TITLE: BIOSOLUBILIZATION OF PHOSPHATES *IN VITRO* BY *Aspergillus* AND *Penicillium* ISOLATES

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ABSTRACT:
Phosphate solubilizing microorganisms play an important role in the supply of phosphorus (P) for plants, as they are able to provide insoluble phosphates in soluble forms. Thus, the objective of this work was to evaluate the capacity and potential of fungal isolates to solubilize single superphosphate (SSP) and thermophosphate (THP) *in vitro*. Phosphate solubilizing fungi (PSF) were isolated from rhizospheric soils of sugar cane (*Saccharum* spp. L.). In order to obtain the PSF, aliquots of one milliliter of serial suspensions (1:1000 v/v) of soil samples were plated in a solid GY (glucose and yeast extract) culture medium in addition to chloramphenicol and inorganic phosphate ($CaHPO_4$), and incubated for 96 hours at 28 °C in a BOD (biochemical oxygen demand). Fungi which presented a solubilization halo around the colonies were isolated and kept at 4 °C in test tubes containing PDA (Potato Dextrose Agar) medium for later identification at a specific level, deposit in the URM Collection of Cultures of the Federal University of Pernambuco, and quantitative analysis of soluble phosphorus. Aliquots of 10^7 spores mL^{-1}, quantified in a Neubauer chamber, from each PSF isolate were tested in a liquid GY medium containing SSP (18% P_2O_5) and THP (14% P_2O_5) with pH adjusted to 6.5 in 15 repetitions. The Erlenmeyer flasks were incubated under agitation (150 rpm) at 30 ºC for a period of 10 days. Soluble phosphorus (filtered) was determined by spectrophotometry (660 nm). From the rhizosphere soils, a total of 38 specimens of PSF were isolated, being 37 *Aspergillus* and 01 *Penicillium*. From these, five *Aspergillus* and one *Penicillium* presented solubilization potential ranging from 330.5 to 385.3 μg SSP mL^{-1} of soluble P and 189.6 to 231.5 μg THP mL^{-1} of soluble P. The solubilization efficiency of the SSP and THP in relation to the control was of around 60 % for three specimens. Efficiency in the solubilization of less soluble sources such as THP by PSF can greatly reduce the amount of this fertilizer applied to the soil and consequently reduce the impact of excess inputs and production costs. Although SSP is the most soluble source in water (16 %), part of the P may become adsorbed or converted into very scarcely soluble compounds. This way, besides increasing the solubility of SSP, the application of PSF could optimize the use of this phosphate fertilizer added to the soil.

Keywords: *Aspergillus*, phosphorus, microorganisms, *Penicillium*

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