



EFFICACY OF PLP LIQUID FORMULA

Tested by New Mexico State University

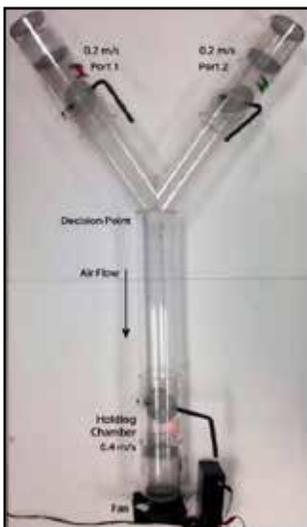
MOSQUITO TESTING

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OBJECTIVE : Testing short-distance repellent effects of *PLP Natural Products Liquid Formula* using a Y-tube Olfactometer



OBJECTIVE

Testing the efficacy of a *PLP Natural Products Liquid Formula* treated grass patch in repelling female *Aedes aegypti* (Yellow fever mosquito) mosquitoes. Yellow fever mosquitoes are the principal vectors of dengue, Zika, and chikungunya.

APPROACH

We used a Y-tube olfactometer to determine if there is a reduction in attraction after the application of *PLP Liquid Formula* to a grass patch as compared to an untreated control grass patch.

The Y-tube olfactometer device

is used for evaluation of the efficacy of mosquito attractants and repellents. Parts of the Y-tube include: holding chamber, the Y-shaped flyway, and the ports. An airflow of 0.4 m/sec is produced with a fan at the bottom of the Y-tube.

EXPERIMENTAL PARAMETERS

We applied the pure product to the patch of grass and evaluated total attraction after application using the Y-tube olfactometer. Approximately 500 ul of the product was applied to a grass patch (100 mm diameter) glued to a petri dish using a pipette. Immediately after application of the product to the grass patch, the patch was placed on the hand of a test person and then we started that replicate. Each replicate was 2 minutes and 30s. At the end of the replicate, all doors were closed, and the number of mosquitoes in the y-tube was recorded. Four replicates were performed for the diluted product and the untreated control. Using the same parameters, we applied 500 ul of pure Cutter® Natural Bug Control to the grass patch (78.5 cm²).

EXPERIMENTAL PROTOCOL

Mosquitoes were starved of water, sugar for at least 12 hours. Approximately, 20 female mosquitoes were placed in the closed

holding chamber and acclimated for 30 seconds. The *PLP Liquid Formula* was applied to the grass patch. The grass patch was positioned on the hand and placed next to the opening of one of the proximal ports ('hand port' vs. 'blank port'). After 45 seconds, all trap doors were opened, and mosquitoes could relocate. After 2 minutes and 30s, all trap doors were closed and number of mosquitoes in the chambers and in the flyway were determined. Mosquitoes were removed and discarded.

RESULTS

Mosquito attraction - the average percentage of mosquitoes attracted to the human volunteer in the presence of an untreated grass patch (control), *PLP Liquid Formula* treated grass patch and Cutter Natural Bug Control-treated grass patch. The average

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attraction rate for the untreated control was 84%(+/-3%). The average attraction rate for the *PLP Liquid Formula* treated grass patch was 28% (+/-4%). There was a 56% reduction in attraction after the application of *PLP Liquid Formula*. The average attraction rate for Cutter Natural Bug Control-treated grass patch was 30% (+/-2%). There was a 54.75% reduction in attraction after the application of Cutter® Natural Bug Control. We calculated a repellency rate of 66% (100-(28/84*100)).

A Mann-Whitney statistical analysis, shows that there was a significant difference between the control and *PLP Liquid Formula* (P=0.0294). There was also a significant difference between the control and the Cutter® Natural Bug Control (P=0.0294). There was not a significant difference between *PLP Liquid Formula* and Cutter® Natural Bug Control (P=0.8839).

CONCLUSION

In our Y-tube bioassay, *PLP Natural Products Liquid Formula* had a strong repellency effect. The *PLP Liquid Formula* has an equivalent repellency effect compared to Cutter® Natural Bug Control in this experimental setup.

