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Characterization and larvicidal activity of green-synthesized silver nanoparticles using cracker plant *Ruellia tuberosa* leaf extract

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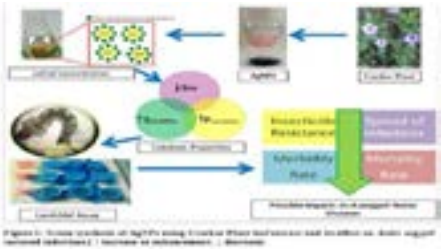
Mosquito-borne diseases have been a perennial problem in tropical countries. The outbreak of malaria in the 1950's resulted to the massive use of DDT insecticide, which was eventually banned due to its adverse effects on humans and the environment. In recent years, the emergence of mosquito-borne diseases such as dengue fever, chikungunya and zika viral infections caught worldwide concern and prompted the WHO to address this problem from its root cause – the eradication of the vector. These diseases were vectored by the same type of mosquito, the *Aedes aegypti*. The aim of this study was to investigate the larvicidal potential of green-synthesized silver nanoparticles (AgNPs) using leaf extract of Cracker Plant (*Ruellia tuberosa*) against III and IV instar larvae of *A. aegypti*. Synthesis of the AgNPs were initially detected within 5 minutes after mixing of the extract and 1 mM AgNO3 solution, with optimum reaction time of 12 h as determined by UV-Visible Spectrophotometry. The spectral wavelength shift from 320 nm to 420 nm due to Surface Plasmon Resonance (SPR) proved the formation of AgNPs. Phytochemicals in Cracker Plant served as capping and stabilizing agents in the AgNPs formation. Scanning Electron Microscopy (SEM) revealed synthesized AgNPs to be spherical and oval in shape with sizes ranging from 28-50 nanometers. Fourier Transform Infrared Spectroscopy (FTIR) showed functional groups associated with flavonoids such as luteolin and triterpenoids such as lupeol and betulin. Larvicidal activity was assessed for 24h with varying concentrations of AgNPs. The recorded 90% lethal concentration (LC90) was found to be 105.42 ppm. Bioassay was done using Ovicidal/Larvicidal (OL) pellets and de-ionized water as positive and negative control, respectively. Results showed Cracker Plant AgNPs as larvicidal agent and can be used for mosquito larvae control.



Biography

Jocelyn L Miranda is a Professor in the field of Pharmaceutical Practice. She plans to further continue her studies by taking up PharmD in 2018. Her expertise has rooted from years of construing journal and performing laboratory experiments related to microbiological and pharmaceutical research. Her drive to suppress the spread of mosquito-borne viral diseases by eliminating the vectors emanates from a previous dengue infection that almost took her life. As a Licensed Pharmacist, she saw the need to come up with a new larvicidal agent that is easy to prepare, effective and environmentally safe. Lately, nano formulated products has caught her attention and eventually urged her to develop this study. She has worked with her mentor Maria Cleofe Badang, a Chemist, to have deeper understanding of nanoparticles' physical and chemical characteristics. Results obtained from this study present an environment friendly insecticide that can serve as alternative for traditional mosquito larvae control worldwide.

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