

# Herbal Termicides

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The alternatives for termite control, looking at herbal means to control the pests

Living in tropical regions of the world it should not be that difficult for us to look for herbs that grow naturally in this part of the world which can be used for curing the dreaded household pests.

The region is rich in various ranges of wildlife both animal and plants and this high level of biodiversity in terms of animals and plants creates complicated interaction and also brings about various self defense mechanisms in the plants, which humans can then look at harnessing in order to create a defense from the pests in their houses.

The term of self defense or survival strategies for plants from animal feed leads to evolutionary success. Some animals prefer to stay away from particular plants. We do not see caterpillar larvae in neem seeds, mosquitoes are hardly seen near lemongrass, no termites are found in timber and mice never eat derris roots.

It was this kind of observation that lead me and the Department of Zoology, Faculty of Science, Kasetsart University, to do research on bio-botanical pesticides for almost 25 years.

Thai herbs have been proven to be effective not only to prevent illnesses, but also as insecticides. A few Thai herbs possess natural chemicals called allelochemicals, which work as natural pesticides, like:

- Citronella oil, extracted from lemongrass (*Cymbopogon winterianus*), is a good repellent against mosquitoes and flies.
- Eupathal from Siam weed (*Chromolaena odorata*) and saponin from tea seed cake (*Camellia* sp.) can be used to deter golden apple snails and cockroaches.
- Rotenone from derris (*Derris elliptica*) roots shows inhibition of microneuronal growth in the intestinal tracts of subterranean termite workers. nCurcumin from galangal (*Curcuma longa*) rhizomes is good to stop larva development of red ant (*Solenopsis* spp.).

Thai scientists have studied the mode of action, as well as the herbal mechanisms in household pests. The studies indicate that a few Thai herbs prevented electron transport in a cell's mitochondria and detoxification mechanisms namely, mixed function oxidase, esterase and glutathione-S-transferase, causing molt interruption, repelling, antifeeding, reproductive development and mortality to the insect pests.

There are at least 20 companies that manufacture Thai-herbal products used for pest control. Unfortunately, a majority of their products are not guaranteed by the Thai government, except for those extracted from neem and lemongrass. But derris and tea seed cake are under a registered regulation.

The Thai-pesticide market share accounts for only one per cent, compared to the synthetic pesticides market, which makes some \$2 billion a year (67 billion baht).

We have also found that some allelochemicals and secondary metabolites from insecticidal plants possess termiticidal effects. My colleagues and I formulated two kinds of herbal products: Emulsification and baits.

The emulsified products are composed of crude herbal mixtures of curcumin from galangal rhizome, citronella from lemongrass, pinine from Siam weed, and capsaisin from chilli. After Soxhlet's extraction, the crude extracts have been mixed with natural oil.

The emulsified concentrate is ready to be used directly on wood, papers and also mixed with 20 parts of water before applying on the ground around your house.

Citronella stop termites from eating wood and papers. Pinine makes termites hemolymph denature, and capsaisin reduced their feeding ability. But, it has to be used every six months.

Baits is a better product. The product is composed of mixture of sugarcane cellulose soaked with azadirachtin from neem seed kernels, curcumin from galangal rhizome and fungus spore from *Metarhizium anisoplae*. Curcumin inhibition of micronympha makes the termites weaker. The contaminated queen is not able to develop eggs owing to reduced oviposition caused by azadirachtin of fungus contamination. The termites will leave the area in three months.

For more details, contact the Department of Zoology, Faculty of Science, Kasetsart University, on 08-9980-4983 or 08-9260-9725, or visit

<http://www.suraphon.com/> or

<http://www.suraphonherbs.com/>