

# How to Choose Mosquito Repellent

Three Methods: [Choosing by Active Ingredient](#) [Choosing by Protection Time](#) [Choosing by Application](#)

Insect repellents work by making us unattractive to biting bugs like mosquitos, ticks, and flies: just apply the repellent and they should avoid the treated area. Mosquito repellents in particular do this in a number of ways, using either synthetic or natural chemicals. How can you choose the best product, though? It depends. Think not only about what active ingredient you want in a mosquito repellent, but also about how long and where you need to be protected.

Method  
1

## Choosing by Active Ingredient

**1 Consider a DEET-based product.** DEET stands for either N,N-diethyl-m-toluamide or N,N-dimethylbenzamide. It is a reliable mosquito repellent that has been in use in the US since the late 1950s under brands like Cutter, Repeller, and Off! You can find DEET mosquito repellents at most outdoors, sporting goods, and hardware stores in lotion and spray forms.<sup>[1]</sup>

- DEET can be highly effective. But be aware that these repellents come in different concentrations, from 5% to 100% DEET.
- Be aware that DEET's toxicity is still under study and be careful with it especially if you're using it on children. Some kids may have skin irritation and can also have harmful reactions if they accidentally swallow some.<sup>[2]</sup>
- However, know that DEET repellents are still considered safe for children in low concentrations. The American Academy of Pediatrics recommends levels of no more than 35% for kids.

**2 Try a Picaridin alternative to DEET.** Picaridin was created by Bayer corporation in the 1980s as an alternative active ingredient to DEET and has been available in repellents in the US since 2005. It's as effective in keeping away mosquitos but lacks some of DEET's unpleasant qualities. Consider it if you're wary of DEET.<sup>[3]</sup>

- Know that Picaridin is safe and as effective as DEET in similar concentrations. It is also odorless, non-oily on the skin, and will not cause skin irritation or melt plastics.
- Look for brands at the pharmacy or outdoors store like Cutter Advanced and Skin So Soft Bug Guard Plus.

**3 Think about a Permethrin repellent.** Permethrin is another proven repellent. It has been used in agriculture, for lice in humans and animals, and as a repellent for mosquitos, ticks, and other insects. It can also last a long time. The thing that makes this product stand out, however, is that it's used on clothes rather than on skin.<sup>[4]</sup>

- Be assured that Permethrin is fairly safe. While it causes skin irritation in some cases, the product is biodegradable in only a few weeks when it bonds to the soil or clothing.
- Permethrin is low in toxicity to birds and mammals. However, it is more toxic to insects, bees, and fish, so you'll need to avoid accidentally contaminating blooming crops and water with it.

**4 Consider other plant-based repellents.** There are a number of mosquito repellents with other kinds of active ingredients, many derived from plants. You might want to consider these products if you are concerned about the possible side effects and toxicity of chemicals like DEET or Permethrin.<sup>[5]</sup>

- You might try a repellent with oil of lemon eucalyptus, a synthetic form of the naturally occurring oil in eucalyptus leaves. This compound is as effective as 15%-20% concentrations of DEET.
- Don't use oil of lemon eucalyptus on children, as its safety hasn't been tested. Don't confuse it with the natural variety, either, lemon eucalyptus oil. This is a different product and hasn't been tested and approved as a repellent.
- Think about trying repellents that use citronella, lavender, sassafras, peppermint, or soy oils as active ingredients, too. These have all been tested and are moderately effective, though less than synthetic counterparts.

**Method  
2****Choosing by Protection Time**

**1 Choose Permethrin for the longest-lasting coverage.** Since Permethrin goes on your clothes and chemically bonds to the fabric, it is really long lasting and will stay active even after you wash the garments. It's probably the best choice for a lasting, low maintenance repellent.<sup>[6]</sup>

- US military studies show that a low concentration of Permethrin on clothing (.5%) gave protection for up to 97.7% of bites. It can also last from 2 weeks to 6 months, or about 5-20 detergent washings.
- Look for pre-treated shirts, hats, and pants, if you are interested in using Permethrin. Brands like LL Bean and ExOfficio now offer such garments.<sup>[7]</sup>

**2 Go with higher DEET concentrations for longer coverage.** DEET is not only powerful stuff, but it can give you excellent coverage if you're going to be outdoors for a long period of time. In general, keep in mind that coverage will last longer with higher concentrations.<sup>[8]</sup>

- DEET with about 50% concentration normally gives about 4 hours of protection, while increasing the level to 100% adds about one more hour. However, some brands with 100% DEET concentration can last up to 10 hours or more.
- Make sure to read any labels carefully to see what sort of concentration the product has. Lower levels of DEET (under 10%) will give you at most two hours of protection.

