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ÁREA DO TRABALHO: MICROBIOLOGIA DO SOLO

TÍTULO DO TRABALHO: Taxonomic And Functional Diversity Of Plant Growth-Promoting Yeasts From Amazonia White-Sand Forest Soils.

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RESUMO:

The Rio Negro Sustainable Development Reserve (SDR), located in the state of Amazonas, is characterized by nutrient-poor and highly leached soils. Despite these limitations, such soils support the unique white-sand forests found within the reserve. This ecological resilience is partly attributed to microbial communities, such as yeasts, which can promote plant growth by synthesizing indole-3-acetic acid (IAA) and solubilizing inorganic phosphate. This study aimed to evaluate whether yeasts isolated from PDA of the Rio Negro SDR are capable of producing IAA and solubilizing phosphate. For yeast isolation, 1 g of soil was suspended in 0.85% saline solution and serially diluted up to 10⁻³. From this dilution, 200 µL was plated in triplicate on PDA supplemented with 0.03% chloramphenicol. The plates were incubated at 28 °C for three days. The isolated yeasts were identified at the molecular level using LSU primers (NL1 and NL4). To assess IAA production, the yeasts were cultured for four days in Yeast Mold medium. The culture supernatant was then mixed in equal volumes with Salkowski reagent to determine whether IAA was present. For phosphate solubilization, the yeasts were incubated for 72 h in Pikovskaya medium supplemented with FePO₄, AlPO₄, or Ca₃(PO₄)₂, along with bromocresol green as a pH indicator to enhance halo visualization. The solubilization index (SI) was calculated as the ratio between the total diameter of the halo and the diameter of the colony. The yeast strains were identified as Candida (CPAA-PD493, CPAA-PD500, CPAA-PD532), Schwanniomyces (CPAA-PD331), Papiliotrema (CPAA-PD264, CPAA-PD268, CPAA-PD407), Vanrija (CPAA-PD260), Kwoniella (CPAA-PD459), Rhodotorula (CPAA-PD146, PD539), Spencermartinsiella (CPAA-PD116), Trichomonascus (CPAA-PD286), and Xenoacremonium (CPAA-PD370). Among the phosphate sources tested, only Ca₃(PO₄)₂ was not solubilized. The solubilization index (SI) ranged from 2 to 11 for FePO₄ and from 4 to 11 for AlPO₄, after 72 h of incubation. Candida spp. showed the highest solubilization capacity after 72h, with CPAA-PD500

reaching an SI of 11.4 ± 1.28 (FePO₄) and 9.92 ± 0.71 (AlPO₄), CPAA-PD532 with 9.46 ± 0.92 (FePO₄) and 8.53 ± 1.28 (AlPO₄), and CPAA-PD493 with 7.11 ± 0.69 (FePO₄) and 8.04 ± 0.73 (AlPO₄). Although strains CPAA-PD500 and CPAA-PD532, from non-riparian soils (TS2500), showed high identity (99.8% and 99.2%) and 100% query coverage with Candida railenensis (KY106716), they did not cluster within the same phylogenetic branch (bootstrap = 52), suggesting that they may represent closely related variants or distinct lineages within the species complex. In contrast, strain CPAA-PD493, from riparian soils (TO0500), exhibited 100% query coverage and 99.8% identity with Candida maltosa (KY106554) and clustered within the same branch as C. maltosa sequences (NG054842, KY106554, KJ722418), with strong bootstrap support (99). Additionally, only Candida spp. (CPAA-PD500, CPAA-PD532), Schwanniomyces (CPAA-PD331) and Papiliotrema (CPAA-PD268) produced IAA, highlighting the in vitro potential of Candida spp. as plant growth-promoters. Further studies will be carried out to investigate their effectiveness in promoting plant growth under in vivo conditions.

Keywords: Amazonian yeast, soils, Phosphate solubilization, IAA

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