ID TRABALHO: 204/2708-0

ÁREA DO TRABALHO: MICROBIOLOGIA DO SOLO

TÍTULO DO TRABALHO: Phosphate Solubilization And Iaa Production By Yeasts Isolated From Amazonian Soils In Czapek Medium

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RESUMO:

Yeasts have gained attention as promising plant growth-promoting microorganisms due to their metabolic versatility, ability to produce phytohormones, and to solubilize inorganic phosphates. Their biotechnological potential includes applications as biofertilizers and biostimulants, contributing to sustainable agriculture, especially in low-fertility tropical soils. The Rio Negro Sustainable Development Reserve (SDR), in the state of Amazonas, presents unique environmental conditions with sandy, nutrient-poor soils that harbor microorganisms with exceptional functional potential due to their adaptation to these challenging conditions. In this context, the objective was to assess the phosphate solubilization capacity and indole-3-acetic acid (IAA) production of yeast isolates from both non-flooded upland and riparian soils within Module 50 of Rio Negro SDR. Twelve yeast isolates were obtained using standard microbiological techniques on Czapek agar medium. Phosphate solubilization assays were conducted on Pikovskaya medium supplemented with Ca₃(PO₄)₂, FePO₄, or AlPO₄, and solubilization index (SI) was calculated. IAA production was quantified spectrophotometrically using Salkowski reagent. Molecular identification of the twelve isolates was performed by sequencing the D1/D2 domain of the LSU rDNA using primers NL1 and NL4. Molecular identification revealed nine distinct genera distributed as follows: from upland soils, Vanrija (CZA379 – TS4500, CZA164 – TS0500), Coniochaeta (CZA534 – TS3500), Apiotrichum (CZA234 – TS0500), Spencermartinsiella (CZA266 – TS0500), Saitozyma (CZA374 – TS4500), Candida (CZA31 – TS2500), Papiliotrema (CZA29 – TS1500), and Sugiyamaella (CZA98 – TS2500); from riparian soils, Candida (CZA490 – TN0150), Rhodotorula (CZA37 – TN0700), and Sugiyamaella (CZA122 – TN0150). All isolates demonstrated phosphate solubilization activity exclusively for aluminum and iron phosphates, with no activity observed for calcium phosphate. For FePO₄ solubilization, SI values ranged from 1.0 to 10.8 ± 5.8 (Rhodotorula sp. CZA37), while AlPO₄ solubilization showed SI values from 1.0 to 11.2 ±

1.34 (Saitozyma sp. CZA374). IAA production was detected only in Candida spp. isolates CZA31 and CZA490, yielding 2.37 ± 0.59 and 2.65 ± 0.31 µg/mL, respectively. These findings demonstrate the multifunctional biotechnological potential of Amazonian yeasts as sustainable alternatives for plant growth promotion in tropical agriculture systems.

Figure 1 – (A) Phosphate solubilization from aluminum and iron sources by yeasts CZA 122, CZA 31, and CZA 266, respectively. (B) IAA production: positive control (C+), negative control (C−), and yeast CZA 31.

Keywords: Yeasts; phosphate solubilization; indole-3-acetic acid (IAA); sustainable agriculture; Amazon rainforest; Rio Negro SDR; biofertilizers; biostimulants.

Acknowledgments: The authors thank the Fundação de Amparo à Pesquisa do Estado do Amazonas (FAPEAM) and the Conselho Nacional de Desenvolvimento Científico e Tecnológico (CNPq) for financial support (Process No.: 445406/2024-0 / CNPq Pró-Amazônia Call).