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**EXTENSION**

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## **Mosquito Repellents<sup>1</sup>**

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Female mosquitoes feed on blood to help their eggs develop into offspring. When she bites, she releases her saliva into the area where she is biting. Her saliva contains proteins that may cause some people to have an allergic reaction such as itchy red bumps and swollen hives. For those with increased sensitivity to bites, a blister, bruise, or large inflammatory reaction can occur. If a mosquito is harboring a virus, it is possible that she can transmit the virus to humans through her saliva. In Florida, the viruses that mosquitoes transmit can cause encephalitis. The most important mosquito-borne diseases in Florida are St. Louis encephalitis, eastern equine encephalitis, and West Nile virus encephalitis.

The best ways to avoid mosquito bites are to avoid infested areas, wear protective clothing, and wear insect repellent.

### **How Do Mosquito Repellents Work?**

Repellents make humans unattractive to a mosquito so that it will avoid areas of the body that have been treated with the product. Repellents do not kill mosquitoes. The best repellents will provide protection from bites for a long period of time from just one application. The University of Florida mosquito researchers test and evaluate the effectiveness of mosquito repellents based on the

amount of time the product will continue to repel mosquitoes after one application to the skin. This is known as Complete Protection Time (CPT).

### **What Kind Of Mosquito Repellents Are Available?**

Repellents that are currently available are either synthetic chemicals, such as DEET, or plant derived chemicals such as Citronella. Various formulations of these products are available that vary in the amount of active ingredient which is the substance that actually repels the mosquito. These products are available as sprays, wipe-on's, sticks, foams, and lotions.

### **What About Products That Combine Repellents And Sunscreen?**

The Environmental Protection Agency (EPA) is considering a decision on whether or not to allow reregistration of products that combine DEET repellent and sunscreen. Sunscreens are intended for generous and frequent use while DEET is intended for less frequent use. The concern is that use of a product that combines the two products may promote increased and unnecessary use of DEET.

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## What About Devices That Emit Sound To Repel Mosquitoes?

There is no evidence that wearing devices that emit sound will repel mosquitoes.

## Will Garlic, Bananas, Or Vitamin-B Repel Mosquitoes?

There is no scientific evidence that eating garlic, vitamins, onions, or any other food will make a person repellent to mosquitoes. The attractant level of each individual to biting arthropods is based on a complex interaction of many chemical and visual signals. Certain foods in certain individuals may effect their individual attractiveness to biting arthropods, for better or for worse.

## How To Decide Which Repellent Is Best

Read the label to determine what the active ingredient is and what percentage of the active ingredient is in the container. Use Table 1, based on University of Florida research, as a guideline to compare products. Some provide protection for a long period of time and some have very short protection times. Keep in mind, however, that repellents do not protect all users equally. The effectiveness of a repellent depends on the mosquito species that is biting as well as the age, sex, level of activity, and attractiveness of the human using the product. Consider the following when choosing a repellent:

- Are you in an area where you know that mosquito-borne diseases are present?
- What is the mosquito population like? (A lot of bites expected? Or occasional bites?)
- Will time spent outdoors at night be longer than an hour?
- Will you be around heavily vegetated, humid areas during the day?
- What type of activities are going on: exercising, running, playing sports, etc.?

- Is the humidity and temperature high?

## How To Apply Mosquito Repellents

- **READ THE LABEL!!!** Apply according to the directions on the label. Do not use any repellent that has not been approved by the EPA. To find this information, you can visit the EPA's Web site [www.epa.gov](http://www.epa.gov) or look for an EPA registration number on the label.
- As with all over-the-counter products, use common sense when applying. Watch for reactions, some people may be allergic to ingredients in the repellent.
- Do not apply to the mouth or eyes, cuts, wounds, or on sunburned or irritated skin.
- To apply to face, spray on hands first and then rub on face.
- Apply **ONLY** to the parts of the body that are exposed. Some products can be applied directly to clothing, but check the label first. Do not apply to skin that will be covered by clothing.
- Do not allow young children to apply this product.
- Apply only as often as the label says. More is **NOT** better! If the product wears off earlier than expected, read the label to determine how often it is safe to re-apply.
- Keep in mind that some things may decrease the effectiveness of a repellent such as: activities that causes perspiration, high humidity, high temperature, rainfall, and swimming

## How Safe Is DEET?

The EPA has determined that the normal use of DEET does not present a health concern to the general U.S. population and is not classifiable as a human carcinogen. The American Academy of Pediatrics states that repellents used on children should not be more than 10% DEET. Repellents containing DEET should never be applied to children under 2 years of age. After returning indoors, wash areas that were treated with repellent.

**Table 1.** Protection Times of Tested Mosquito Repellents

Products	Active Ingredient	Average Complete Protection Time
OFF! Deep Woods	23.8% DEET	5 hours
Sawyer Controlled Release	20% DEET	4 hours
OFF! Skintastic	6.65% DEET	2 hours
Bite Blocker for Kids	2% Soybean Oil	1.5 hours
OFF! Skintastic for Kids	4.75% DEET	1.5 hours
Skin-So-Soft Bug Guard Plus	7.5% IR3535	23 minutes
Natrapel	10% Citronella	20 minutes
Herbal Armor	12% Citronella; 2.5% peppermint oil; 2% cedar oil; 1% lemongrass oil; 0.05% geranium oil	19 minutes
Green Ban for People	10% Citronella; 2% peppermint oil	14 minutes
Buzz Away	5% Citronella	14 minutes
Skin-So-Soft Bug Guard	0.1% Citronella	10 minutes
Skin-So-Soft Bath Oil	Active Ingredient not known	10 minutes
Skin-So-Soft Moisturizing Suncare	0.05% Citronella	3 minutes
Gone Original Wristband	9.5% DEET	0
Repello Wristband	9.5% DEET	0
Gone Plus Repelling Wristband	25% Citronella	0

### For More Information

The Environmental Protection Agency has two fact sheets that can be viewed on the internet.

-How to use insect repellents safely

<http://www.epa.gov/pesticides/citizens/insectrp.htm>

-Reregistration of the insect repellent DEET

<http://www.epa.gov/opp00001/citizens/deet.htm>

### References

Fradin, M. S., and J. F. Day. 2002. Comparative efficacy of insect repellents against mosquito bites. *N. Engl. J. Med.* Vol. 347(1)13-18.