

# VII Simpósio de Microbiologia Agrícola

Inovação e Sustentabilidade para transformar o campo

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## Temporal dynamics and quantification of the compatibility level of *Trichoderma harzianum* and herbicides in tank-mix.

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Herbicides can directly affect the viability and action of microorganisms, especially bio-inputs applied in agriculture. While farmers commonly mix biological and chemical inputs, there is insufficient scientific research evaluating the compatibility of these mixtures. This study investigated the compatibility between biological products and herbicides at different time intervals (0, 6, 12, 24, 48 and 72 hours) after tank-mix preparation. To this end, compatibility assays were conducted by mixing commercial bio-inputs in a spray solution, followed by the quantification of microbial survival based on colony-forming units (CFU) remaining after different exposure periods. The herbicides used were glyphosate, 2,4-D, atrazine, S-metolachlor, and glufosinate-ammonium, while the tested bio-input was a commercial product based on *Trichoderma harzianum*. The isolated factors (herbicide and time) were significant for the compatibility of the bio-input with the herbicides, as was the interaction between these factors ( $p < 0.05$ ). Glyphosate showed the greatest incompatibility with the biological agent; significant differences relative to the control were observed at 12, 24, 48, and 72 hours (survival rate = 0.35%). Atrazine also showed rapid incompatibility (survival rate = 20%), especially at 48 and 72 hours. By the end of the experiment (72 h), all herbicides demonstrated incompatibility with *T. harzianum*. These data reinforce the importance of understanding the ecology of chemical and biological interactions to ensure more efficient resource use in agriculture.

**KEYWORDS:** herbicides; compatibility; microbiological interactions; bio-inputs;