Biological Control of *Tuta absoluta* in Saudi Arabia: A Promising Organic Strategy Using Entomopathogens

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Abstract

Tuta absoluta (Meyrick) is a damaging pest of tomato, with soil stages that are difficult to control using typical insecticides. This research tested two local biocontrol agents, *Beauveria bassiana* (strain NOAC.F7) and *Heterorhabditis* indica (strain NOAC.N8), applied alone or in sequence as soil drenches against the fourth larval stage of *T. absoluta* in greenhouse conditions. *B. bassiana* was tested at 2×10^8 and 2×10^9 spores/ml, while *H. indica* was applied at 100 and 150 IJs/cm². Sequential treatments involved *B. bassiana* followed by *H. indica* after 24 or 48 hours. The experiment used a randomized complete block design with three replicates, and adult emergence was measured. In the control, adult emergence was 100%. Single applications of either *B. bassiana* or *H. indica* moderately reduced pest emergence, to about 48–52%. Sequential treatments improved control, lowering adult emergence to 42–47%. While differences between the 24-hour and 48-hour intervals were not statistically significant, a slightly better suppression was observed with the earlier application of the nematodes. Overall, combining fungal and nematode biocontrol agents provided better control of *T. absoluta* than using either alone. These findings suggest that combining *B. bassiana* (NOAC.F7) with *H. indica* (NOAC. N8) could be an effective and environmentally friendly strategy for managing the fourth larval stage of *T. absoluta* in greenhouse tomato cultivation.

Keywords

Biocontrol, T*uta absoluta, Heterorhabditis indica, Beauveria bassiana,* Tomato, Greenhouse.