

TITLE: EVALUATION OF TWO DIFFERENTS SPECIES OF FORAGE PALM AS CULTURE MEDIUM FOR PRODUCTION OF δ -ENDOTOXINS BY *Bacillus thuringiensis*

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ABSTRACT:

Due to the control of agricultural pests (insects), about one-third of foods ingested by Brazilian population have pesticides and this is related to cancer, congenital malformation, endocrine, neurological and mental disorders. One of the main pests in Brazil is the *Spodoptera frugiperda*, which mainly destroy maize culture (*Zea mays*) at 39%, but also destroy other cultures such as rice and sorghum. Another important systemic problem caused by insects is the Vector-Borne diseases from mosquitos that cause more than 700 000 deaths per year worldwide and full vector-borne diseases account for around 17 % of all infectious diseases. A safe alternative for both agricultural pests and vector-borne control are δ -endotoxin produced by *Bacillus thuringiensis* (*Bt*) during the sporulation. The aim of this work was to evaluate two species of forage palm (*Nopalea cochenillifera* and *Opuntia ficus indica*) as substrate to production of δ -endotoxin by *Bt*. For culture medium, both forage palms were blended with distilled water in the ratio 1:5 (W/V), centrifuged at 4500 rpm during 20 minutes to remove suspended solids and the pH was corrected to 7. After sterilization by autoclaving at 121 °C for 15 minutes, *Bt* 370 was inoculated at the initial optical density of 0.15 A₆₀₀ at 600 nm. The δ -endotoxin, biomass and spore production were evaluated after 72 hours of fermentation. Microbial growth in *N. cochenillifera* based medium produce 0.85±0.023 mg/mL of biomass, 115±3.54 x 10⁵ spores/L and 207.4±24 mg/L of endotoxin. *Bt* production in *O. ficus indica* based medium demonstrates which biomass (0.53±0.6 mg/L), spore production (52.5±3.54 spores/L) and δ -endotoxin production (151.4±1.4 mg/L) were lower. This effect is due to carbohydrates of *Opuntia* spp. are mainly pentoses such as rhamnose and arabinose, in comparison *Nopalea* spp., besides glucose and mentioned pentoses also have others hexoses such mannose and galactose which is reported as assimilable sugars by *Bacillus thuringiensis* while rhamnose and arabinose are not assimilable. In addition, *Nopalea* spp. has more content of arginine (1.167 g/100g) and leucine (1.294 g/100g) than *Opuntia* spp. (0.239 and 0.401 g/100g) which are among the major constituents of *Bt* δ -Endotoxin. In conclusion, *N. cochenillifera* based medium is promising low-cost culture medium to δ -endotoxin production to formulating a new biopesticide less expensive.

Keywords: Fermentation, microbial growth, bioinsecticide, alternative medium, low-cost medium

Development agency: Fundação de Amparo de Ciência e Tecnologia de Pernambuco (FACEPE).