

I.O.MORAES*; D.M.F. CAPALPO**; R.O.MORAES*

*STATE UNIVERSITY OF CAMPINAS/Center of Technology - C.P. 6131 - 13081 Campinas/SP-Brazil

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Bacterial Insecticide Production by *Bacillus thuringiensis*

In Brazil, losses that are caused by insects are roughly 40% mainly by Lepidoptera pests that attack fruits and vegetables in the field, as well as stored grains. Since 1971 in the State University of Campinas we are studying the production of *BACILLUS THURINGIENSIS* by fermentation processes to get endotoxins against insect pests. Submerged fermentation, both continuous and in batch system were studied, using sugar cane molasses and corn steep liquor as carbon and nitrogen sources in laboratory and Pilot Plant. The study of semi-solid fermentation used several agroindustrial residues, for example, coconut waste water residues from the paper and cellulose industry, a kind of meal obtained from residues of cookies and biscuits from bakery industry, and so on. The fermentative conditions in these submerged fermentation process were respectively agitation at 250 rpm, aeration at 0.8 vvm, initial pH at 7.2 and temperature of 30°C + 2°C. After 24 to 30 hours the spore count reached 10-100 billions microorganisms per ml of culture medium. The same amount of microorganisms per gram, was reached in 158 hours when the semi-solid fermentations process was used. The fermentative process was followed by determining the growth and sporulation kinetics, the sugar consumption, dipicolinic acid evolution and pH behavior. A patent of the process was deposited in the INPI (National Institute Industrial Property) and this know how is being transferred to one industry, to produce the bacterial insecticide in a commercial scale. The bioassays to determine the average mortality are being performed using *ANTICARSIA GENTIANAE*, a pest that attack soya beans and laboratory tests were developed using *FLODIA INTERPUNCTELLA* and *ASCIA MONUSTE ORSEIS*, as insect tests.