

Poster: Isothermal microcalorimetry (IMC) to determine antagonistic effects of *Trichoderma asperellum* and *Bacillus amyloliquefaciens* against *Scopulariopsis* sp.

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Scopulariopsis fungi genus has 112 recognized species in Index-Fungorum (<http://www.indexfungorum.org/Names/Names.asp>). Some species are classified as a human opportunistic FFHP (Jagielski et al., 2016). These species are able to produce toxins or carry allergens, which cause health hazards (Woudenberg et al. 2017). In environmental sciences, a new species of *S. gossypii* was categorized as an opportunistic pathogen causing leaf interveinal chlorosis and vascular browning of cotton plants (Li et al. 2017). It has been isolated from a wide variety of substrates, containing both hyaline and somewhat pigmented filamentous fungi that normally are saprotrophs (Sandoval-Denis et al. 2013). Control of the pathogen *Scopulariopsis* sp. is conducted by chemical antifungals such as sertaconazole, terbinafine and tioconazole (Carrillo-Muñoz et al. 2004), however with high costs and low results in environmental conditions. Despite the presence of different *Scopulariopsis* sp. species facilitating vascular wilt, biological control as a strategy against this fungus is not common. A non-conventional technique that has been used recently in biological control of microorganisms within agro-ecosystems is isothermal microcalorimetry (IMC) (Yao et al. 2007). It is a sensitive method for real-time monitoring and dynamic analysis of chemical, physical and biological processes (Braissant et al. 2010) used to measure metabolic activity of relevant environmental microorganisms (Bravo et al., 2011). This research aims to determine the use of IMC to assess the antagonistic activity of *Trichoderma asperellum* (Th034 and Th406), the metabolic interaction between Th034, Th406, and *Bacillus amyloliquefaciens* (Bs006) against *Scopulariopsis* sp. (Sc002) either independently or in consortium. Using the kinetic parameter data obtained after fitting the Richards equation of growth, an Anova test was performed to compare the variance between the antagonistic populations and the target population of *Scopulariopsis* sp. Using the maximum heat values (Q_{max} in $J \cdot h^{-1}$), the fractional inhibitory concentration index of *Scopulariopsis* sp. (FIC) was calculated as shown in a previous study (Falcão et al., 2014). The FIC index was above the threshold for antagonistic activity using *T. asperellum* Th406. Using a standardized medium developed in this study, this research demonstrates that *Scopulariopsis* sp., is inhibited due to the metabolic activity of *T. asperellum* (Th406) measured by IMC with a FIC of 4.88. Thus, the strain Th406 is suggested as a promising microbial agent against *Scopulariopsis* sp. Sc002.

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