

Green Pesticides: Eco-friendly Technology for Integrated Pest Management

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Agriculture is the backbone of the Indian economy. Nearly 75% of the rural areas of Indian villages depends on agriculture. The amount of food production is greatly deteriorating due to insect pests. To control the harmful insects there is a great requirement of a threefold increase in the annual use of fertilizers and much more extensive use of pesticides. The indiscriminate use of chemical pesticides has caused ill-effects on the beneficial insects and humans. To overcome these ill-effects, the green pesticides or botanical pesticides or plant based pesticides are identified as alternative and safe technology over the chemical pesticides of today.

Impact of Chemical Pesticides

Application of chemical pesticides has minimized the threat from pest manifestation by rapid knock-down effect on them. It has been estimated that hardly 0.1% of the agrochemical used in crop protection reaches the target pest leaving the remaining 99.9% to enter the environment thus causing hazards to non-target organisms. However, indiscriminate use of pesticide over a long period has not only proved to be harmful to soil microflora, animals and human life, but also an contributed to a number of side effects, viz. development of resistance by the insects/weeds/pests, resurgence and outbreak of new pests, toxicity to non-target organism, presence of non-permissible level of pesticide residues on seeds, vegetables, fruits and border alteration in dynamics of pest species population, cumulatively causing poor soil fertility, and hazardous effects on environment endangering the sustainability of ecosystem. Higher dose and repeated frequency of applications have also caused about one million people to suffer every year from pesticide poisoning. These dreadful facts demand ecofriendly and environmentally safer alternate methods for crop protection.

Green Pesticides: A Safe and Ecofriendly Technology

Most of the Plant-derived materials are safer and effective against diseases, nematodes and other organisms in addition to phytophagous insects. Plants and insects have co-evolved over millions of years; plants have accumulated specific secondary metabolites to counteract insect damage. These bioactive secondary metabolites act as insecticides, antifeedants, insect growth regulators, juvenile hormones, ecdysones, repellents, attractants, arrestants, etc. Due to the multiple activities of plant molecules, green pesticides can be considered as important alternative source for the chemical pesticides.

- Plant based pesticides are economically viable and ecologically safer than the conventional synthetic pesticides
- Unlike chemical pesticides, most of the plants have more than one chemical compound, which possess the biological activity. These chemicals may exert a single biological effect or may have diverse biological effects. Hence, the chances of developing quick resistance to different chemicals are unlikely.
- Poor and marginal farmers who suffer from increasing costs and hazards of synthetic pesticides can grow their own pesticides-yielding plants.
- Easily biodegradable in nature, economically viable and environmentally safer.

The drawbacks of green pesticides are:

1. Green pesticides are slow in controlling insect pests.
2. Thus do not produce an immediate "knockdown" effect.
3. There is a lack of residual action for most botanicals.

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