

Neem

Neem Oil comes from the neem tree (*Azadirachta indica*), a fast-growing ornamental shade tree native to Southeast Asia and India. For thousands of years it has been used for its insecticidal properties and in cosmetics and medicines. Neem oil can be found in all parts of the plant, but the concentration is highest in the seeds.

Neem seeds contain a number of biologically active compounds – the most active and best studied is azadirachtin. Azadirachtin is not a single compound but over 25 different, but very closely related compounds.

When discussing commercially available products called Neem, it is VERY IMPORTANT to understand what is being referred to. That's because there are two products that are sometimes referred to as Neem. Raw neem seed oil contains all the biologically active compounds. However, this product is further refined by alcohol extraction which

separates out the azadirachtin and other terpenoid compounds. This yields what is usually referred to and sold as Neem Oil or Neem Oil Extract. When you check the active ingredients on Neem Oil, it is most often "clarified hydrophobic extract of neem oil". This is the neem seed oil from which the azadirachtin and similar compounds have been removed; henceforth referred to as neem oil. Azadirachtin from the alcohol fraction is further purified and used as the active ingredient in several commercial insecticides such as AzaTrol, AzaMax and Azatin. Azadirachtin will be listed as the active ingredient in these pesticides.

Neem oil has several modes of action. The oil forms a

coating on the insect body blocking the breathing openings (spiracles) and suffocating the insects. It has also been shown to have repellent effect against certain insects and mites (see the individual product label). Neem oil has also been shown to prevent the germination and penetration of some fungal spores

such as powdery mildew. Neem oil is a contact pesticide; therefore, complete coverage when spraying is essential for good control. Commercial neem oil products usually contain 70% clarified hydrophobic extract of neem oil and are used at concentration of 0.5-2.0%. Always read and follow label directions.

Azadirachtin is a powerful insecticide that effects insects in several ways – it is an antifeedant, insect growth regulator, sterilant, repellent and oviposition inhibitor. Azadirachtin has weak systemic properties and is sometimes sold as a root drench with activity against chewing and



Sample neem oil insecticidal product.

piercing-sucking insects. Azadirachtin has no fungicidal activity.

Neither neem oil nor azadirachtin are persistent in the environment and are quickly broken down by UV light and microbes. This is both good and bad. Rapid degradation indicates it will have very little long-lasting environmental impact, but it also means that for good pest control, it must be applied on a regular basis during times of high pest pressure. Both products are practically non-toxic to mammals, birds, reptiles, plants (same precautions as horticultural oils), bees and other beneficial insects. However, it can be lethal if applied directly

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to beneficial insects; therefore, do not apply when pollinators are active. Both are slightly to moderately toxic to fish and aquatic organisms; therefore, they should not be applied to or used around bodies of water or where runoff might happen.

Like many oils, these products can be irritating to eyes, skin or mucous membranes. Neem oil is made up of fatty acids and glycerides (both common in our diets) and, if ingested, will be metabolized.

Azadirachtin was found to pass through the body and

over 90% eliminated within 7 hours.

Neem oil and azadirachtin have shown activity against over 60 different insect pests and more than a dozen fungal diseases. The individual product label will tell you what plants it can be used on and what it is claimed to control. Remember, the label is the law and the number one source of product information.

Many neem oil and azadirachtin products are OMRI (Organic Materials Review Institute) listed as useable in certified organic production practices.

~Dr. Joe Willis



Photo of a gardener applying neem oil insecticide. Note they are wearing protective gloves.

December Checklist/Garden Tips

Move tender container plants indoors on nights when temperatures are predicted to be in the low thirties or lower to prevent damage. Leave them inside in sunny windows or place them back outside when the freeze is over.

Although cold, dry winds can dry out leaf tissues and cause brown edges, plants do not feel wind-chill. When you see low temperatures predicted, focus on the actual temperature rather than wind-chill. If it's getting down to 38 degrees with a wind-chill of 25 degrees, you do not have to worry about a freeze.

Plan now for freezing temperatures. Decide what tender plants you will choose to protect and what will be left to its own chances. Make sure you have enough materials on hand to protect those plants that you will cover. Suitable materials include plastic, fabric sheets, blankets, tarps and cardboard boxes to name a few. Each plant to be protected needs to have a covering large enough to extend to the ground. It also helps to have stakes available to drive into the ground around plants to help support the coverings over the plants and bricks to weight down the bottom edges of the covering.

Cool season herbs like cilantro, dill, fennel, parsley, borage, sorrel, and chervil can be directly seeded into garden beds. Soak your parsley seed for a few hours in warm water to help them germinate better.