Light enhances the production of conidia and influences their hydrophobicity in Tolypocladium inflatum

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Abstract
Insect fungal pathogens such as Beauveria bassiana, Metarhizium robertsii, and Tolypocladium inflatum have been used as insect biocontrol agents. Their infection mechanism involves non-specific adhesion to the host cuticle, which is controlled by hydrophobins, small proteins that form an amphipathic monolayer with rodlet morphology on diverse fungal structures. Light is an abiotic factor that may influence a wide range of cellular processes, including conidiogenesis, stress tolerance, and metabolite biosynthesis. Although its effects have been studied in many fungi, little is known about the effects of light on the hydrophobic properties of conidia. The aim of this work was to investigate the influence of visible light on the conidial hydrophobicity of three entomo- pathogenic fungal species. For this, conidia of B. bassiana, M. robertsii, and T. inflatum were grown either under light or in the dark, drop profiles of water and diiodomethane on conidial surfaces were analyzed, and conidial hydrophobicity was estimated from contact angle measurements. Moreover, conidial production was deter- mined, and their genome was screened with sequences for hydrophobins. Conidia of B. bassiana and M. robertsii are more hydrophobic than conidia of T. inflatum. The light modified the surface tension of T. inflatum; therefore, conidia of T. inflatum became hydrophilic. However, light did not affect the conidial hydrophobicity of B. bassiana and M. robertsii. In addition, light modified the conidial production of B. bassiana and T. inflatum cultures, but it had no effect on the conidial production of M. robertsii. The T. inflatum genome contains two predicted proteins whose sequence is akin to that of proven class II hydrophobins from other ascomycetes. Presumably, these proteins are responsible for the conidial hydrophobicity properties in this fungus. Our study helps elucidate how light affects the conidial hydrophobicity of entomopathogenic fungi.

Keywords: Entomopathogenic fungi, Visible light, Hydrophobicity, Hydrophobins.