

How to Repel Mosquitoes Safely

The first step in avoiding mosquitoes is prevention. Remove any standing water where mosquitoes can breed around the home and the schoolyard, such as plant pots, leaky hoses, empty buckets, toys, and old tires.

The best way to avoid mosquitoes, especially in the evening when they are most active, is to wear long pants and long sleeves. Burning citronella candles outside also helps repel mosquitoes. Since these two options are not always possible, mosquito sprays can sometimes be a good alternative. Many common mosquito sprays can contain toxic ingredients, however, so it is important to consider all of the option and read labels carefully before buying or spraying the repellents.

Some Least-Toxic Mosquito Sprays Include:

- **Oil of Lemon Eucalyptus**- CDC recommends lemon eucalyptus oil repellents as a good alternative to DEET. The scented oil of lemon eucalyptus masks both carbon dioxide and lactic acid exhalations that alert mosquitoes to our presence, essentially hiding humans from detection. According to CDC, this plant-based mosquito repellent provides protection time similar to low concentration DEET products.(Repel Lemon Eucalyptus Insect Repellent- www.repel.com).
- **Essential oils**- Pesticides made with essential oils are derived from plants that are known to have insecticidal properties. Some essential oils used in repellents include Cedarwood, Soybean Oil (www.biteblocker.com), and **Geraniol** (MosquitoGuard- www.wildroots.com, Bite Stop- www.bitestop.com, Bugband- www.bugband.net) When compared against products like Citronella, Geraniol proved to be 100% more effective. Against products containing 10% Deet, Geraniol proved to be more effective.
- **Picaridin** (KBR 3023), derived from pepper, is a newly registered repellent that CDC claims provides comparable protection as DEET products with similar concentrations (Cutter Advanced- www.cutterinsectrepellent.com/). The limited data available on this product suggest that it has low potential for toxicity.
- **Citronella sprays**- The same ingredient in the candles that repels mosquitoes also is in some mosquito sprays, including the repellent Natrapel (www.tendercorp.com). PfSE members recommend using natural products listed above besides citronella, which has been shown in studies to be least effective.
- Some repellents include many of these ingredients, including: Quantum Buzz Away Mosquito Repellent (www.quantumhealth.com), All Terrain (<http://www.allterrainco.com/>), Avon Skin-So-Soft, and Herbal Armour.

These recommendations are based on what is known about the relative toxicity of the active ingredient. The inert ingredients, which often makes up the largest portion of the product, is not disclosed, and therefore cannot be evaluated. With all these repellents, be sure to reapply often (following the directions on the label) to repel the mosquitoes most effectively.

Be Sure to Avoid:

- **Pesticide-impregnated clothing**, such as Buzz Off clothing, which is impregnated with the synthetic pyrethroid permethrin. Permethrin is a possible carcinogen and a suspected endocrine disruptor. Endocrine disruptors interfere with normal hormone function and can contribute to breast and testicular cancer, birth defects, learning disorders, and other problems. Animal studies also indicate that small amounts of permethrin may cause immunotoxicity, or corruption of the immune system.
- **Products containing DEET**, which is quickly absorbed through the skin and has caused effects including severe skin reactions including large blisters and burning sensations. Laboratory studies have found that DEET can cause neurological damage, including brain damage in children. EPA requires that child safety claims be removed from all end-use product labels, as they are misleading. DEET labels must inform users of precautions that are realistically impossible to follow, including not applying the product near children's hands or face, not apply over cuts, wounds and irritated skin, and thoroughly wash all treated skin with soap and water after returning indoors.

