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Development of nanosilica as insecticide carrier against two stored products insect pests in the protection of stored wheat

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Abstract. Silica nanoparticles were synthesized by the technique of sol-gel to be applied as an insecticide carrier. The insecticidal efficacy of chlorpyrifos and silica nanoparticles loaded with chlorpyrifos (Ch-SNPs) was assessed against adults of *Rhyzopertha dominica* F. and *Tribolium confusum* Jacquelin du Val. on wheat grains. Both of the formulations were applied at three concentrations of 5, 10 and 25 ppm and the mortality was counted after 1, 2, 5, 7, 10 and 14 days of exposure. After 14-d time interval, dead and live adults were removed and the vials were kept in the same conditions for an additional 45-d and the progeny production was recorded. Results indicated that adults of *T. confusum* were more susceptible than *R. dominica.* For *R. dominica*, the number of F_1 individuals was significantly low in wheat grains treated with chlorpyrifos and Ch-SNPs. In the case of *T. confusum,* no progeny was produced in the treated grains. The storage of treated wheat grains for three months did not reduce germination percentage. Therefore, the use of silica nanoparticles as insecticide carrier can lead to controlled release of chlorpyrifos and increase the exposure time of insects contact with the insecticide particles. However, more experiments are required to confirm the results.