Larvicidal Effect of Coffee (Coffea arabica cordoba-caracolillo) Against Mosquito (Aedes aegypti)

Salazar Balboa, Vanessa (School: Prepa UDEM Unidad San Pedro Universidad de Monterrey)
Hernandez Garza, David (School: Prepa UDEM Unidad San Pedro Universidad de Monterrey)
Villarreal Castillo, Adrian (School: Prepa UDEM Unidad San Pedro Universidad de Monterrey)

The World Health Organization indicates that the mosquito Aedes aegypti is the main vector of dengue, zika fever, and chikungunya viruses (WHO, 2017). Consequently, the Ministry of Health in Mexico recommends the use of insecticide temephos. This synthetic insecticide is known for its high toxicity, slow degradation, and bioaccumulation. Mosquitoes exposed to this organophosphate have developed resistance. Coffee bean can be used as mosquito repellent, but there is scarce research in using it as a larvicide against arthropods. The purpose of this research is to prove whether an organic larvicide can be developed from coffee beans to minimize the use of chemical insecticides and control Aedes aegypti without harming its biological cycle. Bioassays were carried out in in vitro quadruplicate trials using a control and coffee bean (Coffea arabica var.córdoba-caracolillo) in different processing stages: green, roasted, and roasted residue, against Aedes aegypti larval stage 3 and 4. The residue, green and roasted coffees showed a mortality rate of 8%, 25% and 84% respectively on the first day, increasing to 49%, 95% and 96% on the third day. Mortality percentages of each variable over the larvae were determined in 24, 48 and 72 hours. Afterwards, In vivo trials were performed using the stages of coffee against Aedes aegypti larval stage 3 and 4. Results demonstrate that coffee is an organic larvicide that can be used to control the populations of this mosquito and thereby reduce the spread of diseases such as dengue, zika, chikungunya, and yellow fever, without affecting the ecosystem.

Awards Won:
Fourth Award of $500