RESEARCH REPORT

Testing efficacy of Citronella, Lemon Grass, Tulsi Oil, Base Oil against different species of adult mosquito density in Greater Noida

Overview

- **Title of the Report:**
  Testing Efficacy Citronella, Lemon Grass, Tulsi Oil, Base Oil, on different species of adult mosquito adult density in Greater Noida.
- **Principal Investigator(s):**
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- **Affiliation:**
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- **Date of Submission:**
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Introduction

This report evaluated the efficacy of a formulation containing **Citronella, Lemon Grass, Tulsi Oil, and Base Oil** as a mosquito repellent against adult mosquitoes under controlled laboratory conditions in Greater Noida. The experiment was conducted in three treatment replicates and one untreated control. Environmental conditions such as temperature and humidity were monitored to assess their influence on repellent performance. Data were collected on 19-09-2025.

Summary

The experiment was carried out in a **testing room (12 × 12 m)** where **60 adult mosquitoes** (*Aedes*, *Anopheles*, *Culex* – 20 each) were released per replicate.

The repellent formulation demonstrated an **average protection rate of 74.44%**, showing moderate to high repellency. Environmental parameters (temperature ~30–32.3°C; humidity 60–65%) influenced mosquito activity, though repellency remained consistent across replicates.

Materials Used:

- Mosquito Repellent - containing Citronella, Lemon Grass, tulsi Oil, Base Oil.
- 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 with unscented soap and dried them completely.
- A marked area on the forearm or foot was designated for repellent application.
- Citronella, Lemon Grass, tulsi Oil, Base Oil was applied evenly over the marked area at a standardized dose (1–2 ml/cm²) and was allowed to dry for 5 minutes before exposure.

Observations:

- Mosquitoes were released into the test chamber.
- Observers recorded:
  Number of probing attempts
  Number of landing catch

Results:

Experiment No	**Total Mosquitoes**	**Exposure Time (min)**	**Landing Catch**	**Temperature (°C)**	**Humidity (%)**
1	*Anopheles* + *Aedes*+ *Culex* = 60	60	7	30	65
2	*Anopheles* + *Aedes*+ *Culex* = 60	60	9	32	60
3	*Anopheles* + *Aedes*+ *Culex* = 60	60	6	32.3	61
4 (Control)	*Anopheles* + *Aedes*+ *Culex* = 60	60	32	29.6	68

Analysis

- **Efficacy:**
  The repellent achieved **74.44% average protection** across treated replicates.
- **Environmental Influence:**
  Slight variations in temperature (30–32.3°C) and humidity (60–65%) did not significantly alter repellency outcomes.
- **Control Group:**
  High landing counts (32) in the untreated control confirmed mosquito aggressiveness and validated treatment results.

Protection Rate Calculation

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

- Exp 1: (32 − 7) / 32 × 100 = **78.12%**
- Exp 2: (32 − 9) / 32 × 100 = **71.87%**
- Exp 3: (32 − 6) / 32 × 100 = **81.25%**

Average Protection = (78.12 + 71.87 + 81.25) ÷ 3 = 74.44%

Conclusion

The formulation containing **Citronella, Lemon Grass, Tulsi Oil, and Base Oil** exhibited **moderately high repellency** against *Aedes*, *Anopheles*, and *Culex* mosquitoes under laboratory conditions. With an average protection rate of **74.44%**, the product significantly reduced mosquito landings compared to the untreated control. Its consistent performance under varied environmental conditions highlights its potential as a natural mosquito repellent.

Recommendations

- Conduct **extended-duration trials** to evaluate residual efficacy.
- Compare efficacy with **synthetic chemical repellents** for benchmarking.
- Perform **field-based evaluations** under varied ecological conditions.

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