



## Orange Oil and Orange Guard

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### Orange Oil

Rincon-Vitova's Orange Oil is a cold pressed, food grade oil extracted from orange peel that contains d-limonene and essential oils from *Citrus sinensis* L. Osbeck (Family Rutaceae). Orange oil destroys the wax coating of the respiratory system of insects causing suffocation. The citrus fragrance also repels insects, especially if the surface is absorbent and saturated with an orange oil mixture. D-limonene is GRAS (Generally Recognized as Safe) by the FDA. It's used as a food additive in many desserts as well as cleaning and shampoo products.

Orange oil can be diluted to 1.7 - 2.3% with water and a small amount of insecticidal soap or dishwashing detergent, for spraying on trees and plants. Use a maximum of 2 to 3 oz per gallon of water (1 part orange oil to between 40 and 60 parts water). Orange oil may also be mixed with equal or greater parts of other oils. While not safe to drink in large amounts, it is natural and not toxic to humans and other organisms.

Orange oil can be mixed with other oils that also smother insects or insect eggs. Horticultural oil with or without orange oil may be extended with an equal part of inexpensive vegetable oil. Neem oil can also be included, though it is harder on beneficials and has a bad smell. Ecotrol or wintergreen essential oil can be mixed with Neem to cover up the smell. Whatever oil mixture is used, it helps to add a castile soap, such as Trader Joe's or Dr. Bronner's peppermint soap, or a coconut oil soap or Safer's insecticidal soap. Fatty acids in soap damage the ability of the insect tissues to maintain water balance, so they eventually dehydrate and die. This combined with the suffocating effect of the oils will cause harm to all insects, good and bad. Therefore, it is important to only spray infested foliage and try to conserve natural enemies.

For a contact insecticide on hard surfaces including kitchen counters for ants or cockroaches or for drenching ant hills, mix 4 to 6 ounces of orange oil per gallon with 2 to 4 ounces of liquid detergent or soap. When treating for ants around trees, saturate the soil around the trunk while looking for where they are coming from. Spray ants on or in garbage cans and, again, follow the trail to treat the mound. Carpeting and pet bedding can also be saturated with a solution of orange oil for flea control. Orange Oil can be stored at normal room temperatures and can be applied at any temperature.

The USDA studied orange oil effectiveness. They mixed d-limonene in a 1% solution of water with a 0.1% agricultural surfactant and had good control of mealybugs without harm to most plants. Used at half strength, the mixture worked against whiteflies. Full-strength, it controlled from 69% to 100% of mealybugs and scales, including  $\geq 93\%$  control of root mealybugs. The mixture worked better than insecticidal soap or horticultural oil by itself against green scales on gardenia plants and did the best (44% control) on mealybugs. Limonene solutions of 1% damaged certain ferns, gingers and delicate flowers, but no harm was seen on palms, cycads, and orchids. (Jr Econ Ent, Vol 98, pp772-779, June 2005).

### Orange Guard

A commercial formulation of orange oil, Orange Guard, is available in quarts and gallons, certified by the Organic Materials Review Institute and registered in California as a horticultural spray and for use against ants. Dilute 1 part Orange Guard in 4 to 6 parts water for Ornamental Plants for 100% control of aphids and spider mites. Mixed in 6 parts water, it still kills over 90% of these plant pests. Orange Guard contains a surfactant so it does not need the addition of soap. It could also be combined with other oils or botanicals. Orange Guard, like orange oil, can be stored at normal room temperatures and can be applied at any temperature. Do not boil or freeze.