Organic insecticides

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The world population is growing skyrocketing. To address their food demand is a great challenge. As agricultural land does not increase but is decreasing day by day due to unscientific urbanisation and industrialisation, the only way of increasing the agricultural production is to utilise the limited lands as far as possible and to save the production against insects and pests using insecticides.

Insecticide is substance used for destruction of insects and related pests. Before the invention of scientific insecticides, various kinds of plant materials were used to combat insects , rats and other pests in different parts of the world. The use of these insecticides decreased along with the invention of synthetic insecticides such as DDT (Dichlorodiphenyl trichloroethane), chlordane, aldrin, malathion, parathion, BHC (Benzene hexachloride) etc.

The discovery of DDT proved a great boon to mankind because of its remarkable power as an insect killer. By December 1969, more than 900 different active pesticides were available in more than 60,000 preparations. Though the scientific pesticides proved powerful weapon for killing the pests , the persistence of their residues has thoroughly polluted our environment. The residues spread over the earth by wind and water. The migrating birds and fishes transport DDT to thousand of miles around the world. The DDT residues pass from plants to animals through food chain and food web. Study has revealed the occurrence of pesticide residues in human and animal foods including wheat, oil seeds, vegetables, fish and eggs. As man occupies the top of the different food chains, he must have accumulated large quantity of DDT and other pesticides. The occurrence of such pesticides in the tissues of people living in urban areas have been reported. They interfere with important biochemical pathways in animals and could result in variety of symptoms including cancer. The accumulation level of pesticides in carnivorous birds has also been found in alarming scale. The DDT disrupts the shell-forming mechanism in birds that causes decline in population of eagles and falcons.

As the existence of living beings has been challenged by the use of synthetic insecticides, the use of these insecticides should be replaced by other kinds of safer insecticides or biological control employing predators and parasites of the pest should be used. The most safe way is to use organic insecticides that are non-toxic to humans.

Organic insecticides obtained from natural source solve the problems of insect pests in orchards, farm land, storage and plantations. The natural insecticides are biodegradable and do not linger in the environment to cause pollution. The organic insecticides are either contact or stomach

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poisons. Further, most effective insecticides e.g., pyrethrum and rotenone are non-toxic to warm-blooded animals in the small quantities used for pest control. A number of plant species have been identified with their important parts for obtaining insecticides and the effective chemicals as given in the table below

S.N.	Common Name	Species	Family	Toxic parts	Toxic chemicals
1.	Pyrethrum	*Chrysanthemum cinerariifolium*	Asteraceae	Flower	Pyrethrins
2.	Rotenone	*Derris elliptica*	Fabaceae	Root	Rotenoids
3.	Indigobush	*Amorpha fruticosa*	Fabaceae	Fruit	Amorphin
4.	Anabasis	*Anabasis aphylla*	Chenopodiaceae	Leaf and stem	Anabasine, aphylline, aphyllidine
5.	Croton or Purging Croton	*Croton tiglium*	Euphorbiaceae	Seed	Croton resin
6.	Male fern	*Dryopteris filixmas*	Filicineae	Rhizome	Filicin
7.	Pituri	*Duboisia hopwoodii*	Solanaceae	Dried leaves	Nornicotine
8.	Cockroach plant	*Haplophyton cimicidum*	Apocynaceae	Dried leaves	Haplophytine, haplocine, haplocidine, cimicidine, cimicine
9.	-	*Heliopsis longipes*	Asteraceae	Roots	Affinin
10.	Oxeye	*Heliopsis helianthoides*	Asteraceae	Roots	Heliopsin, scabrin
11.	Quassia	*Quassia amara*	Simaroubaceae	Bark and wood	Quassin, neoquassin
12.	-	*Ryania speciosa*	Flacourtiaceae	Dried roots, leaves and stem	Ryanodine

13.	Sabadilla	*Schoenocaulon officinale*	Liliaceae	Ripe seeds	Cevadine, veratridine, cevadilline, sabadine, sabadilline
14.	Vogel tephrosia	*Tephrosia vogelii*	Fabaceae	Roots	Rotenoids
15.	Thundergod vine	*Tripterygium wilfordii*	Celastraceae	Roots	Wilforine, wilfordine, wilforgine, wilfortrine, wilforzine
16.	Red squill or sea onion	*Urginea maritima*	Liliaceae	Bulb	Glycoside
17.	White or false hellebore	*Veratrum album*	Liliaceae	Rhizome	Cevadine, jervine, protoveratridine, protoveratrine, pseudojervine, rubijevine, germerine
18.	Southern prickly-ash tree	*Zanthoxylum clava-herculis*	Rutaceae	Bark	Herculin, neoherculin

In addition to above mentioned plant species, some locally available plant species such as *Achorus calamus*, *Artemisia* spp., *Melia azadirach*, *Nicotiana tabacum*, *Urtica* spp. etc. have been proved effective insecticides. These insecticides decrease the cost of production, environment friendly, harmless to warm-blooded animals and can be used in required concentrations to kill the pests whenever necessary. The chance of loss of species also can be minimised to some extent.

Thus, production and use of organic insecticides should be encouraged and further investigation of the source should be emphasised to save the human beings and the valuable biosphere.

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