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Mosquito Protection Fact Sheet

Most authorities recommend repellents containing N, N-diethylmetatoluamide (DEET) as an active ingredient. DEET repels mosquitoes, ticks, and other arthropods when applied to the skin or clothing. In general, the more DEET a repellent contains, the longer time it can protect against mosquito bites. However, there appears to be no added benefit of concentrations greater than 50%. **DEET is toxic when ingested and may cause skin irritation in sensitive persons.**

Be advised that the possibility of adverse reactions to DEET will be minimized if they take the following precautions:

- Use enough repellent to cover exposed skin or clothing. Do not apply repellent to skin that is under clothing. Heavy application is not necessary to achieve protection. If repellent is applied to clothing, wash treated clothing before wearing again.
- Do not apply repellent to cuts, wounds, or irritated skin.
- After returning indoors, wash treated skin with soap and water.
- Wash treated clothing before wearing it again.
- Do not spray aerosol or pump products in enclosed areas; do not breathe the spray.
- Do not apply aerosol or pump products directly to the face. Spray your hands and then rub them carefully over the face, avoiding eyes and mouth.
- When using repellent on a child, apply it to your own hands and then rub them on your child. Avoid the child's eyes and mouth and apply sparingly around the ears.
- Do not apply repellent to children's hands. (Children tend to put their hands in their mouths.)
- Do not allow children under ten years old to apply insect repellent to themselves; have an adult do it for them. Keep repellents out of reach of children.
- Protect infants two months of age and under by using a carrier draped with mosquito netting with an elastic edge for a tight fit.
- Bed nets, repellents containing DEET, and permethrin should be purchased before traveling and can be found in hardware, camping, sporting goods, and military surplus stores. Overseas, permethrin or another insecticide, deltamethrin, may be purchased to treat bed nets and clothes.



DEET and Children

No definitive studies have been published about what concentration of DEET is safe for children. No serious illness has arisen from use of DEET according to the manufacturer's recommendations. DEET formulations at 30% are recommended for both adults and children >2 years of age by SCHD. Lower concentrations are not as long lasting, offering short-term protection only and necessitating more frequent reapplication. Repellent products that do not contain DEET are not likely to offer the same degree of protection from mosquito bites as products containing DEET. Non-DEET repellents have not necessarily been as thoroughly studied as DEET and may not be safer for use on children. Parents should choose the type and concentration of repellent to be used by taking into account the amount of time that a child will be outdoors, exposure to mosquitoes, and the risk of mosquito-transmitted disease in the area. Many doctors feel that mosquito repellent for very young children should contain no more than 10% DEET and that no repellent should be used on infants.

Experts have implied to only apply mosquito repellent dependent on the time of day they are outdoors and the outdoor activity. This includes the morning and evening hours and if the children are going to play in a wooded area or near water. Also, dressing children in light colored clothes decreases their chance of being bitten.

Other Repellents



- **Citronella** is commonly used as a repellent. Protection of topically applied Citronella is short lasting. Studies show that 10% Citronella lasts less than 30 minutes.
- **Bath oils such as Avon Skin So Soft**, do offer some protection from mosquito bites and contain repellents recognized by the EPA. Tests have shown that repellency lasts less than 30 minutes.
- **Soybean Oil** can also be used. Products containing 2% soybean oil have shown repellency to last for over one hour, on average.



Mosquito Barriers



- Limit outdoor activities when mosquitoes are most active, dusk and dawn.
- Keep windows and doors sealed tight and maintain window and door screens to prevent mosquitoes from entering the house.
- If outside, wear protective clothing such as shoes, long pants, and a light colored long sleeved shirt.
- Mosquito netting can also be used over your face and neck or placed over infant strollers or playpens.

Table 1. Protection Times of Insect Repellents.*Source: New England Journal of Medicine, Vol 347, No. 1, July 4, 2002; www.nejm.org

PRODUCT	ACTIVE INGREDIENT AND CONCENTRATION	COMPLETE-PROTECTION TIME (MINUTES)	
		MEAN	RANGE
OFF! Deep Woods (SC Johnson)	DEET, 23.8%	301.5 ± 37.6	200-300
Sawyer Controlled Release (Sawyer)	DEET, 20%	234.4 ± 31.8	180-325
OFF! Skintastic (SC Johnson)	DEET, 6.65%	112.4 ± 20.3	90-170
Bite Blocker for Kids (HOMS)	Soybean oil, 2%	94.6 ± 42.0	16-195
OFF! Skintastic for Kids (SC Johnson)	DEET, 4.75%	88.4 ± 21.4	45-120
Skin-So-Soft Bug Guard Plus (Avon)	IR 3535, 7.5%	22.9 ± 11.2	10-60 †
Natrapel (Tender)	Citronella, 10%	19.7 ± 10.6	7-60 †
Herbal Armor (microencapsulated) (All Terrain)	Citronella, 12%; peppermint oil 2.5%; cedar oil, 2%; lemongrass oil, 1%; geranium oil, 0.05%	18.9 ± 13.3	1-55 §
Green Ban for People (Mulgum Hollow Farm)	Citronella, 10%; peppermint oil, 2%	14.0 ± 11.3	1-45
Buzz Away (Quantum)	Citronella, 5%	13.5 ± 7.5	5-30
Skin-So-Soft Bug Guard (Avon)	Citronella, 0.1%	10.3 ± 7.9	1-30
Skin So-Soft Bath Oil (Avon)	Uncertain ¶	9.6 ± 8.8	1-30
Skin So-Soft Moisturizing Suncare (Avon)	Citronella, 0.05%	2.8 ± 3.4	1-15
Gone Original Wristband (Solar Glooooooow)	DEET, 9.5%	0.3 ± 0.2	0.17 - 0.63
Repello Wristband (Repello Products)	DEET, 9.5%	0.2 ± 0.08	0.17- 0.63
Gone Plus Repelling Wristband (Solar Glooooooow)	Citronella, 25%	0.2 ± 0.09	0.17 - 0.48

- Plus-minus values are the means ± SD of the times to the first bite in the tests of all 15 subjects. DEET denotes N,N-diethyl-3- methylbenzamide (formerly known as N,N-diethyl-*m*-toluamide), HOMS Home Operations and Management Systems, and IR3535 ethyl butylacetylaminopropionate.

References

1. **CDC Website:** www.cdc.gov/travel/bugs.htm
2. **Texas A & M University:** [http://bexar-tx.tamu.edu/IPM/Landscape/F2/Insect Repellents.htm](http://bexar-tx.tamu.edu/IPM/Landscape/F2/Insect%20Repellents.htm)
3. **Washington State University:** www.wsu.edu/commun/WNVpreventingbites.htm
4. **University of Maryland Medicine:** www.umm.edu/features/bugs_kids.html