

Insect repellents have become an increasingly popular topic as a result of the emergence of the West Nile Virus. Due to the fact that there is currently no effective treatment for the West Nile Virus other than supportive care, the best way to avoid complications resulting from this illness is to prevent its spread by avoiding the mosquito bites that transmit the virus. It may be difficult for consumers to choose which insect repellent will work best for them since there is a large variety from which to choose. This article is designed to answer questions such as these: Should the insect repellent contain N-N-diethyl-meta-toluamide commonly known as DEET? Is DEET safe to use in adults, children, or even infants? How does DEET work in preventing mosquito and other bug bites? What concentration of DEET works best? How effective are insect repellents in preventing mosquito bites?

Should you use an insect repellent that contains DEET?

DEET was developed by the United States military in 1946 to protect soldiers from bug bites in mosquito and insect infested areas. In December of 1980 a registration standard for DEET was issued with regards to safety and toxicity. All pesticides sold in the U.S. are required to gain registration through the Environmental Protection Agency (EPA) to show that they can be used without posing unreasonable risks or harm to the user or the environment. (1) In September of 1988 DEET was re-registered under the more stringent standards developed by the EPA after November 1, 1984. Currently there are 225 DEET products registered through the EPA. (1)

At this point in time, the most effective insect repellents contain DEET as their active ingredient. DEET, in varying concentrations, has been the standard in mosquito repellents for over 40 years. There are some non-DEET containing products that offer protection from insect bites including soybean-oil products, but these products have not shown the same effectiveness as those containing DEET. Not only are the non-DEET containing products less effective, they do not offer protection for as long as the products that contain DEET. All things considered, products containing DEET are the most effective and best-studied insect repellents available today. (2,3)

Is DEET safe to use in adults, children, or even infants?

Animal studies have shown DEET to have low acute toxicity. In rats DEET showed slight toxicity when ingested or placed on the skin. On a four-category toxicity scale where Category I represents highly toxic, DEET is classified as Category III, slightly toxic. DEET could not be categorized as Category IV, non-toxic, because it can cause slight toxicity to the eye, skin, or if ingested orally. (1) When products containing DEET are used properly according to the directions on the label they are considered very safe. Although there have been some reports of seizures potentially related to DEET exposure this is thought to be extremely rare. (4)

The use of insect repellents containing DEET in adults is generally considered very safe. However it is recommended that even adults not use products with concentrations of DEET higher than 30 to 35%. The use of DEET in children is usually considered a safe practice. To be on the safe side it is prudent to use products with a relatively low DEET concentration of no more than 10 to 15% DEET. There is still some debate as to what the safest age is to begin using products containing DEET on infants. Some experts believe it is safe to use DEET products in children older than two months, while other more cautious experts believe it is wise to not use DEET containing products

until children are older than two years. (2) DEET containing products are considered safe to use by pregnant or breastfeeding women with no adverse effects being reported.

There are some general rules to follow in order to use DEET containing insect repellents as safely as possible. These safety considerations include using enough repellent to cover exposed skin and clothing. Heavy application is not necessary as long as all exposed areas are covered. When applying DEET containing products avoid the eyes and mouth. Do not apply DEET containing products to open wounds, cuts, or irritated skin. When returning indoors wash any DEET exposed skin with soap and water. (2)

How does DEET work in preventing mosquito and other bug bites?

Although DEET containing products have been used as insect repellants for over 40 years, the exact mechanism that DEET works in preventing insect bites is not completely understood. The most likely hypothesis is that DEET affects the insect's ability to locate the animals on which they feed. Mosquitoes have special receptor antennae that can sense chemicals produced by humans and animals allowing the mosquito to locate their target. Some scientists believe that DEET effectively disturbs the function of these receptor antennae. (4)

What concentration of DEET works best?

DEET containing products come in numerous different concentrations ranging from 4 to 100%. The effectiveness of DEET is not concentration dependent. 10% DEET products are just as effective at preventing bug bites as 40% DEET products; the difference is that the higher percentage products have a longer duration of action. A product with 23.8% DEET offers protection for approximately 5 hours whereas a product with 6.65% DEET provides protection for an average of 2 hours. (2) Products containing over 50% DEET are more likely to cause adverse reactions including skin annoyance and eye irritation. (3) All things considered, adults should use a DEET containing product with a concentration of between 10% and 50% DEET, depending on the length of time that they will be outdoors.

How effective are insect repellants in preventing mosquito bites?

Insect repellents if used properly according to the label can be very effective in preventing mosquito and other insect bites. No insect repellent is 100% successful but studies have shown products containing DEET to be the most useful products available. Other than insect repellents there are other ways of avoiding insect bites. Mosquitoes are most active between dusk and dawn so outdoor activities should be avoided at these times. If outdoors when mosquitoes are active wear long sleeve shirts and pants. The use of mosquito netting and bug tight screens can be very effective. Avoid mosquito-infested areas. Finally, do not use incandescent lights that attract mosquitoes when outside.

Reference:

1. Environmental Protection Agency (EPA) R.E.D. Facts. DEET. <http://www.fda.gov>. Accessed on 11/10/04.
2. Center for Disease Control (CDC). West Nile Virus. <http://www.cdc.gov>. Accessed on 11/10/04
3. Colorado State University Cooperative Extension Golden Plains Area Cooperative Extension. Colorado State University. <http://www.coopext.colostate.edu>. Accessed on 11/10/04
4. DEET General Fact Sheet. <http://www.fda.gov>. Accessed on 11/10/04
5. Maynard Board of Health. West Nile Virus Information-2003. <http://web.maynard.ma.us/gov/boh/west-nile-virus.htm>. Accessed on 11/10/04