M.L.C.E Larvicide: Garcinia mangostana Pericarp and Citrus aurantifolia Leaves Combined Extracts as a Novel Natural Larvicide for Aedes aegypti Larvae

Chuah, Yee Jia (School: Sekolah Menengah Kebangsaan Sultan Ismail)

The rise of vector-borne diseases, particularly dengue fever has highlighted the need to enhance mosquito control. Aedes aegypti is the mosquito species responsible for the rapid transmission of dengue fever, Zika virus and Chikungunya. However, the current mosquito control using synthetic larvicides may lead to a negative impact on the environment, and larvae might develop increased resistance. Hence, natural product-based larvicide is crucially demanded as an environmentally-friendly alternative for mosquito control. This study investigated the larvicidal activity of the combination of Garcinia mangostana pericarp extract and Citrus aurantifolia leaves extract, named the M.L.C.E Larvicide against A. aegypti larvae. Each bioassay consisted of 20 larvae and more than 50 larvicidal bioassays had been conducted at different concentrations of extracts (from 0.025%w/v to 0.4%w/v). The exposure to M.L.C.E caused a significant behavioral change in larvae, thus leading to larval inactivation and 100% mortality at 0.1%w/v. M.L.C.E Larvicide exhibited a greater performance than that of its individual extracts ($p<0.05$). The combined extract exhibited a similar performance of larvae mortality when compared to the commercialized larvicide, Temephos after 16 hours of exposure. M.L.C.E Larvicide was found to contain bioactive compounds including alpha-mangostin and other GC-MS detected small metabolites such as caryophyllene and germacrene D. They were likely to be the main contributors interfering with the larval development and physiological processes, leading to morphological alterations and larvae mortality. In conclusion, the study highlights the potential of M.L.C.E Larvicide as a natural, eco-friendly and sustainable alternative for mosquito control towards A. aegypti larvae.

Awards Won:

Fourth Award of $500