

# EXTRACTION OF PLANT BASED BOTANICAL PESTICIDES FOR MANAGEMENT OF VEGETABLE PESTS

**Md. Ramjan**

*College of Horticulture and Forestry, Central Agricultural University, Pasighat-791102  
Arunachal Pradesh*

**Corresponding author: mohammadramjan165@gmail.com**

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## **Introduction**

Naturally occurring chemicals (insect toxins) extracted or derived from plants or minerals. They are also called natural insecticides. Pest management is facing economic and ecological challenge worldwide due to human and environmental hazards caused by majority of the synthetic pesticide chemicals. Identification of novel effective insecticidal compounds is essential to combat increasing resistance rates. Botanical pesticides have long been touted as attractive alternatives to synthetic chemical pesticides for pest management because botanicals reputedly pose little threat to the environment or to human health.

Botanicals have been in use for a long time for pest control. The compounds offer many environmental advantages. However, their uses during the 20th century have been rather marginal compared with other bio-control methods of pests and pathogens. Improvement in the understanding of plant allelochemical mechanisms of activity offer new prospects for using these substances in crop protection.

As many as 2,121 plant species have been reported to possess pest control properties, 1,005 species have insecticidal, 384 antifeedant, 297 repellants and 31 growth inhibiting properties but not many could find their way to commercialization. Around 735 botanical pesticides products from various companies registered and these include 443 Azadiractine based, 290 Pyrethrum based and 1 Cymbopogan based products.

## **Factors Affecting Use of Botanical Pesticides**

- Raw material availability
- Standardization of botanical extracts containing a complex
- Mixture of active constituents
- Solvent types, plant species and part of plant
- Rapid degradation
- State registration
- Market opportunities for botanical pesticides
- Weather conditions

### Properties of botanicals pesticides

- Fast breakdown
- Fast action
- Selectivity
- Toxicity
- Phytotoxicity
- Cost and availability

**Table 1. Resources of Botanical Pesticides**

Plant name	Botanical name	Family	Active principles	Plants part used
Neem	<i>Azadirachta indica</i>	Meliaceae	Azadirachtin	Seeds & leaves
Rotenone	<i>Derris elliptica</i>	Fabaceae	Rotenone	Roots
Sabadilla	<i>Schoenocaulon officinalea</i>	Liliaceae	Cevadine	Seeds
Rynodine	<i>Ryania speciosa</i>	Flacourtaceae	Ryanoids	Woody stem
Tobacco	<i>Nicotiana tobaccum</i>	Solanaceae	Nicotine	Plants
Pyrethrum	<i>Chrysanthimum cinerarifolium</i>	Asteraceae	Pyrethrin	Dried flowers

Citrus	<i>Citrus spp</i>	Rutaceae	Limonene	Peel extracts
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**Table 2. Botanical pesticides used to control different insect pest in vegetables**

Botanical pesticides	Insects pest
Nicotine	Aphids, thrips, caterpillars
Rotenone	Bug aphids, potato beetles, spider mites, carpenter ants
Ryania	Codling moths, potato aphids, onion thrips, corn earworms
Sabadilla	Grasshopper, codling moths, armyworms, aphids, cabbage loopers, squash bugs
Pyrethrum	Caterpillars, aphids, leafhoppers, spider mites, bugs, cabbage worms, beetles
Essential oil	Caterpillars, cabbage worms, aphids, white flies
Neem products	Armyworms cutworms, stemborers, bollworms, leaf miners, caterpillars, aphids, whiteflies, leafhoppers, psyllids, scales, mites, and thrips

**Table 3. Methods of preparation and application of some other botanical pesticides**

Botanicals	Parts used	How to make	Pest controlled
<i>Annona spp</i> (sweet and sour soap)	Leaves	Chop ½ kg of leaves and put in 2 liters water, boil to 1 liter and mixed with 10 liters water.	Aphids, caterpillars, DBM, Flea beetle, etc.
<b>Basil</b>	Leaves, stem	Chop of 300 grams fresh basil and put in 2 liters water, boil to 1 liter and mixed with 10 liters water.	Red spider mites, leaf miners, fruits fly
<b>Chilli and peppers</b>	Fresh chillies	Chop of 500 grams fresh chillies and put 3 liters water, boil to for 15-20	Ants, scales,

		minutes and mixed with 10 liters water.	caterpillars, aphids, DBM
<b>Chilli powder (dry)</b>	Fruit	Sprayed the chilli powder around the plant for near the stem to the furthest leaf.	Ants and termites
<b>Neem</b>	Seeds, leaves, skin (bark)	Chop 1 kg of fresh leaves and put in 5 liters water or pound ½ kg unripe fruit and put in 4 liters water, leave it for 2 days and spray every 4 to 5 days. <b>Or</b> ½ liter neem oil in 4 ½ liters water and spray every 4 to 5 days.	Controls the most of insects
<b>Garlic</b>	Seed cloves	Chop 500 grams garlic and add it to 8 liters water, leave it for 2 to 3 days	Aphids leafhoppers, squash bug, whiteflies

**Conclusion**

Chemicals input in agriculture resulted in problem to agro-ecosystem; therefore there is need for conservation biotic balance in the agro-ecosystem. Organic agriculture is promising and sustainable. However complete dependence on organic farming is risky, since achieving targeted yield is difficult. There for emphasis has to make keeping in mind the demand for food and other items. A long term prospective in selected areas of crop production will enable the profitability and sustainability of agriculture including pest management.