Organic pesticides

Organic pesticides score over synthetic ones

Though chemical pesticides are effective, they have a lethal impact on farming and life. On the other hand, organic pesticides used judiciously are farm-friendly and life-enhancing, says Dr. Chandrashekhar, Professor of Entomology, Bangalore University of Agriculture.

INEP: What are pesticides?

Dr. Chandrashekhar: As the name suggests these are chemicals that kill or destroy pests. The first known pesticide is arsenic, which was used about 100 years ago. But the most popular chemical pesticide is DDT. Mr. Paul Muller, a scientist, discovered DDT in 1934 during World War II. This was used as a weapon to kill enemy soldiers in the war. It was used to eradicate malaria around 30 – 40 years ago. We also used it against pests, predators, beetles and other insects that were destroying our crops. But DDT is harmful when used injudiciously.

INEP: What are the pesticides generally used in India?

Dr. Chandrashekhar: There are five to six types of pesticides. They are classified according to their chemical composition. There are organo-phosphates, carbonates, and nicotinoids. The most commonly used pesticides have organo-phosphate compounds. Pyrethroids and para-nicotinoids are the latest additions in the market.

DDT belongs to the chlorinated hydrocarbons category. Its harmful effect is that once it is released into the atmosphere it can last for a period of 20 – 30 years. That is one of the reasons why we are not using DDT and other such chemicals of the hydrocarbon group. We can use DDT only to control malaria. But even that had to be stopped in phases. We have about 70 – 80 pesticides.

INEP: What are organic pesticides?

Dr. Chandrashekhar: Since DDT was very harmful, scientists wanted to find an alternative for it. But it was difficult as these chemical pesticides could also stop the entire biological process. They could destroy other natural or beneficial viruses, bacteria, worms and other pests. So the search was on for something natural or that could be made from natural substances. The experiment began 20 – 30 years ago, using a natural substance. The *bevina kashaya* or *neem* concoction is an example of an organic pesticide. Organic pesticides can be made using viruses. For example, we have noticed that *avare kaalu*(a local variety of beans*)* gets infested by a worm. As we know that *avare kaalu* has to be eaten by us and not by the worm, we have to get rid of this worm. It is found that even the worm in the bean has a disease. A virus causes this. The virus is isolated in a laboratory, and developed as a pesticide which farmers can use as an organic pesticide. If a pesticide is created from a virus or other micro-organisms or anything similar that is made from natural elements it is an organic pesticide.

INEP: What are the pesticides generally used in India?

Dr. Chandrashekhar: The *avare kayee* worm or helicoverp also affects tomato, cotton and 130 other crops. This is a single major pest that affects 130 crops. A virus has been discovered to control this helicoverp. The speciality of this virus is that it affects only helicoverp and nothing else. Organic pesticides are made from fungi also. There is a bacterium called bacillus thurengensis which affects the silk worm. This bacterium has been isolated, treated and then used as an organic pesticide. The point is that if the bacterium or the virus is used directly it may affect the silk worm. If it is isolated, developed in the lab, and detoxified, then it can be used as an organic pesticide.

There are several pesticides made out of a *neem* concoction by factories. Farmers are also making the *neem* concoction privately in their homes and are using it as an organic pesticide. The *neem*-based pesticides are the major pesticides used in India.

INEP: How is the *neem* concoction prepared?

