

*There is a more detailed discussion of botanical active ingredients as insect repellents in the 2009 book, "Prevention of Bites, Stings, and Disease", Oxford University Press. Following is a quote, but there are more details in the book:*

### **Choosing a Natural Repellent Product**

Botanical repellents are difficult to evaluate as a class of products. On the one hand, the public badly wants to use what are perceived as natural products. On the other hand, once you use a process to extract everything that's inside a plant, you are getting a mixture of dozens of chemicals. The plants are not our friends and many of those chemicals may cause skin irritation or allergy, some cause cancer, and some are downright toxic. If you are like most people and the idea of plant-based repellent appeals to you, or if you are out where only plant-based repellents are available, how do you make the best decision?

At this point in most of the world, the clear answer is to use products containing the derivatives of oil of lemon eucalyptus with PMD as the active ingredient. It works very well and it is safe when used according to label directions.

The next layer of selection is much less clear. Citronella has been used by many people, yet even at 10% concentration there is a danger of irritation to the skin. Lemon grass is used similarly and it has similar potential for causing irritation or allergy. What is more, neither is a long-lasting repellent, though the duration can be improved greatly by correct formulation. Citronella and lemon grass products are not useless and most are probably safe. We would never recommend them alone as the best protection against a real arthropod-borne disease problem, but they might be just the thing for a short exposure or when you want to offer guests some relief from a problem that is basically a nuisance and not a health threat. The current plant-based products are more likely than the synthetics to be good against one insect and not against another.

Other active ingredients derived directly from plants present more of a problem. As we have described, some are very effective. In fact, some, especially in combination, rival the synthetics in effectiveness. The day may come when we can use such combinations in confidence that one or the other of the ingredients does not include something harmful. In the meantime, we have to face botanical repellents with considerable caution in order to avoid skin irritation or worse.

An alternative is to choose products that use purified extracts or synthesized chemicals that are only part of the raw extract from the plants. In this way, you know exactly what you are putting on your skin. Any problem that results can be evaluated based on evidence rather than on guesswork. Some of those chemicals are very effective and they may provide long-lasting protection if they are formulated with the right oils or other additives to slow down the rate of evaporation.

Whether you use a plant extract, a pleasant mixture of many aromatic plants, or a chemical derived from a plant, be cautious about depending on the product. First, take a

good look at whether the product actually protects you from the bites you are trying to avoid. Second, and more important, try the product on a small part of your skin to see whether it irritates you. Even if it does not seem to cause any kind of reaction, you may still be sensitizing your skin to damage later on. In the worst case, you may slowly poison yourself with a plant-based toxin. The lists of plants presented in this chapter may be helpful in selecting the right product, but the ingredients change all the time and those who sell plant-based repellents seem to be very aggressive about using the latest extract for a new product.

Natural is great and you can hope that the botanical world will present less of a threat to your long-term health than the world of synthetic chemistry. That said, the principal drawback of botanical repellents is safety and the great unknown of what the dozens of chemicals in an extract are doing to your body. Purified botanical chemicals are safer and as time goes on, we will know more about them. The impressive efficacy of some mixtures of plant products is a very encouraging development that suggests that better products are on their way.

Finally, we suggest that you use a registered product. If there has been some sort of governmental review of toxicology and efficacy, you are much more likely to be using a product that is safe and effective.

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Available on Amazon.com here: <http://www.amazon.com/Prevention-Bug-Bites-Stings-Disease/dp/019536578X>

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