

## **Rapid biosynthesis of silver nanoparticles using *Crotalaria verrucosa* leaves against the dengue vector *Aedes aegypti*: what happens around? an analysis of dragonfly predatory behaviour after exposure at ultra-low doses**

### ABSTRACT

*Aedes aegypti* is a primary vector of dengue, a mosquito-borne viral disease infecting 50–100 million people every year. Here, we biosynthesised mosquitocidal silver nanoparticles (AgNP) using the aqueous leaf extract of *Crotalaria verrucosa*. The green synthesis of AgNP was studied by UV–vis spectroscopy, SEM, EDX and FTIR. *C. verrucosa*-synthesised AgNPs were toxic against *A. aegypti* larvae and pupae. LC<sub>50</sub> of AgNP ranged from 3.496 ppm (I instar larvae) to 17.700 ppm (pupae). Furthermore, we evaluated the predatory efficiency of dragonfly nymphs, *Brachydiplax sbrina*, against II and III instar larvae of *A. aegypti* in an aquatic environment contaminated with ultra-low doses of AgNP. Under standard laboratory conditions, predation after 24 h was 87.5% (II) and 54.7% (III). In an AgNP-contaminated environment, predation was 91 and 75.5%, respectively. Overall, *C. verrucosa*-synthesised AgNP could be employed at ultra-low doses to reduce larval population of dengue vectors enhancing predation rates of dragonfly nymphs.

**Keyword:** Arbovirus; *Brachydiplax sbrina*; EDX; FTIR; SEM; Green synthesis; Nanobiotechnologies