

**Solid state fermentation
of *Bacillus thuringiensis* tolworth as a tool
for *Spodoptera frugiperda* control in maize**

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Introduction : *Bacillus thuringiensis* (*Bt*) is a well known entomopathogenic bacterium that produces a spore-crystal complex, which is responsible for the entomopathogenic characteristic and could be obtained by fermentation process, either in liquid or semi-solid substrates. There are a few groups in Brazil that have succeeded in scaling-up the *Bt* fermentation process. Many reasons could be pointed out, but the principal ones are the difficulties in standardizing the resulting product and the low reproductibility of the lab results in the field. A group of researchers from EMBRAPA (CNPMS and CNPMA) / Brazil succeeded in developing a solid-state fermentation for the production of active *Bt* var. *tolworthi* (T09) against *Spodoptera frugiperda* (fall armyworm) in corn fields.

Materials and methods : the *Bt* T09 was grown and sporulated on humidified rice (main component of the culture medium), maintained into polypropylene bags, in controlled chambers ($30 \pm 2^\circ\text{C}$). After high sporulation (more than 10^9 CFU/g) was attained, the bags were maintained frozen. Whenever necessary they were defrosted, washed and centrifugated four times, and the pellets were suspended in water to get a 2×10^6 spores/ml. The resulting suspension was sprayed via tractor in corn fields in Sete Lagoas, in pre-established maize plants with egg batches. Pulverization took place at 4:00 PM and evaluation was done 48 hours later.

Results and discussion : the LC₅₀ and LT₅₀ were established with laboratory bioassays showing the following values : 1 mg spore-crystal toxin / 2,66 ml, for 2 day-old-larvae; 2,8 days for a 1-mg toxin/6.25 ml, respectively. For a 2-mg toxin/ml it was accomplished a 98% mortality after 24 hours. From all plants in the pre-established field, mortality of neonate larvae was 100% and all larvae were found dead on the leaves. During one cycle of maize crop, two pulverizations took place, and for 70 days after emergence it was not necessary to apply any other insecticide for fall armyworm control.