Efficacy of an Ingestible Vitamin/Garlic Supplement as a Mosquito Repellent

COURTNEY WEATHERBEE
Repellent Products

Mosquito Patch

Garlic Barrier

INSECT REPELLENT

INSECT REPELLENT

Kids Herbal Armor
“Tobacco smoke was far more effective than any of the then available insect repellents, but I suppose I am not allowed to say that.” – John Turney, BMJ 2000
Garlic and Vitamin B

- Garlic has some repellent effect when applied topically, but not as effective as DEET-based products.
- Previous studies indicate ingestible garlic and/or Vitamin B supplements are not effective repellents.
- Relatively little research has been directed toward ingestible herbal supplements as repellents.
Product Background

Creator took a break from chemical engineering and moved to the Dominican Republic. It was a tropical paradise except that he wasn’t a fan of chemical bug sprays and the mosquitoes were vicious. While swatting at the swarm of blood-suckers, he noticed they only seemed to be biting him and not the young local boy. The little boy jokingly told him, “I have sour blood. The mosquitoes don’t like me.”
He became curious about any truth behind what the boy said and was inspired to put his chemical background to use by studying the science of mosquito bites. He thought there must be a simple way to keep mosquitoes from biting, without requiring chemical sprays. The result of this research was the development of this supplement.
Product Information

- **What is it?**
  - Natural vitamin supplement
  - Easier alternative to bug patches and chemical sprays
  - Simple, natural way to get full dose of Vitamin B₁ and garlic
  - Not evaluated by the FDA

- **How it Works:**
  - Repels Mosquitoes - Combination of Vitamin B₁ and garlic which repel mosquitoes naturally as your body digests the product
  - Reduces the Itch - Formula contains natural and unique blend of herbs that safely act as anti-histamines soothing and controlling the irritation and itch
  - One pill an hour prior to exposure, lasts up to 6 hours
Objective

- Determine the efficacy of ingestible vitamin/garlic supplement as a mosquito repellent
  - Lab tests
  - Field trials
Laboratory Tests

- Four volunteers placed exposed right arm in a cage containing approximately 100 *Aedes triseriatus* females from the MSU colony for 30-60 seconds.

- Counted the number that landed and attempted to feed.

- Repeated later the same day, with same cage of mosquitoes, at least 1.5 hours after consuming supplement.
Laboratory Tests - Results

- Slightly increased average landing rates after taking supplement but not statistically significant
  - 2 sample t-Test, p=0.3529
- Consumption of supplement had no effect on landing rates

<table>
<thead>
<tr>
<th></th>
<th>Pre-supplement</th>
<th>Post-supplement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subject A</td>
<td>0.6</td>
<td>1</td>
</tr>
<tr>
<td>Subject B</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Subject C</td>
<td>1.3</td>
<td>1.3</td>
</tr>
<tr>
<td>Subject D</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

Landing rates (#/second)
Field Trial Location

River Trail at Kruger’s Landing – Lansing, MI
Field Trials

- Four field trials with paired volunteers
- One subject took the supplement, the other served as untreated control
- Reversed roles the following evening
- Sat in wooded area for 10-20 minutes
- Attempted to collect all mosquitoes that landed using manual aspirator
- Mosquitoes stored at -20°C
- Later identified and enumerated
Field Trials - Results

Panels A, B, C, and D for dates August 21/22, August 28/29, September 9/10, and September 19/20 respectively

Effect Tests (ANOVA):

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>F Ratio</th>
<th>Prob &gt; F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
<td>7</td>
<td>20.8695</td>
<td>0.0003</td>
</tr>
<tr>
<td>Treatment</td>
<td>1</td>
<td>0.5446</td>
<td>0.4845</td>
</tr>
</tbody>
</table>

Summary Stats (landing/min):

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Mean</th>
<th>Std Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supplement</td>
<td>3.0054167</td>
<td>0.25991564</td>
</tr>
<tr>
<td>No Supplement</td>
<td>2.7341667</td>
<td>0.25991564</td>
</tr>
</tbody>
</table>
Mosquito Species

- 200+ individual mosquitoes collected and identified
- Species collected typical for habitat in southern Michigan in late summer
- Supplement had no effect on species that landed

Ae. = Aedes, Ps. = Psorophora, An. = Anopheles
Conclusions

- Consumption of supplement had no significant effect on landing rates in lab or field
- Supplement did not affect types of mosquitoes landing
- Much individual variation, but all subjects bitten regardless of treatment
- Product is ineffective at reducing mosquito landing rates and therefore ineffective as mosquito repellent
Acknowledgements

- Tony Nguyen, Third Shore Group
  Royal Oak, MI

- Volunteer Subjects

- Dr. Mike Kaufman
QUESTIONS?