

## Detailed evaluation of methylated and acetylated products of cinnamon leaf oil against *Aedes aegypti*

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*Aedes aegypti* is a known vector of several viruses including Yellow fever, Dengue, Chikungunya and Zika virus. Two potential *Aedes aegypti* mosquito repellents; methyl eugenol and acetyl eugenol were semi-synthesized using eugenol extracted from cinnamon leaf, which is the main constituent in cinnamon leaf as well as in other plant leaf extracts like maduruthala and clove oil. Methyl eugenol was semi-synthesized using methyl iodide as a methylation precursor and acetyl eugenol was semi-synthesized using acetic anhydride, triethylamine base and catalytic amount of DMAP. Synthesis reactions were monitored using TLC and products were purified using flash silica columns. Formations of desired products were confirmed using GC-MS analysis. A diluted series (0.6-8 mg/mL) was prepared for these semi-synthesized compounds and for the cinnamon leaf extract using ethanol and tested separately for their mosquito repellency using arm-in-cage tests followed by standard WHO methods. Experiments were performed on twenty volunteers in triplicates. Effective dose (ED<sub>99</sub>) for each repellent was calculated using beta regression analysis. Current study suggests that all compounds tested were effective mosquito repellents. Their ED<sub>99</sub> varied as; cinnamon leaf extract (5.80) > methyl eugenol (5.41) > acetyl eugenol (5.13). Acetyl eugenol could be a potential safe repellent as its ED<sub>99</sub> was achieved at a lower concentration and due to the absence of any side effects on skin when applied. Both maduruthala and clove oil contained significant contents of eugenol and clove oil had slight amounts of acetyl eugenol which could be extracted to synthesize repellent compounds or use directly in future.

**Keywords:** Eugenol, Methyl eugenol, Acetyl eugenol, Cinnamon leaf extract

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