# Incorporation of Green Synthesized Silver Nanoparticles and Eucalyptol Oil into Polymeric Nanoparticles for the Enhanced Mosquito Repellence

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**Abstract**

Malaria is a vector-borne disease spread mostly by mosquitoes through bites during their search for food (human blood). Malaria is a deadly disease if not detected early. Malaria control can be done in many ways though considering safety and economic problem an environmentally friendly method is advised which is the green chemistry approach. The main objective of the study is to prepare silver nanoparticles with eucalyptol oil incorporated into chitosan for enhanced repellence against mosquitoes. Silver nanoparticles were synthesized by chemical reduction of silver nitrate using sodium borohydride and sodium citrate each as reducing agents with PVA and PEG as their surfactants. The eucalyptol oil was extracted through steam distillation of eucalyptus alba leaves using Clevenger type apparatus and then encapsulation was done through embedding AgNPs with eucalyptol oil into polymeric nanoparticles of chitosan. The reduction process was monitored using a UV-Vis spectrometer where at the point of color change to pale red and pale yellow respectively the readings of absorbance peaks were between 420nm and 540nm. FT-IR analysis was done using the Shimadzu spectrometer where the interactions of the functional groups between AgNPs, eucalyptol oil, and chitosan were observed through the shifting of the band stretch, peaks, and symmetries of attributed carbonyl, amide, hydroxyl, amino and alkyl groups. A double-based mosquito repellent was developed using silver nanoparticles and eucalyptol oil embedded in chitosan. The capsule produced was effective in that during testing several mosquitoes were repelled, it can be applied through embedding it into the textile and also as an ointment, further studies can be done on how it should be embedded into the textile.

**Keywords**: *malaria, AgNPs, eucalyptol oil, chitosan*