

## **Application of control-release formulation of biochemical reagent in the integrated pest control**

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### **ABSTRACT**

In order to prolong the releasing period of pest pheromone and stabilize the active components, a paste formulation containing microencapsulated insect sex pheromone was initiated. The microcapsule was formed through the polymerization between the oil phase and aqueous phase. The pheromone molecules were encapsulated inside the hollow space of the capsule as core materials that were surrounded by the polymeric shell. The suspension liquid was then mixed with xanthan gum to form a paste that could be applied in the trap of the target species for monitoring and male annihilation. The microcapsule paste formulation of sex pheromones were prepared for tobacco cutworm (*Spodoptera litura* Fab.), diamond-back moth (*Plutella xylostella* L.), and rice stem borer (*Chilo suppressalis* Walker), respectively. Results of the field tests on the controlled-releasing rates showed that the male pest attraction of the microcapsule paste formulation is effective over 60 days for tobacco cutworm and over 45 days for diamond-back moth and rice stem borer. The head-space GC-MS analyses showed the all the active pheromone molecules are stable during the releasing period in the field with the introduction of anti-oxidant reagent. The most appropriate distance between two traps for male annihilation was evaluated. For diamond-back moth, a modified trap integrated the light luring with pheromone attraction was designed. The best parameters of this trap toward attracting the moth were evaluated using Taguchi methods. Our results suggest that the proposed microcapsule paste formulation of sex pheromones could prolong the releasing period of pheromone lure and maintain the stability of the active compounds in it. Moreover, the microcapsule paste formulation is compatible with other methods in pest control. All these characteristics suggest that microcapsule

paste formulation has its potential to facilitate the application of integrated pest control strategy.

**Keywords:** pheromone, control-release formulation, integrated pest control