



## INSECT REPELLENTS IN A WARMING WORLD

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A new study was done to see which repellents were most effective at keeping mosquitoes away.<sup>1</sup> The researchers cautioned that additional studies are needed since they only used female *Aedes aegypti* mosquitoes. This issue obviously has become more concerning over the Zika virus. The *Aedes aegypti* mosquito spreads Zika, yellow fever, dengue, and chikungunya. This mosquito is moving further north each year with increased moisture and heat in our atmosphere from the burning of more fossil fuels.

This study used human volunteers to test the efficacy of 11 spray-on repellents as well as 5 wearable devices. They even tried one citronella candle around the volunteers. The candle did not help. Sprays were most effective by far, mainly those containing diethyltoluamide (DEET) or oil of lemon eucalyptus (OLE). OLE contains the active ingredient para-menthane-diol (PMD).

Four out of five wearable devices tested did not repel mosquitoes. One decreased attraction rate of the mosquitoes by about 27% when people were 1 meter from the cage of the mosquitoes. I would not suggest using it either. None of the bracelets had any effect on reducing attraction. Even the sprays are not 100% effective.

The CDC website (which has not been updated since this report) suggests using at least 20% DEET products. These include such brand names as Cutter Backwoods and Off! Deep Woods (for protection against mosquitoes, ticks, and other bugs). Although the CDC states that higher percentages of the active ingredient provide longer-lasting protection, they state that this increase in protection time maximizes at about 50% DEET. Many years ago, an article in the *New England Journal of Medicine* suggested that there was no need for using percentages greater than 30% as this just increased skin sensitivity and was not more protective in warding off mosquitoes.

The CDC does state that there are other repellents protecting against mosquitoes but they may not be effective against ticks and other bugs. These include Picaridin, OLE, IR 3535, and 2-Undecanone (methyl nonyl ketone). The CDC also states that if you are using a sunscreen, apply it first, and let it dry, they apply the repellent. Do not use products that contain both sunscreen and repellent together in the same product. They also state that one should not spray repellent on the skin under clothing.

Consider using clothing and gear (such as boots, pants, socks and tents) that are treated with Permethrin, which is an insecticide. Do not use Permethrin directly on the skin. Follow instructions for treating items yourself very carefully.

Wearing long-sleeved shirts, long pants, white socks, and a hat are suggested. Light color is suggested to see the vectors easier. Tuck your shirt into your pants and tuck your pants into your socks for maximum protection. Placing clothes in the dryer on high for 1

0 minutes kills ticks.

If bugs can get into where you are sleeping, sleep under a Permethrin-treated bed net that can be tucked under the mattress. Feel and look for small ticks. Some can be the size of poppy seeds.

Children should not have insect repellents sprayed on them if they are younger than 2 months of age. The CDC states that products containing OLE and PMD should not be used on children younger than 3 years of age. Children should not be allowed to touch the repellent. Adults should apply it to their own hands and then gently spread it over the child's exposed skin rather than spraying it directly on the child. Repellent should not be applied to children's hands because they tend to put their hands in their mouths. Obviously, repellent should be kept out of the reach of children. Under 2 months of age, babies can be protected by draping mosquito netting over their carrier, bed or car seat. Obviously, there needs to be a tight fit with something like an elastic edge.

The concern is, of course, mounting for pregnant women with concerns of Zika and the fetus (unborn infant). Those that are pregnant or could soon become pregnant should strictly follow steps to prevent mosquito bites. Updated CDC recommendations on traveling should be observed carefully. When used as directed, EPA-registered insect repellents are safe and effective for pregnant and breastfeeding women.

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<sup>1</sup>J. Insect Sci. 2/16/17.