

Design of a *Bacillus thuringiensis*-based formulation that increases feeding preference on *Spodoptera exigua* (Lepidoptera: Noctuidae) larvae

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Abstract:

A *Bacillus thuringiensis* (Bt)-based formulation intended to increase feeding response in *Spodoptera exigua* (Hübner) (Lepidoptera: Noctuidae) was developed. Eight matrices were prepared from natural ingredients and confronted with fresh maize leaves to select one highly palatable to larvae. The selected matrix was combined with Bt HD-125 strain at three different concentrations (30, 70, and 100 g/kg) of the spore-crystal complex to elaborate three insecticidal formulations. Effects caused by the matrix, including palatability, any adverse effect, and reduction in toxic activity of the strain, were tested on the formulations. Results indicated that the blend of modified cornstarch, porcine gelatin, and dried corncob was the most preferred by larvae. Formulations obtained were evaluated in mortality bioassays with neonate larvae in laboratory, using artificial diet, and in the greenhouse, with maize, *Zea mays* L., plants to compare their effectiveness when applied to natural food. In laboratory tests, all formulations, including a commercial formulation, were ingested by larvae causing high mortality in neonate larvae; in the greenhouse tests, formulations were also ingested causing mortality in larvae, overcoming commercial formulation effectiveness. Results suggest that the selected matrix combined with Bt 70 g/kg is the most suitable formulation to achieve effective control because this concentration acts faster than the lower concentration and is equal than the higher concentration. This formulation, designed specifically against a particular pest, is highly effective and offers a high potential for effective pest control.