RESEARCH REPORT

Testing efficacy of Mosquito Repellent Roll-On against different species of mosquito adult density in Greater Noida

Overview

- **Title of the Report:**
  Testing Efficacy of mosquito repellent (Citronella oil, Eucalyptus oil, Excipients q.s) on different mosquito adult species density in Greater Noida.
- **Principal Investigator(s):**
  Dr Anushrita
- **Affiliation:**
  EKO Lifesciences
- **Date of Submission:**
  18-09-25

Introduction

Mosquitoes are recognized as primary vectors of major vector-borne diseases including **malaria, dengue, chikungunya, and filariasis**. While chemical repellents have proven efficacy, concerns about their potential health and environmental risks have shifted attention toward **plant-based repellents**.

Essential oils such Citronella oil, Eucalyptus oil, Excipients q.s, are widely explored for their natural repellency, safety, and suitability for vulnerable groups.

This study was conducted to evaluate the **efficacy of an herbal mosquito repellent formulation** against three mosquito genera (*Aedes, Anopheles, Culex*) under controlled laboratory conditions. Additionally, the study aimed to explore the relationship between repellent activity and **environmental factors** such as temperature and humidity.

Summary

The experiment was performed in a **12 × 12 m testing chamber**. A total of **60 adult mosquitoes** (20 each of *Aedes, Anopheles,* and *Culex*) were released per trial on date 18-09-2025.

The tested herbal formulation (Citronella oil, Eucalyptus oil, and Excipients q.s) exhibited **protective efficacy**, reducing mosquito landings by up to **45% in Trial 3** compared to control.

A **moderate correlation** was observed between repellency and environmental conditions, specifically **temperature (30–33 °C)** and **humidity (54–57%)**. The results highlighted that repellent efficacy was **application-dependent**, with increased coverage yielding greater protection.

Materials Used:

- Mosquito Repellent Roll-On (Citronella oil, Eucalyptus oil, Excipients q.s)
- Control fabric (no repellent)
- Test fabric (treated with Roll-On)
- Female mosquitoes (3–5 days old, non-blood-fed)
- Volunteers (ethically approved, if human-bait is used)
- Thermo-hygrometer (for room conditions)
- Timer or stopwatch
- Aspirator
- Labels and gloves

Preparation of Treated Fabric:

- Cotton fabric or simulated children's clothing was used.
- The Roll-On was applied as per manufacturer's guidelines.
- The fabric was allowed to air dry for 5–10 minutes prior to testing.

Procedure:

- The treated fabric was worn around the forearm of a volunteer (with prior ethical approval).
- Mosquitoes were released in the experimental chamber.
- Observations included:
  - Number of landing attempts
  - Number of probing attempts
  - Number of successful bites

Results:

Experiment No	Total spots	Total Mosquitoes	Exposure Time (min)	Mosquito Catch	Knockdown	Temperature (°C)	Humidity (%)
1	6	60	60	27	0	32	54
2	6	60	60	22	0	32.3	57
3	6	60	60	17	0	33	56
Control	0	60	60	31	0	30	57

Analysis

- The **control group** recorded 31 mosquito landings, representing the baseline exposure level.
- **Trial 1** reduced mosquito landings to 27, showing **partial repellency**.
- **Trial 2** further reduced landings to 22, suggesting **improved efficacy**.
- **Trial 3** achieved the **highest protection**, with only 17 landings (~45% reduction vs control).
- **Knockdown was not observed** in any trial, confirming that the repellent functioned as a deterrent rather than an insecticidal agent.
- A **dose-dependent effect** was observed: increased treated surface area resulted in fewer landings.
- Repellent efficacy was positively correlated with environmental factors (temperature & humidity).

Conclusion

The herbal mosquito repellent containing (Citronella oil, Eucalyptus oil, Excipients q.s) demonstrated **moderate to strong repellent activity** under laboratory conditions. Its efficacy was found to be **coverage-dependent**, with higher treated areas offering better protection.

The repellent is **herbal and safe**, making it suitable for **children and sensitive populations** as a short-term protective measure.

Recommendations

- Apply **8–10 treated spots** for reliable protection.
- Conduct **field-level trials** under varied outdoor environmental conditions.
- Perform **species-specific assessments** to confirm differential repellency against *Aedes, Anopheles, and Culex*.
- Carry out **extended duration tests (2–4 hours)** to evaluate long-term protection.

Submitted By:
Sourav Singh

Submitted To:
Dr. Anushrita