Study of the Phytochemical Composition of Averrhoa carambola Extract and Its Effect on Water Biopollutants

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Water biopollutants such as insects, parasites, and microbes have wreaked havoc in the global health and development. They have grown resistant to traditional disinfectants such as chlorine and are a significant risk in drinking water. The alternative proposed is an extract of Averroha carambola which is a widely cultivated plant across the tropics. The crude extracts prepared from the leaves were used for in-vitro mortality bioassays on Culex quinquefasciatus and Hirudinaria granulosa which showed significant insecticidal properties with 90% + mortality at 10% concentration. It proved extremely effective as it reduced infestations by 85%. Further tests on several water-based bacteria such as E.coli, V.cholerae, and P.aureginosa showed significant zones of inhibition and antimicrobial properties. The extract was effective against chlorine-resistant parasites as well with an average of 80% mortality. The GCMS analysis provided three probable active compounds – 9-Octadecanoic acid, Dotriacontane, and Quinic Acid. These compounds are known to possess larvicidal, antimicrobial, and antiparasitic properties. Their synergy in the extract may be responsible for the effects seen in the in-vitro test. GC-Electroantennography Detector further confirmed these active compounds as significant electrical activity was seen in insects exposed to these compounds. Y Olfactometer tests showcased that the extract has repellant properties and demonstrates an additional benefit. The cost analysis of the extract against market alternatives displays that the extract is cost-effective and competitive as it is cheaper by $1.5/ month. Thus, it was concluded that the extract of A. carambola is a cost-effective disinfectant supplement against a broad range of water biopollutants.

Awards Won:

Third Award of $1,000

Fondazione Bruno Kessler: Award to participate in summer school "Web Valley"