RESEARCH REPORT

Testing efficacy of N, N-Diethylbenzamide 12% W/W with Vitamin E and Almond against different species of adult mosquito density in Greater Noida

Overview

- **Title of the Report:**
  Testing Efficacy of N, N-Diethylbenzamide 12% W/W with Vitamin E and Almond, on *An. stephensi* 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 N, N-Diethylbenzamide 12% W/W as a mosquito repellent against different species of adult mosquitoes under controlled laboratory conditions in Greater Noida. The study consisted of three treatment replicates and one control trial. It also examined the influence of environmental factors, including temperature and humidity, on mosquito activity and repellent performance. Data were collected 29-09-2025.

Summary

The experiment was conducted in a controlled test room (12 × 12 m), where 60 adult mosquitoes were released in each trial (20 Aedes, 20 Anopheles, 20 Culex).

The formulation demonstrated strong protection, with an **average repellency of 81.91%** across the three replicates. Environmental conditions ranged between **32–33 °C** and **56–57% relative humidity**, with stable repellency observed throughout.

Materials Used:

- Mosquito Repellent - containing N, N-Diethylbenzamide 12% W/W.
- 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.
- N, N-Diethylbenzamide 12% W/W was applied evenly over the marked area at a standardized dose (1–2 mg/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	6	32	57
2	*Anopheles* + *Aedes*+ *Culex* = 60	60	7	32.8	56
3	*Anopheles* + *Aedes*+ *Culex* = 60	60	5	33	56
4 (Control)	*Anopheles* + *Aedes*+ *Culex* = 60	60	32	31	55

Analysis

- **Efficacy:** The repellent provided consistent protection, averaging **81.91% repellency** across the three trials.

- **Environmental Factors:** Minor fluctuations in temperature (32–33 °C) and humidity (56–57%) did not significantly impact repellency, demonstrating product stability under tested conditions.
- **Control Trial:** The untreated control recorded 32 landings, validating mosquito activity and providing a baseline for calculating repellency.

Percent Protection (Repellency)

Using formula:

% Protection = (Control – Treatment) ÷ Control × 100

- Exp 1: (32 – 6) ÷ 32 × 100 = **81.25%**
- Exp 2: (32 – 7) ÷ 32 × 100 = **78.12%**
- Exp 3: (32 – 5) ÷ 32 × 100 = **84.37%**

Average Protection = (81.25 + 78.12 + 84.37) ÷ 3 = 81.91%

Conclusion

The formulation containing **N, N-Diethylbenzamide 12% W/W with Vitamin E and Almond** demonstrated strong repellency against mixed adult mosquito populations (Anopheles, Aedes, Culex). With an **average efficacy of ~82%**, the repellent significantly reduced mosquito landings compared to untreated controls. Its performance remained stable under tested environmental conditions, suggesting good potential for real-world application.

Recommendations

- Extend research to **field trials** under different environmental and ecological conditions.
- Evaluate **residual activity** by extending observation periods beyond 60 minutes.
- Conduct **comparative studies** with standard synthetic repellents (e.g., DEET) for benchmarking.

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