containing sodium phytate higher concentration of available phosphorus was obtained when the B70 strain was used (74.80 mg.L^{-1} , pH 3.0). Regarding the activities of acidic and alkaline phosphatase enzymes no significant differences were found between the two incubation times, with higher rates measured after 3 days.

Enzymatic activity of alkaline phosphatase was highest when the B30 bacteria was inoculated in medium supplemented with the organic compound. In general, the B30 strain showed higher capacity for solubilizing phosphorus from different sources, demonstrating potential to be used associated with organic mineral and applied as alternative fertilizers.

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