GREEN SYNTHESIS OF SILVER AND COPPER NANOPARTICLES FOR POTENTIAL BIOPESTICIDE APPLICATION AGAINST ORIENTAL FRUIT FLY (*Bactrocera dorsalis* Hendel)

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APPROVAL AND ACCEPTANCE

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JAY-LORD P. VILORIA

ABSTRACT

Background: The fruit fly species *Bactrocera dorsalis* (Hendel) has been throughout one of the most serious pests affecting agricultural fruits in most tropical countries. In this study, green synthesis of silver and copper nanoparticles is aimed for their potential application against oriental fruit flies. **Methods:** Silver (AgNPs) and copper nanoparticles (CuNPs) were synthesized from reacting $AgNO_3$ and $CuSO_4.5H_2O$, respectively, with *Cymbopogon citratus* and *Tridax procumbens* leaf extracts. Optimization by varying the volume ratio, pH, and temperature of the reaction mixture was done. The percent mortality of fruit flies were evaluated after progressive exposure to the plant extracts-synthesized metal nanoparticles. **Results:** The formation of AgNPs and CuNPs using plant extracts is favorable in basic conditions - pH 11 using *C. citratus*, and pH 9 using *T. procumbens* extract; and requires an optimum temperature of 50°C for AgNPs, and not lower than 70°C for CuNPs. AgNPs present in agglomerates with an approximate length of 70 nm, and CuNPs with an average length of 57 nm were fabricated. *T. procumbens*-AgNP exhibited the highest anti-fruit fly activity, causing 66.7 ± 23.1% mortality. AgNPs has significantly improved the insecticidal activity of the two plant extracts, while CuNPs has caused no mortality, possibly due to very low concentration consumed by the fruit flies. **Conclusion:** The effectiveness of silver nanoparticles in pest control has been further proven in this study. The effective treatments can be incorporated to bait stations using natural attractants to prevent environmental concerns.

***Keywords*:** green synthesis, silver nanoparticles, copper nanoparticles, optimization, *Bactrocera dorsalis*

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