



## Herbal Insecticide and Pesticide - Save the Life and Future

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### Abstract

Insecticides provide many substantial benefits for farmers and consumers by controlling insects and preventing diseases, as well as increasing crop yield and keeping cost down; however, these potent chemicals have also put our health in great danger. The purpose of this is to identify the side effects of synthetic insecticides and the benefits of herbal insect repellents over them. The side effects of synthetic insecticides (organophosphate, organochlorine, carbamates etc) includes cancer, endocrine complications, infertility and sterility, brain damage, birth defects, respiratory disorders, organ failure, skin irritations etc. This can be avoided by the use of herbal insect repellents which includes peppermint, neem, pyrethrum, chrysanthemum catnip, quassia, tobacco etc.

**Key words:** Insecticides, Preventing diseases, Natural.

### INTRODUCTION

Herbal insecticides are biological agents that target certain unwanted living organism deter, incapacitates, kills, or otherwise discourages insects. They are a class of biocide. Herbal insecticidal method is a rapidly expanding field of agriculture, where natural agents, primarily parasitism and predators are used to control an insect that has been causing economic harm to human interests. These methods can be alternatives or supplements to conventional pest control methods such as synthetic pesticides. This method does not seek to eradicate insects completely, but to keep them to economically minimum factors by reducing populations to acceptable levels. Insect repellents help to prevent and control the outbreak of insect-borne diseases such as



malaria, Lyme disease, bed bug infestation, yellow fever, dengue fever, bubonic plague and west Nile fever [1].

## HERBAL INSECTICIDES

### ***Agastache cana***

It is obtained from the family Lamiaceae. It is known for being a natural mosquito repellent. This mint family member has highly flavored oil that minimizes contact with many flying insects, including mosquitoes. Many people apply the contents of the crushed plant directly to their skin. When it is brought together with larval control and mosquitoes breeding sites, it can effectively decrease the mosquito population in a given area [2].



### ***Anagallis arvensis***

*Anagallis arvensis* which is obtained from the family Primulaceae is an insecticidal or at least is repellent to some insects, possibly by virtue of its pungent essential oil which has a characteristic smell. Taken by mouth, experimental doses of the liquid in humans caused twenty-four hours of intense nausea, headache and bodily pain. Some people also experience dermatitis from contact with the leaf.



### **Venus fly trap**

It is obtained from *Dionaea muscipula*, Droseraceae. It catches its prey—chiefly insects and arachnids—with a trapping structure formed by the terminal portion of each of the plant's leaves, which is triggered by tiny hairs on their inner surfaces.



### **Nasturtiums**

It is obtained from the family Brassicaceae. It is used as a companion plants for biological pest control, repelling some pest, acting as a trap crop for others and attracting predatory insects.



### **Anethole**

It is obtained from *Foeniculum vulgare*, Umbelliferae. It is a promising insecticide. Several essential oils consisting mostly of anethole have insecticidal action against larvae of mosquitoes. Against the mite, anethole is a slightly more effective pesticide than DEET. It also acts against the cockroach *Blattella Germania* and against adults of the weevils *Sitophilus oryzae*, *Callosobruchus chinensis* and beetle *Lasioderma serricorne* [3].



### **Breadfruit**

It is obtained from *Artocarpus altilis*, Moraceae. It contains phytochemical, having potential as an insect repellent.



### Clove

It is obtained from *Syzygium aromaticum*, Myrtaceae. Because of the bioactive chemicals of clove, the spice may be used as an ant repellent. Studies determine its effectiveness for reducing fever, as a mosquito repellent [4].



### Eucalyptus oil

It is obtained from *Eucalyptus oblique*, Myrtaceae. Cineole-based eucalyptus oil is used as an insect repellent and biopesticide. In the U.S., eucalyptus oil was first registered in 1948 as an insecticide and miticide



### Orange oil

It is obtained from *Citrus sinensis*, Rutaceae. Orange oil can be used in biological pest control green pesticides. It can kill an ant, as well as a whole colony of ants. Orange oil also erases an ant's scent-pheromone trail indicators and disrupts re-infestation activities in ants.



