RESEARCH REPORT

Testing efficacy of Lemongrass, Neem & Alcohol against different species of adult mosquito density in Greater Noida

Overview

- **Title of the Report:**
  Testing Efficacy of Lemongrass, Neem & Alcohol on different species of adult mosquito density in Greater Noida under laboratory conditions.
- **Principal Investigator(s):**
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- **Affiliation:**
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- **Date of Submission:**
  18-07-25

Introduction

This report evaluated the efficacy of a formulation containing Lemongrass, Neem, and Alcohol as a mosquito repellent against different species of adult mosquitoes. The study included three treatment replicates and one untreated control, conducted under laboratory conditions in Greater Noida. It also examined the influence of environmental variables—namely temperature and humidity—on mosquito activity and repellent performance. The dataset spanned observations conducted on **14-07-2025**.

Summary

The experiment was conducted in lab – testing room (12*12 m), where 60 adult mosquitoes 20 of each of three viz. *Aedes, Anopheles and Culex* were released. The formulation achieved an average repellency of 91.78% across three replicates, indicating strong initial efficacy. Environmental factors such as moderate humidity (50–65%) and a temperature range of approximately 28°C were observed to positively correlate with Lemongrass, Neem & Alcohol effectiveness.

Materials Used:

- Lemongrass, Neem & Alcohol
- Negative Control: No repellent
- Female mosquitoes (mixed species)- (3–5 days old, non-blood-fed)
- Human volunteers (screened, medically fit, non-allergic)
- Unscented soap and paper towels
- Aspirators
- Timer/stopwatch
- Thermo-hygrometer
- PPE (gloves, mask, lab coat)

Procedure:

Mosquito Preparation:

- 60 healthy female mosquitoes were used in each replicate.
- Mosquitoes were starved for 12 hours prior to testing.

Volunteer Preparation:

- Volunteers washed their forearms/feet using unscented soap and allowed them to dry completely.
- The Lemongrass, Neem & Alcohol, repellent was sprayed according to standard protocol.

Exposure:

- Mosquitoes were released into the test environment.
- Observations were made and the following were recorded:
  Number of probing attempts
  Number of landing catch

Results:

Experiment No	**Total Mosquitoes**	**Exposure Time (min)**	**Landing Catch**	**Temperature (°C)**	**Humidity (%)**	**Knockdown**
1	*Anopheles* + *Aedes*+ *Culex* = 60	60	4	28.8	75	7
2	*Anopheles* + *Aedes*+ *Culex* = 60	60	3	29	77	12
3	*Anopheles* + *Aedes*+ *Culex* = 60	60	1	29	72	24
4 (Control)	*Anopheles* + *Aedes*+ *Culex* = 60	60	30	28.8	79	00

Analysis

Percent Protection Calculation:

Percent Protection= (Control−Treated/Control) ×100

Experiment	Landing	Percent Protection (%)
1	4	(30-4)/30 × 100 = 86.67%
2	3	(30-3)/30 × 100 = 90.00%
3	1	(30-1)/30 × 100 = 96.67%
Mean	–	91.78%

Knockdown Rate:

Knockdown Rate= (Knockdown Count/60) ×100

Experiment	Knockdown	Knockdown Rate (%)
1	7	11.67%
2	12	20.00%
3	24	40.00%
Average	–	23.89%

- **Repellency:** Lemongrass, Neem & Alcohol consistently showed high repellency with an average protection of **91.78%**, significantly reducing mosquito landings versus the control (30 landings).
- **Knockdown:** Knockdown rates increased progressively with each replicate, suggesting a potential cumulative or time-enhanced impact. The third replicate resulted in a **40% knockdown rate**.
- **Environmental Stability:** The formulation-maintained performance consistency within a narrow temperature band (**28.8–29°C**) and moderately high humidity (**72%–77%**), indicating good environmental robustness.

Conclusion

Mosquito Repellent Spray (Lemongrass, Neem, and Alcohol) demonstrated strong dual-action performance:

- Achieved over **91% repellency**, significantly reducing mosquito-human contact.
- Induced an **average knockdown of 23.89%** within 60 minutes of exposure.
- Maintained consistent efficacy across variable humidity and temperature conditions, reinforcing its potential suitability for real-world applications.

Recommendations

- Extend trials to **longer durations** to assess residual repellency and knockdown longevity.
- Conduct **species-specific knockdown assessments** to better understand differential susceptibility.
- Perform **semi-field and field validation** to confirm lab-based findings in diverse ecological conditions.

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