In vitro biocontrol potential of endophytic actinobacteria against *Bipolaris sorokiniana*

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Abstract

Several diseases affect wheat cultures. One of the most relevant is caused by Bipolaris sorokiniana, a hemibiotrophic fungus. The phytopathogen is the causal agent of spot blotch, one of the most damaging diseases in wheat, which causes losses of 20%-80% in yields. The fungus attacks all organs of the plant, from the stem to the head, and disseminates through the remains of previous harvests and host plants and seeds. On the other hand, actinobacteria secrete substances that limit or inhibit the growth of phytopathogenic fungi and may be used in the biocontrol of these microorganisms. This study evaluated the physiological and enzymatic activity of tomato plant endophytic actinobacteria and their inhibition of Bipolaris sorokiniana based on the production of secondary metabolites. Their efficiency to colonize wheat seedlings was also assessed. Antibiosis was analyzed using the double-layer method, the agar- well-diffusion test, volatile metabolites, chitinase, glucanase, siderophores, indole-3-acetic acid, nitrogen fixation, phosphate solubilization and root colonization. Isolates with the highest antifungal potential were applied to optimize the production of active compounds in submerged culture. Enzymatic and physiological activities were evaluated at different incubation temperatures. A significant number (69.6%) of actinobacteria presented antifungal activity against at least one *B. sorokiriana* isolate. Of these, 17% produced a crude extract with inhibition halos over 2 cm. The highest production of bioactive metabolites was at 30ºC after 72h of incubation. The four selected isolates produced volatile compounds, chitinase, glucanase, siderophores, and exhibited nitrogen fixation, produced indole-3-acetic acid and root colonization. Only one isolate was not able to solubilize phosphate. The results obtained indicate that the isolates selected have good biocontrol potential and may be used *in vivo*.

Keywords: Antagonist actinobacteria, antifungal activity, biocontrol, spot blotch, lytic enzymes.

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