### Catnip

It is obtained from *Nepeta cataria*, Lamiaceae. Nepetalactone is a mosquito and fly repellent. Oil isolated from catnip by steam distillation is a repellent against insects, in particular mosquitoes, cockroaches and termites [5].



### Chamomile

It is obtained from *Matricaria chamomilla*, Asteraceae. The chamomile plant is known to be susceptible to many fungi, insects, and viruses. Fungi such as *Albugo tragopogonis* (white rust), *Cylindrosporium matricariae*, *Erysiphe cichoracearum* (powdery mildew), and *Sphaerotheca macularis* (powdery mildew) are known pathogens of the chamomile plant.



### Chrysanthemum

It is obtained from *Chrysanthemum indicum*, Asteraceae. Pyrethrins attack the nervous systems of all insects, and inhibit female mosquitoes from biting. In sublethal doses they have an insect repellent effect. They are not persistent, being biodegradable, and also decompose easily on exposure to light.



### Cedar oil

Cedar is obtained from cedar wood of family Pinaceae. In India, oil from the deodar cedar has been possess insecticidal and antifungal properties and to have some potential for control of fungal deterioration of spices during storage.



### Spearmint

It is obtained from *Mentha spicata*, Lamiaceae used for its aromatic oil, referred to as oil of spearmint, effective insecticide against adult moths.



### Onion

Onion is obtained from *Allium ochotense*, Amaryllidaceae. The pungent juice of onions has been used as a moth repellent and can be rubbed on the skin to prevent insect bites [6].



### Lemongrass oil

It is obtained from *Cymbopogon schoenanthus*, Poaceae. It is a highly fragrant grass from India. The oil is very useful for insect repellent.



### Neem oil

Neem is obtained from whole plant of *Azadiracta indica*, Meliaceae.

Formulations made of neem oil also find wide usage as a biopesticide for organic farming, as it repels a wide variety of pests including the mealy bug, beet armyworm, aphids, and the cabbageworm, thrips, whiteflies, mites, fungus gnats, beetles, moth larvae, mushroom flies,

Leafminers, caterpillars, locust, nematodes and the Japanese beetle. It

can be used as a household pesticide for ant, bedbug, cockroach, housefly, sand fly, snail, termite and mosquitoes both as repellent and larvicide. Neem oil also controls black spot, powdery mildew, anthracnose and rust fungi. *Monarda citriodora*.



### SOME OTHER INSECTICIDES ARE

There are many preparations from naturally occurring sources that have been used as a repellent to certain insects. Some of these act as insecticides while others are only repellent.

Some examples are;

- ❖ Achillea alpina - mosquitoes
- ❖ Alpha terpinene - mosquitoes
- ❖ Basil - flies, mosquitoes, whiteflies, carrot fly, asparagus beetles
- ❖ Borage - tomato hornworm, cabbage worms
- ❖ Castor bean - moles
- ❖ Camphor - moths
- ❖ Carvacrol - mosquitoes
- ❖ Castor oil - mosquitoes
- ❖ Celery extract - mosquitoes
- ❖ Cinnamon - mosquito larvae
- ❖ Citronella oil - mosquitoes
- ❖ Dahlias - nematoids
- ❖ Dill - aphids, cabbage looper, squash bugs
- ❖ Fennel - mosquitoes, snails, aphids, slugs
- ❖ Garlic - rice weevil, mosquito, wheat flour beetle
- ❖ Geranium oil - flies
- ❖ Lavender - flies
- ❖ Lemon eucalyptus - flies
- ❖ Marrubium vulgare - grasshopper repellent in agriculture

- ❖ Oliec acid - bees and ants
- ❖ Pennyroyal - mosquitos and fleas
- ❖ Peppermint - mosquitoes
- ❖ Rosemary - mosquitoes
- ❖ Spiny amaranth - cutworms
- ❖ Spanish flag - tea mosquitoes bug

