Antifeedant Activity and Contact Toxicity of the Two Peptaibols, Trichocellin A-I and B-II Isolated from the Endophytic Fungus *Trichoderma reesei*

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Plutella xylostella is a destructive cabbage pest responsible for massive economic losses worldwide. The use of synthetic pesticides in huge amounts for its control has resulted in pesticide-resistant strains, detrimental human health impacts, and environmental problems. Consequently, the development of alternatives with minimal such undesirable side-effects becomes crucial. Biopesticides derived from microbes are one such alternative. In a preliminary study, the crude extract of the endophytic fungus *Trichoderma reesei* isolated from *Cyperus iria* exhibited prominent antifeedant activities against *P. xylostella* larvae. The main aim of the current study was to isolate the bioactive compounds of *T. reesei* and investigate their antifeedant activities and contact toxicities against *P. xylostella* 2nd instar larvae. Two bioactive peptaibols, trichocellin A-I and trichocellin B-II, were isolated from the ethyl acetate extract of *T. reesei* using a bioassay guided purification method and their structures were elucidated using nuclear magnetic resonance and mass spectral data. To investigate the antifeedant activities choice leaf disc assay was conducted at an initial concentration of 50µg/cm^2 using commercial neem (100%) and methanol as positive and negative controls respectively. For contact toxicity assay larval mortality was calculated after 24 h of applying 17.5µg of compounds/larvae. Trichocellin-A-I resulted in a 100% feeding deterrence while the DC50 value was 2.38µg/cm^2. Trichocellin B-II also gave a feeding deterrence index of 100% for choice leaf disc assay. For the contact toxicity assay, Trichocellin A-I and B-II showed 40% and 50% mean motility percentages respectively while the respective values for positive and negative controls were 100% and zero. This study revealed that the endophytic *T. reesei* produces two biopesticides, trichocellin A-I and trichocellin B-II, that exhibit potent antifeedant activity and moderate contact toxicity against *P. xylostella* larvae.

Keywords: Plutella xylostella, Trichoderma reesei, Choice leaf disc assay, Contact toxicity

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