Title Propionic acid in bio-based packaging to prevent *Sitophilus granarius* (L.) (Coleoptera, Dryophthoridae) infestation in cereal products

Author G.S. Germinara, A. Conte, L. Lecce, A. Di Palma and M.A. Del Nobile

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Abstract

The aim of the work is to develop a biodegradable carrier material to control insect pests in cereal products. To this purpose, a known repellent of stored-product insects, propionic acid, was incorporated in biodegradable coatings then applied onto carton intended for packaging cereal goods. Different coating layers of corn zein and policaprolactone (PCL) respectively, were tested as carrier of the natural compound. The bioassay was carried out over a two-week period with a high number of insects confined in a small space and damaged cartons imitating breakdown or poor sealed packaging, in order to simulate awfully infestation conditions. The results demonstrated that at the end of the aging period, the percentage of *S. granarius* adults found in cartons coated with propionic acid-loaded mono and multilayer PCL and zein was only 13.1%, 11.3%, 18.0% and 10.7% of the total number of insects used in the bioassay, respectively. On the contrary, coating materials and/or solvents used for coating preparation had no effects on insect entering ability, since the percentages of insects found in coated cartons without propionic acid and in the uncoated cartons were almost similar.