

## **Isolation of Actinomycetes and Endospore-forming Bacteria from the Cacao Pod Surface and Their Antagonistic Activity against the Witches' Broom and Black Pod Pathogens**

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In this study, actinomycetes and endospore-forming bacteria were isolated from the surface of cacao pods. The activity of these microorganisms against *Crinipellis pernicioso* and *Phytophthora palmivora*, causal agents of witches' broom and black pod diseases of cacao, respectively, was investigated. A total of 336 isolates of actinomycetes and endospore-forming bacteria were tested on a detached pod assay against *C. pernicioso*. The screening procedure used proved to be fast and inexpensive, allowing the selection of five actinomycetes as the most promising isolates for the biocontrol of *C. pernicioso*. Under laboratory conditions the actinomycetes were able to inhibit 100% of *C. pernicioso* basidiospore germination. However, under field conditions the selected actinomycetes were unable to protect cacao pods against both pathogens. In these experiments, inhibition of *C. pernicioso* ranged from 6% to 21% in relation to the control, whereas there was no inhibition of black pod caused by *P. palmivora*. Formulations need to be improved in order to enhance the activity of the actinomycetes against cacao pathogens in the field. Molecular identification of the selected isolates showed that they are species of the genus *Streptomyces*.

KEY WORDS: *Theobroma cacao*; biological control; actinomycetes; endospore-forming bacteria; *Streptomyces* sp.; *Crinipellis pernicioso*; *Phytophthora palmivora*.

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