**ID TRABALHO:** 204/1185-0

**ÁREA DO TRABALHO:** MICROBIOLOGIA DO SOLO

**TÍTULO DO TRABALHO:** A Fungal Ally From The Amazon: Talaromyces Sp. Pd2 For Biocontrol And Plant Growth Promotion. Um Aliado Fúngico Da Amazônia: Talaromyces Sp. Pd2 Para Biocontrole E Promoção Do Crescimento Vegetal

**AUTORES:** Kamila Tomoko Yuyama, Samuel Correa Bandeira, Ashlyn Hosannas Seixas Singh, Thaísa Gonçalves Ferreira, Thaissa Lorena Fernandes Soares, Gilvan Ferreira Da Silva

**INSTITUIÇÃO:** EMBRAPA da Amazônia Ocidental (1), (2), (3), (4), (5), (6)

**RESUMO:**

Anthracnose, a post-harvest disease caused by Colletotrichum spp., can result in up to 80% yield loss in bananas. The Rio Negro Sustainable Development Reserve (RDS) contains nutrient-poor, highly leached soils, particularly in palm-dominated riparian zones shaped by seasonal flooding. Despite low nutrient availability, these soils support diverse microbial communities likely adapted to intense resource competition and involved in processes such as plant growth promotion. Given these conditions, it is hypothesized that native fungi like strain PD2 may exhibit antagonism against phytopathogens and promote plant growth. This study aims to assess its antifungal potential and plant growth-promoting properties. PD2 strain was isolated from riparian soil (TN0150; 02°55′16″S, 60°51′08.82″W) using serial dilution and plating on PDA, followed by incubation at 28 °C and purification through monosporic isolation. Molecular identification was performed using ITS (ITS1/ITS4) and β-tubulin (BenA: Bt2a/Bt2b) primers. Antagonistic activity against Colletotrichum sp. was assessed by dual culture, with mycelial plugs placed 3.5 cm apart during 7 and 9 days. Inhibition was expressed as PIRG = [(C – T)/C] × 100, where C and T are radial growths in control and test plates, respectively. Phosphate solubilization was tested on Pikovskaya medium with FePO₄, AlPO₄, or Ca₃(PO₄)₂, using bromocresol blue, and the solubilization index (SI) was calculated as halo diameter/colony diameter. Siderophore production was detected on MGs medium with 10% CAS, indicated by halo formation. Based on identification with type strains in GenBank, PD2 was identified as Talaromyces sp., showing 93.02% identity to Talaromyces aerius (BenA region) and 98.71% to Talaromyces chlamydosporus (ITS region). Although a multilocus phylogenetic analysis is required for accurate species delimitation, the observed divergence and low identity even in conserved regions such as ITS support the possibility that PD2 may represent a distinct lineage within Talaromyces, potentially corresponding to a novel species. Although Talaromyces sp. PD2 did not solubilize Ca₃(PO₄)₂, it showed effective phosphate solubilization of

AlPO₄, with solubilization index (SI) values of 2.16 ± 0.62 (24 h), 3.08 ± 0.62 (48 h), and 2.43 ± 0.27 (72 h), and of FePO₄ with SI values of 2.20 ± 0.07 (24 h), 2.82 ± 0.69 (48 h), and 2.30 ± 0.25 (72 h) after incubation at 30°C. Siderophore production was also detected, with halo diameters of 1.1 cm (24 h), 1.3 cm (48 h), and 1.6 cm (72 h) following incubation at 30°C. In antagonism assays, PD2 inhibited Colletotrichum sp. after 7 days, showing a PIRG of 43.7 ± 5.13%, and after 9 days with a PIRG of 55.1 ± 5.24%, incubated at 30°C. PD2 secretes a red exudate exhibiting pronounced antibiosis activity, forming a distinct inhibition halo— a characteristic rarely observed in fungi. Altogether, Talaromyces sp. PD2 is a promising ally for sustainable Amazonian agriculture, combining plant growth-promotion with strong antibiosis against the anthracnose pathogen.

Keywords: Talaromyces, antibiosis, siderophore production, iron phosphate solubilization, aluminum phosphate solubilization and anthracnose

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 and Process No.: 445388/2024-2).