#### **ADVANTAGES**

- Eradication of certain species of insects that pose threat to forest trees.  
Eg; budworms or loppers can kill thousands of trees due to defoliation.
- Prevention of much spoilage of stored foods.
- Increased yields of crops because of protection from defoliation and diseases.
- Prevention of certain diseases and conserve health in humans.  
(Malaria, dengue fever, Lyme diseases, bubonic plague west Nile fever, yellow fever etc)
- Used to control household pests.
- Difficult for insects to develop resistance to these pesticides.
- Safe to natural enemies and higher organisms.
- Cheaper, renewable, can be handled safely.
- Biodegradable.
- Rapid degradation of the active ingredient make it more acceptable.
- They are economical.
- They are more stable and can kept for prolonged period (degradation is less).
- They are less harmful to the human beings and more effective against pest.
- Environment friendly.
- Low toxicity to plants.
- Selectivity.
- Low mammalian toxicity.

#### **DISADVANTAGES**

- The onset of action is slow.
- The quantity of pesticide required may be more due to crude components.
- High specificity, which will require an exact identification of the pest/pathogen.
- Variable efficacy.

#### **SYNTHETIC INSECTICIDES**

Attractive toxic sugar baits or ATSBs are oral insecticides designed to reduce malaria infections by killing the host vector - the mosquito - rather than the parasites. Typical ATSBs consist of boric acid, an oral toxin. It also acts as stomach poison.

- Insecticide-treated nets were developed in the 1980s for malaria prevention. These nets are treated with synthetic pyrethroid insecticides.
- By increasing air flow using fans
- Application of insect repellent to the skin

- The use of indoor residual spraying of insecticides.
- Wearing cloths treated with insect repellence.

**COMPARISON BETWEEN HERBAL AND SYNTHETIC INSECTICIDES**

<b>HERBAL INSECTICIDES</b>	<b>SYNTHETIC INSECTICIDES</b>
<ul style="list-style-type: none"> <li>• They do not develop resistant to pesticides</li> </ul>	<ul style="list-style-type: none"> <li>• They accelerate the development of genetic resistance to pesticides.</li> </ul>
<ul style="list-style-type: none"> <li>• Selective</li> </ul>	<ul style="list-style-type: none"> <li>• Not selective.</li> </ul>
<ul style="list-style-type: none"> <li>• The ecosystem is less affected.</li> </ul>	<ul style="list-style-type: none"> <li>• Ecosystem is affected.</li> </ul>
<ul style="list-style-type: none"> <li>• Relatively cheaper</li> </ul>	<ul style="list-style-type: none"> <li>• Relatively costlier</li> </ul>
<ul style="list-style-type: none"> <li>• No harmful residues remain in food, fodder and fibers.</li> </ul>	<ul style="list-style-type: none"> <li>• Harmful residues may often remain food, fodder and fibers.</li> </ul>
<ul style="list-style-type: none"> <li>• Less stable</li> </ul>	<ul style="list-style-type: none"> <li>• Highly stable</li> </ul>
<ul style="list-style-type: none"> <li>• Narrow spectrum of activity</li> </ul>	<ul style="list-style-type: none"> <li>• Broad spectrum of activity</li> </ul>
<ul style="list-style-type: none"> <li>• Slow action; Residues may not be accumulate</li> </ul>	<ul style="list-style-type: none"> <li>• Rapid action; Residues were accumulate in the plant parts.</li> </ul>

**CONCLUSION**

Certain plants contain properties that either invite beneficial insects or repel harmful insects. Beneficial insects prey on pests that cause damage in the garden. Ladybugs and praying mantis are good examples of beneficial. Using plants for pest control not only cuts down on your workload, but it also reduces the amount of insecticides that you use in your garden and fewer insecticides means more good bugs, which in turn means help in controlling bad bugs. They may be used in companion planting for pest control in agricultural and garden situations, and in households. The essential oils of many plants are also well known for their pest-repellent properties. Oils from the families Laminaceae (mint), Poaceae (true grasses) and Pinaceae (pines) are common insect repellents worldwide. In all aspects herbal insecticides are more beneficial than synthetic insecticides.

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