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Comparative studies of Tripolyphosphate and Glutaraldehyde cross-linked chitosan-botanical pesticide nanoparticles and their agricultural applications

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ABSTRACT

A nanopesticide formulation was developed using chitosan and a botanical pesticide PONNEEM[®] and its antifeedant, larvicidal and growth regulating activities were screened against *Helicoverpa armigera*, a major lepidopteran pest. Chitosan nanoparticles (CSNs) were prepared by using two different cross-linking agents namely glutaraldehyde (GLA) and tripolyphosphate (TPP). The effects of cross linking agents on CSNs and the biological properties against the insect pest were also studied. Cross linking of chitosan with either TPP or GLA was confirmed through Fourier Transform Infrared (FTIR) spectroscopy. Electron micrograph revealed that the size of CSNs varied from 32-90 nm. The stability of nanoparticles lasted for 9 days in CSNs-TPP-PONNEEM. In CSNs-GLA-PONNEEM, the stability of nanoparticles was higher. CSNs-TPP-PONNEEM treatment recorded 88.5% antifeedant activity and 90.2% larvicidal activity against *H. armigera*. Weights of *H. armigera* pupae in CSNs-TPP-

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