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# American Family Physician

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## [Tips from Other Journals](#)

◀ [Index](#) | [Next](#) ▶

### DEET vs. Other Mosquito Repellents: A Comparison

Because of the recent spread of West Nile virus in the United States, mosquitoes have gained front-page attention. Fradin and Day present data on the relative efficacy of various mosquito-repellent preparations.

The human toll related to mosquito-transmitted disease is small in the United States, but worldwide, more than 700 million persons per year are affected by disease from mosquito vectors, and 3 million die of malaria. The authors note that protective clothing and avoidance of mosquito-infested habitats are important common-sense measures, but that use of insect repellent may be necessary in many cases to avoid bites. They divided the tested solutions into two broad categories: synthetic chemicals and plant-derived oils. A total of 16 preparations, which are available for sale nationwide, were selected for testing.

Testing volunteers inserted a repellent-treated arm into a cage with 10 disease-free, unfed female mosquitoes. Each preparation was tested three times on each volunteer in a randomized fashion. Volunteers recorded how long it took until they received the first mosquito bite.

Topically applied solutions containing N, N-diethyl-3-methylbenzamide (DEET) provided the longest protection (*see accompanying table*). Soybean oil was the only other agent to provide bite protection for more than one hour. Many preparations provided little protection at all, including DEET-impregnated wrist bands.

#### Protection Times of Insect Repellents

<i>Product and manufacturer</i>	<i>Active ingredient and concentration (%)</i>	<i>Complete protection time (minutes)</i>
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OFF! Deep Woods (SC Johnson)	DEET (23.8)	200 to 360
Sawyer Controlled Release (Sawyer)	DEET (20)	180 to 325
OFF! Skintastic (SC Johnson)	DEET (6.65)	90 to 170
Bite Blocker for Kids (HOMS)	Soybean oil (2)	16 to 195
OFF! Skintastic for Kids (SC Johnson)	DEET (4.75)	45 to 120
Skin-So-Soft Bug Guard Plus (Avon)	IR3535 (7.5)	10 to 60
Natrapel (Tender)	Citronella (10)	7 to 60
Herbal Armor, (microencapsulated) (All Terrain)	Citronella (12); peppermint oil (2.5); cedar oil (2); lemongrass oil (1); geranium oil (0.05)	1 to 55
Green Ban for People (Mulgum Hollow Farm)	Citronella (10); peppermint oil (2)	1 to 45
Buzz Away (Quantum)	Citronella (5)	5 to 30
Skin-So-Soft Bug Guard (Avon)	Citronella, (0.1)	1 to 30
Skin-So-Soft Bath Oil (Avon)	Uncertain*	1 to 30
Skin-So-Soft Moisturizing Suncare (Avon)	Citronella (0.05)	1 to 15
Gone Original Wristband (Solar Glooow)	DEET (9.5)	0.17 to 1.33
Repello Wristband (Repello Products)	DEET (9.5)	0.17 to 0.63
Gone Plus Repelling Wristband (Solar Glooow)	Citronella (25)	0.17 to 0.48

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*DEET = N,N-diethyl-3-methylbenzamide (formerly known as N,N-diethyl-m-toluamide); HOMS = Home Operations and Management Systems; IR3535 = ethyl butylacetylaminopropionate.*

*\*--This product contains mineral oil, isopropyl palmitate, dicapryl adipate, fragrance, dioctyl sodium sulfosuccinate, butylated hydroxytoluene, and carrot oil.*

*Adapted with permission from Fradin MS, Day JF. Comparative efficacy of insect repellents against mosquito bites. N Engl J Med 2002;347:16.*

The authors concluded that topically applied DEET provides the longest mosquito-repelling protection, with the best protection being obtained from higher concentrations of the compound.

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*Fradin MS, Day JF. Comparative efficacy of insect repellents against mosquito bites. N Engl J Med July 4, 2002; 347:13-8.*

◀ [Index](#) | [Next](#) ▶

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