

## Insect Repellents

Insect repellents are applied to skin, clothes or surroundings in order to deter pesky insects. Skin-applied repellents registered with the U.S. Environmental Protection Agency (EPA) include N,N-Diethyl-meta-toluamide (DEET), picaridin, oil of citronella, oil of lemon eucalyptus, IR3535, 2-undecanone, and catnip oil. Several essential oils (e.g. geranium oil, soybean oil, peppermint oil) that are unregistered but deemed safe by the EPA have also been promoted as insect repellents.

DEET-containing products comprise the majority of the skin-applied repellents sold in the U.S. DEET products have been used in the U.S. since 1957 and are available in concentrations of 4% to 100%. The EPA estimates that one-third of the U.S. population applies DEET-containing repellents each year. In 2013, DEET was responsible for 71% of insect repellent exposures reported to U.S. poison centers, 52% of which were children less than 6 years old. Ninety-eight percent of cases resulted in no symptoms or minor effects. (*Clin Tox* 2014;52:1032-1283). Urticaria is the most common local adverse effect associated with topical DEET. Central nervous system effects following repeated, excessive dermal applications or ingestions include restlessness, drowsiness, irritability, tremors, ataxia and seizures. Vomiting, abdominal pain, hypotension and bradycardia have also been reported.

### Other Skin-Applied Insect Repellents

Picaridin	Low toxicity with all routes of exposure
Oil of citronella	Dermal irritation; CNS depression, aspiration pneumonitis when ingested
Oil of lemon eucalyptus (p-menthane-3,8-diol [PMD])	Eye irritation and transient injury of the corneal epithelium; low toxicity with other routes
IR3535	Eye irritation; low toxicity with other routes
2-undecanone	Low toxicity with all routes of exposure
Catnip oil (catmint oil)	Mild skin irritant; Low toxicity with other routes
Essential oils (e.g. geranium oil, soybean oil, peppermint oil,)	Low toxicity with all routes of exposure

Insect repellents applied only to clothing and equipment most often contain 0.5% permethrin, a pyrethroid insecticide. Hypersensitivity reactions (e.g. bronchospasm, oropharyngeal edema), and dermal, ocular and upper airway irritation have occurred. Large ingestions (200-500 mL) of concentrated permethrin solutions have produced tremors, seizures and coma.

The treatment of exposures to insect repellents consists of dermal and ocular irrigation and supportive care. Benzodiazepines are indicated for seizures that occur following ingestions and extensive dermal exposures of DEET and permethrin.

Michael Joines, BSPHarm, CSPI



### Did you know?

The American Academy of Pediatrics recommends to avoid using DEET on babies less than 2 months old and only apply products containing less than 30% DEET on older children.

Higher concentrations increase the risk of toxicity and are not more effective as repellents. Parents should be advised to choose the lowest concentration that will provide the required length of coverage. Ten percent DEET provides protection for about 2 hours while 20% protects for about 4 hours. Other insect repellents are safe to use on children with the exception of oil of lemon eucalyptus, which should not be used on children under the age of 3. Combination sunscreen/insect repellent products should be avoided since sunscreens need to be reapplied more often than repellents.



@MPCToxTidbits