**3 Bear in mind that "natural" active ingredients won't last as long.** The dilemma many people have when choosing a mosquito repellent is that they don't trust chemicals like DEET or Picaridin, fearing that they are toxic and "unnatural." Unfortunately, the alternatives don't always work better. Naturally derived mosquito repellents usually aren't as effective and also don't last very long.<sup>[9]</sup>

- You'll probably be OK with a natural active ingredient like citronella or peppermint oil if you're only outdoors for a short time – at most a few hours.
- For instance, Burt's Bees Herbal Insect Repellent uses rosemary oil, lemongrass oil, and citronella and works for up to 6 hours. This is pretty exceptional.
- More typical are products like Buzz Away Extreme, Badger Anti-Bug Balm, and All Terrain Herbal Armor, which use active ingredients like citronella and give protection from about 4 hours to as little as 20 minutes.

**Method  
3****Choosing by Application**

**1 Get a lotion or spray-on repellent for your body.** The kind of mosquito repellent you choose to use can also depend on how you want to use it – in other words, the method of application. Most repellents go on the skin or are sprayed on your clothing. Look for lotions, aerosol sprays, creams, and sticks if this is what you want.<sup>[10]</sup>

- Liquids, creams, lotions, and sticks will let you apply the repellent directly to your skin, while an aerosol or pump spray will allow you to treat skin or clothing.
- Keep in mind that sprays give a more even application to the skin and clothing.
- Read the labels on these products to see what the active ingredients are. Choose a lotion or spray that has the ingredient you most prefer, whether DEET, Picaridin, or a natural alternative.

**Go with Permethrin for clothing, tents, shoes, and other gear.** As said, Permethrin is specially designed for use on

**2** clothing and other fabrics. Pick a product with this active ingredient if you want to use the repellent in this way. While Permethrin normally comes in an aerosol spray, make sure that you don't inadvertently use it on the skin.<sup>[11]</sup>

- Look for pump sprays like Sawyer Products Premium Permethrin Clothing Repellent or aerosols like Repel Permethrin Clothing and Gear Repellent.
- You can also apply Permethrin to things like mosquito nets and use it on your clothing along with a DEET-based skin repellent. This will increase your protection even more.

**3** **Don't bother with citronella candles.** The idea of having an outdoor garden party and being protected from mosquito bites by scented candles is a nice one. There are, in fact, plenty of candles that claim to do just this by using the repellent qualities of citronella. The thing is, they don't work very well.<sup>[12]</sup>

- Citronella is moderately effective when you apply it to your skin. However, it is not always useful against mosquitos in candles. This may be because the smoke can change with wind direction and dissipates quickly.
- In one study, citronella candles reduced the number of bites only by a small amount – 42.3% and 24.2%. You can try repellent candles if you want, in other words, but don't expect too much.<sup>[13]</sup>

**4** **Check the Environmental Protection Agency's search tool.** The US EPA can help you put together all of these different factors to choose the best mosquito repellent for you. Just go to their website and search for "Find Insect Repellent." This will take you to a comprehensive search tool. All of the products listed here are registered with the EPA, meaning they have been tested for safety and effectiveness and have shared this information with the government.<sup>[14]</sup>

- On the search tool, choose how much time you want protection from the drop-down menu. Then, indicate that you want protection from mosquitos. You can also narrow the search by active ingredient and by company.
- Press the "search" button and then review the results. The EPA lists each entry by product name, hours of protection, active ingredient and concentration, company name, and EPA registration number.

## Sources and Citations

1. [http://msdh.ms.gov/msdhsite/\\_static/14,957,93.html](http://msdh.ms.gov/msdhsite/_static/14,957,93.html)
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3. <http://www.outdoors.org/articles/amc-outdoors/picaridin-vs-deet-which-is-the-best-insect-repellent/>

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