

Skeeters buggin' you?

Insect repellents provide safe relief with proper use

By Angela Brammer
University of Florida

With recent reports in the media about West Nile Virus, Eastern equine encephalitis and St. Louis encephalitis – all transmitted by mosquito bite – people are increasingly concerned with how to protect themselves and their families.

There are ways to reduce the risk of mosquito bite that do not involve the use of insect repellents. For example, some mosquitoes breed in stagnant water, and pouring out water-filled flowerpots, old tires, gutters and other containers can reduce their numbers. Mosquitoes are most active from dusk to dawn and seem to be more attracted to people wearing dark apparel. Wear light-colored, loose-fitting long sleeves and pants, and stay inside when possible, especially during peak biting times.

But for those times when you must be outdoors, an insect repellent is often the best method of protection from mosquito bites. Proper use of repellents is critical, as improper use and abuse can sometimes lead to health problems.

Types of repellents

Several types of repellents are available. They vary in effectiveness. The Florida Department of Health recommends using a repellent containing DEET. Read the label carefully and follow directions to reduce the possibility of an adverse reaction to the active ingredient. The following information on DEET and other repellents is from the Annals of Internal Medicine's "Mosquitoes and Mosquito Repellents: A Clinician's Guide" and the University of Florida's "Use and Application of DEET" and "Avoiding and Repelling Mosquitoes and Other Biting Nasties."

DEET (diethyltoluamide) is widely recognized as the most broadly effective, longest lasting repellent available. It was developed by the U.S. Department of Agriculture in the 1940s for the U.S. Army and has been available to the general public since 1957. It comes in formulations ranging from 5 percent to 100 percent and in many forms, including lotions, sprays and oils. Above a certain level (about 50 percent), the increase in effectiveness with increased concentration of DEET shrinks substantially. Depending on the situation, DEET can provide two to eight hours of protection.

For casual use, a product containing 10 percent to 35 percent DEET should be adequate. For children, it is best to be conservative and keep the concentration of DEET at 10 percent or less. Read the label to see how much DEET is in the repellent. The label usually does not say "DEET." Instead, it lists "diethyltoluamide" or "N,N-diethyl-meta-toluamide" under the active ingredients. Use the lowest concentration that works.

Special considerations in applying DEET-based repellents:

- High temperatures and humidity reduce the length of its effectiveness. In such a situation, it may be necessary to apply the repellent more often or use a slightly stronger concentration.
- DEET can damage plastics, leather, synthetic fabrics such as rayon, and painted or varnished surfaces. Take care to avoid these materials when using repellent. For example, a person can damage eyeglasses or a watch inadvertently by applying DEET to the hands and then touching these items. DEET does not damage cotton, wool or nylon.
- Millions of people have used DEET since it was developed in 1946, but it can be toxic if used improperly. Great care must be taken to ensure that it is used according to the label and EPA guidelines, especially with children because they are more likely than adults to accidentally ingest it. Also, the low body weight of children means that a smaller amount of repellent could potentially have a much greater effect on a child than an adult.
- Many older DEET products contained an additive that has raised some concern. As of 1993, the additive was no longer included in DEET repellents. Use only those DEET products made since 1993.

Citronella is a common and popular ingredient in many repellents. It is derived from a lemon-scented grass and can be found in oils, sprays and candles. Studies have shown that citronella oil protects against most mosquito bites in the first 30 to 40 minutes after application but its effectiveness diminishes quickly after that and is gone in two hours. Because of this, citronella should be reapplied every two hours to be most effective.

Permethrin, a synthetic insecticide, does not actually repel insects; it kills them on contact. It has low toxicity in humans and is absorbed poorly by the skin. Permethrin is also different from the other repellents in that it is applied not to the skin, but to clothing, tents or other fabrics. It lasts on those fabrics for up to two weeks, even after washing. Fabrics treated with permethrin should be allowed to dry for two to four hours before use.

Herbal or plant-derived repellents have had some success. The oils of many plants do repel insects, but the duration of their effect is often significantly shorter than can be achieved with DEET. One example is an herbal repellent based on geraniol, formulated by Dr. Jerry Butler of the University of Florida from lemon grass and other plants. Sold under the name MosquitoSafe, it has been labeled “generally regarded as safe,” by the EPA, but it must be reapplied every at least every four hours.

Skin-So-Soft bath oil, made by Avon and reported to have insect-repelling activity on the basis of its fragrance or formulation, has been shown in laboratory tests to be effective in repelling *Aedes* mosquitoes for about 40 minutes. By comparison, a solution of 12.5 percent DEET provided protection from bites for 10 times as long.

Safety guidelines

The Environmental Protection Agency’s Office of Pesticide Programs recommends following these guidelines to ensure safety when using insect repellents on adults or children:

- Read the entire product label before applying repellent to be sure you are following the directions. Even if you have read it before, do not trust your memory. Read it again.
- Apply repellent only to exposed skin, as indicated by the label. It is important to remember to apply repellent to all areas of exposed skin because mosquitoes will go after untreated skin that is only a few centimeters away from repellent-covered skin.
- Do not go overboard with repellent. Saturation is not necessary. Use just enough to cover exposed skin.
- Do not use repellents on cuts or otherwise irritated skin.
- Do not spray repellent directly on the face. Instead, spray it on your hands first and then use your hands to apply it to the face. Use sparingly around the ears, and keep repellent away from eyes and mouth.
- Do not apply repellent to children’s hands at all. Use your own hands, rather than a spray, to put repellent on a child.
- Do not spray repellent in enclosed areas or near food.
- Once back inside, wash treated skin with soap and water as soon as possible, especially if you have made more than one application or have used repellent on consecutive days. Clothing should also be washed before it is worn again.
- If you think you or your child might be having a reaction to a repellent, wash it off immediately, then call a local poison-control center.

Additional information

For more information on the active ingredients in insect repellents and other pesticides, call the National Pesticide Telecommunications Network at (800) 858-7378. Hours are 9:30 a.m. to 7:30 p.m. (Eastern time) seven days a week.