Therapeutic botanicals application in reducing Dengue transmission and other Aedes-borne diseases.

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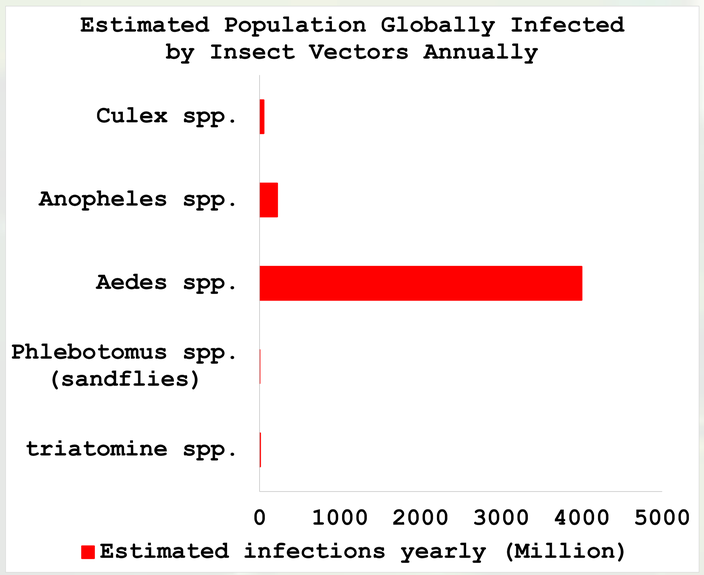
Abstract

Over 300 million people are affected by diseases transmitted by the *Aedes aegypti* mosquito, such as dengue, yellow fever, chikungunya and the Zika virus. The ability of the *Aedes aegypti* mosquito to quickly adapt to changes in their environment combined with the absence of effective medications for *Aedes*-borne diseases, hinders both the control of the and the management of Aedes spp. transmitted diseases. While synthetic insecticides have limited efficacy in the control of mosquito populations, their widespread use and their effect on non-target organisms have rendered them unpopular. Plants have an array of active biochemicals and have been used traditionally for their activities against numerous maladies, insect bites or as insect repellents to prevent insect transmitted diseases. Our laboratory has demonstrated the ability of plants used in routine home therapy at reducing *Aedes aegypti* mosquito populations. Of the plant extracts tested, two organic plant extracts 1011SK and F5401F showed the greatest efficacy against mosquitoes collected from Kingston, Jamaica, previously shown in our lab to be resistant to a range of synthetic insecticides. The Lethal dose to decrease the population of Kingston *Aedes aegypti* mosquito to 50% (LD50) was 7.30 ppm and 0.25 ppm after 24 hours of plant extract exposure respectively. In our search to find effective control measures against the *Aedes aegypti* mosquitoes, we show plants as suitable alternatives to synthetic insecticides. Our next quest is to demonstrate the mode of action of these plant extracts against the mosquitoes.

Introduction



Over 17% of all infectious diseases are transmitted by vectors, resulting in over **700,000 deaths** annually. **Mosquitoes** are the greatest contributors to the spread of insect vector-borne diseases! (WHO.INT/Health Topics; accessed May 25th 2022)

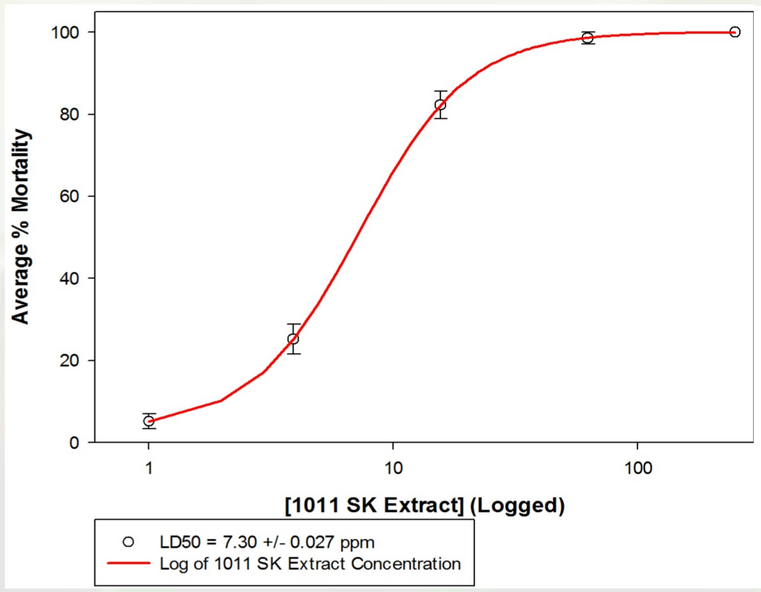
What if you were born in a **tropical country**, with **multiple insect vectors** transmitting infectious disease, and you were surrounded by **plants with Therapeutic properties**?

For us, we looked to the plants for their insecticidal activity, specifically, plants belonging to the Order **Magnoliales**.

Methodology

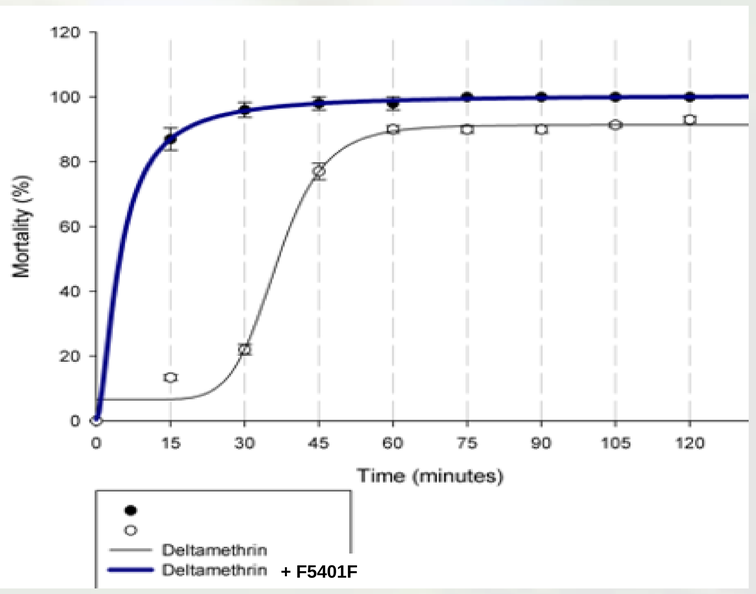
Aedes aegypti mosquito larvae and adults were tested with increasing dosage of the plant extracts and mortality observed over a 24-hr. period. All assays were conducted in triplicates, with test control.

Results & Findings



- ***Aedes aegypti* larvae tested with increasing concentration of 1011SK**

Plant extracts from Order Magnoliids have insecticidal activity against *Aedes aegypti* that have been tested to be resistant to commercial insecticide Deltamethrin



- ***Aedes aegypti* Adults tested with increasing concentration of F5401F with and without Deltamethrin**

Plant extracts from Order Magnoliids not only have insecticidal activity against *Aedes aegypti* but when used with commercial insecticide Deltamethrin, together the lethality is enhanced