

Comparative insect repellency study of combined lemongrass and peppermint oil lotion versus 25% DEET lotion against mosquitoes

Submission date 17/01/2024	Recruitment status No longer recruiting	<input type="checkbox"/> Prospectively registered
		<input type="checkbox"/> Protocol
Registration date 09/02/2024	Overall study status Completed	<input type="checkbox"/> Statistical analysis plan
		<input type="checkbox"/> Results
Last Edited 17/01/2024	Condition category Infections and Infestations	<input type="checkbox"/> Individual participant data
		<input type="checkbox"/> Record updated in last year

Plain English summary of protocol

Background and study aims

Dengue is a mosquito-borne viral infection endemic in the Philippines. One of the strategies advocated by the WHO to obtain protection from mosquitoes is the use of repellents. DEET-based repellents have been widely used but are known to cause adverse effects. This study tests an alternative and effective plant-based repellent. This study aims to compare the repellency action of lemongrass and peppermint oil lotion against DEET lotion against female *Aedes aegypti* mosquitoes.

Who can participate?

Healthy volunteers aged 18-40 years old

What does the study involve?

Participants were randomly allocated to one of two groups to have 5.0 grams of combined lemongrass and peppermint oil lotion or 5.0 grams of 25% DEET lotion applied from wrist to elbow. The repellent was dried before the arm was inserted into the cage containing 100 female mosquitoes, exposed for 3 minutes and observed for landing or probing. The procedure was repeated every hour for up to 6 hours. The occurrence of one landing and/or probing within 3 minutes indicates the end of complete protection time. Protection over time was determined using the same procedure from the treated versus untreated control arm.

What are the possible benefits and risks of participating?

This study involves moderate risks. Classification of combined lemongrass oil and peppermint oil lotion as non-irritant and safe will prompt the continuation of the study to the next phase. Possible adverse events range from mild symptoms, such as erythema (redness), itching, dryness, scaling or stinging; moderate symptoms such as burning, tenderness or pain; to severe symptoms such as formation of vesicles, erosions and/or crusting. However, no adverse events were noted throughout the study.

Where is the study run from?

Entomology Laboratory Standards and Testing Division, Industrial Technology Development Institute, Department of Science and Technology (Philippines)

When is the study starting and how long is it expected to run for?

January 2021 to October 2022

Who is funding the study?

1. League of Asean Dermatological Societies (LADS) (Philippines)
2. Philippine Dermatology Society (PDS) (Philippines)

Who is the main contact?

Dr Aira Monica R. Abella, aika2122001@gmail.com

Contact information

Type(s)

Public, Scientific, Principal investigator

Contact name

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Additional identifiers

Clinical Trials Information System (CTIS)

Nil known

ClinicalTrials.gov (NCT)

Nil known

Protocol serial number

2021-17

Study information

Scientific Title

Comparative study of the insect repellency action of combined lemongrass oil and peppermint oil lotion versus 25% DEET (N,N-diethyl-meta-toluamide) lotion against female Aedes aegypti mosquitoes

Study objectives

There is a statistically significant difference in repellency between 25% DEET lotion and combined lemongrass oil and peppermint oil lotion based on the percentage protection against female *Aedes aegypti* mosquitoes.

Ethics approval required

Ethics approval required

Ethics approval(s)

approved 25/08/2021, Institutional Review Board, Research Institute for Tropical Medicine (9002 Research Drive, Filinvest Corporate City, Alabang, Muntinlupa City, 1781, Philippines; +63 (0)632 88097599; irb@ritm.gov.ph), ref: 2021-17

Study design

Randomized controlled trial

Primary study design

Interventional

Study type(s)

Prevention

Health condition(s) or problem(s) studied

Dengue

Interventions

Participants were randomized by simple randomization to one of two treatment groups. 5 grams of Repellent A - Combined Lemongrass and Peppermint oil lotion and 5 grams of Positive Control Repellent B - 25% DEET lotion were applied from wrist to elbow per treatment group. Repellent was dried before inserting into the cage containing 100 female mosquitoes, exposed for 3 minutes and observed for landing or probing. The procedure was repeated every hour up to 6 hours.

Intervention Type

Drug

Phase

Phase 0

Drug/device/biological/vaccine name(s)

25% DEET (N,N-diethyl-meta-toluamide) lotion, combined lemongrass oil and peppermint oil lotion

Primary outcome(s)

The % protection over time was determined by counting the number of mosquitoes landing /probing on the treated arm (T) in relation to the number of landings on the control untreated arm (C) of the same individual ($\% p = ((C-T)/C) \times 100$) for a 3-minute exposure every hour (1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours).

Key secondary outcome(s)

Complete protection time was calculated as the number of minutes elapsed between the time of repellent application and the first mosquito landing or probing for a 3-minute exposure every hour (1 hour, 2 hours, 3 hours, 4 hours, 5 hours, 6 hours).

Completion date

10/10/2022

Eligibility

Key inclusion criteria

1. Healthy male or female aged 18–40 years
2. Must know how to read and write
3. Must be willing to comply with the study protocol requirements
4. Must be willing to sign an informed consent after having clearly understood its content
5. Must be willing to have photos taken for documentation purposes during the experiment

Participant type(s)

Healthy volunteer

Healthy volunteers allowed

No

Age group

Adult

Lower age limit

18 years

Upper age limit

40 years

Sex

All

Total final enrolment

46

Key exclusion criteria

1. Pregnant or lactating women
2. Those with a history of allergy or hypersensitivity reactions to insect repellents and its components
3. Those with a history of adverse reactions to insect bite
4. Those who have active skin lesions or other dermatological disorders (like atopic dermatitis, psoriasis)
5. Those with a history of other comorbid conditions (diabetes, hypertension, malignancy)
6. Current or ex-smoker (≥ 10 pack years)

Date of first enrolment

21/04/2022

Date of final enrolment

27/06/2022

Locations

Countries of recruitment

Philippines

Study participating centre

Entomology Section, Biological Laboratory, Standards and Testing Division, Department of Science and Technology - Industrial Technology Development Institute

DOST Compound, General Santos Avenue, Bicutan

Taguig City

Philippines

1631

Sponsor information

Organisation

Research Institute for Tropical Medicine

ROR

<https://ror.org/01g79at26>

Funder(s)

Funder type

Other

Funder Name

Investigator initiated and funded

Funder Name

Philippine Dermatological Society

Funder Name

League of Asean Dermatological Societies

Results and Publications

Individual participant data (IPD) sharing plan

All raw data will be available including the participants' consent forms. Kindly contact the main author via email, Dr Aira Monica R. Abella (aika2122001@gmail.com). Other files can also be made available:

- 1. Raw data of results
- 2. Photographs of methods (ex: laboratory set-up, arm-in-cage procedure, plant materials, etc)
- 3. List of subject volunteer participants
- 4. Informed consent forms

All data can be shared immediately upon request. Consent from participants was obtained prior to the procedure.

IPD sharing plan summary

Available on request

Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
Participant information sheet	Participant information sheet	11/11/2025	11/11/2025	No	Yes