SPORES PREPARATIONS OF BACTERIAL INACTIVATION WITH Co^{60} AND PRESERVATION OF ENDOTOXINS ENTOMOPATHOGENIC ACTIVITY

AuthorsLima,V.C.P.[1] ,Rabinovitch, L.[1] , Vivoni, A.M.[1], Santos,M.A.V.M. [2],Lopes, R.T. [3]

Institution:[1]FIOCRUZ-MS-Institute Oswaldo Cruz,Laboratory of Bacterial Physiology(Av. Brasil nº 4360,zip code: 21040-900 Manguinhos, Rio de Janeiro, Brazil). [2]CPqAM/Fiocruz-Research Center Aggeu Magellan, Laboratory of Entomology (Av. Professor Moraes Rego s/n,zipcode:50.740-465Campus da Federal University of Pernambuco-UFPE,Recife, Brazil).[3]COPPE-UFRJ-Nuclear Engineering Program, (Av. Pedro Calmon 550-University City, Federal University of Rio de Janeiro, Brazil).

Abstract:

Some *Bacillus thuringiensis* (*Bti*) serotypes and *Lysinibacillussphaericus* strains (*Ls*) are used in insecticides larvicidespreparations active against Culicidae and Simuliidae. In most of these traditional commercial liquid insecticides (presented under different formulations containing organic acids, thickeners, preservatives, emulsifiers, disintegrants and water) bacterial spores are present, along with the toxins, since they are thought to be harmless to men and most animals. However, some users prefer bacterial larvicides commercial products free of viable spores, for environmental applications in large scale.However, the inactivation of spores in these preparations creates new expectations in users regard it improved security for living beings. Studies show that Co^{60}(4.86 n-1; factor 1:13) inactivate spores leaving the active protoxins. In a previous work developed at the Bacterial Physiology Laboratory (2014) it was found that 20 kGypromoted inactivation of the spores present in formulated *Bti* IPS-82 (initial average sporecountingin the order of $3{,}50x10^6$ CFU / mg, equivalent to Log N = 0). In this study, we used the sporulated*Ls* 2362 lineage withintracytoplasmic endotoxins present, in the same excipient of the previous formulation. Its spores showed sensitivity to heat resistance at 80° C, a fact not observed with spores of the lineage of *Bti* IPS-82, which forced the work to 70ºC temperature with this lineage. The Co^{60} radiation applied to the *Ls*formulatedbiomass, starting with mean values of 1.86 CFU / mL (as spores), showed that complete inactivation of*Ls* 2362occurred with 12.5 kGy. These findings show significant difference in results obtained with *Bti*IPS-82. Experiments with new formulations ofentomopathogenic aerobic spore-formingbacteria are being carried out to confirm this finding in other serotypes.

Keywords:*Bacillus thuringiensis; Lysinibacillus sphaericus*; entomopathogenic; aerobic spore; Co^{60}, irradiation; Simuliidae