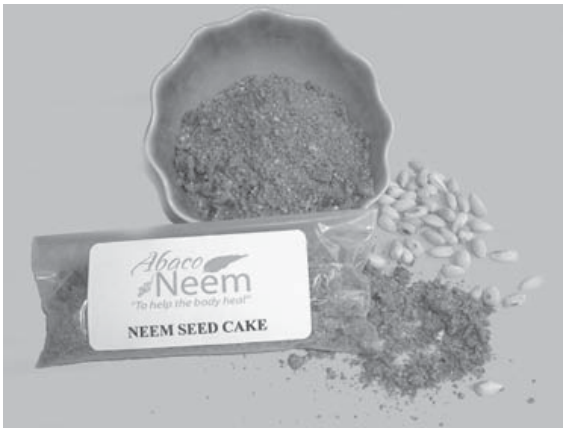
Organic pesticides

Dr. Chandrashekhar: The coat on the *neem* seed is removed and the pulp is taken out. If 40 gm of pulp are mixed with one litre of water, then a 4% *neem* concoction is ready. The method of making it is very important and a slight deviation from the procedure makes it less effective. But if made properly it is very effective. The seed has to be powdered well, mixed in water and soaked for an entire night. Then it has to be ground well. The more you grind the better will be the product. It is mixed with water and soaked for a night. While grinding only 100 or 200ml of water is used. For the final 4 per cent concoction 4 kg of *neem* paste is mixed with 100 litres of water. The University of Agricultural Sciences has more details about this product. A seed crushing machine is now available.

In spite of these huge benefits of *neem* farmers hesitate to prepare this product at home. While grinding, the *neem* seed produces a foul smell that causes headache. Normally it is women who do the grinding work. To avoid the headache they may not grind well. If the seeds are not ground well it may not become an effective pesticide. If ground well the *neem* concoction is one of the best organic pesticides. The *neem* concoction can also be a product of the cottage industry if organized on a community basis.

INEP: What about the investment?

Dr. Chandrashekhar: Several tonnes of *neem* seeds are going out of the country. Nobody is paying for this. India is incurring a huge loss. The only investment on the preparation of the *neem* concoction is manual labour and the cost of gathering the seeds. They have to be handpicked. The rest of the things can be managed with the help of a few people. The *neem* seeds are available only once a year around the months of June and July. So every year we have to collect them and store them. The seeds cannot be stored for more than one year as they



Neem seeds, powder & cake

become old enough to get infected by worms. The infected *neem* seeds lose their potency. The irony is that the pesticide itself is 'pestered'.

The Farmers of North Karnataka and Andhra Pradesh store beetles, predators and other pests to breed and multiply viruses and predators. These can also be used as organic pesticides. It is better if 20 to 50 farmers make a joint effort. The Centre for Research in Dry Land Agriculture of Hyderabad (CRIDA) has more details on the use of pests and predators as organic pesticides and they also offer training in this method.

INEP: Are organic pesticides too harmful?

Dr. Chandrashekhar: Yes. The role of the pesticides is to stop the biological process. The reaction of the organic pesticides on crops cannot be different from the way a chemical fertiliser reacts. The purpose of a pesticide is to get rid of the pest. But organic pesticides are less harmful, much less than a chemical pesticide. In an organic pesticide the virus of one worm can not affect another type of worm. Its role is very specific.

We have to be very careful while preparing and using the *neem* concoction. Australia has already cautioned about the *neem* concoction. They have discovered that an improper preparation of this concoction can have side effects. Yet the damage caused by organic pesticides is less because its impact wears out quickly. Another advantage is that whatever little damage it causes can be managed or rectified easily because it is a natural product.

INEP: Are animals and living creatures affected by organic pesticides?

Dr. Chandrashekhar: So far organic pesticides haven't harmed humans or animals. But chemical pesticides like DDT used to get rid of pests have a long staying power. They lead to bio-magnification. That is, it got into water, and into micro-aqua food eaten by small fish, which are eaten by big fish. It had killed birds and by the time it had reached human beings the quantity of chemicals of DDT was huge.

In the case of organic pesticides such possibilities have not been seen so far. Even the best organic pesticide like the *neem* has 150 chemicals but it does not have the staying power like the chemical pesticide, like DDT. As photosynthesis starts, the potency of neem reduces. But then one is not sure when the change occurs in nature and of the reasons for it.

INEP: Does the use of organic pesticides lead to bio-magnification?

Dr. Chandrashekhar: I just gave the case of bio-magnification in the case of the DDT, and how it goes from the invisible plankton to the big fish. Organic pesticides do not lead to bio-magnification. Because it is a natural product, the moment organic pesticides get into the body, the body starts producing a chemical to fight the invaders.

INEP: How about completely stopping the use of all pesticides?

Dr. Chandrashekhar: It may not be possible. We have tried growing five grass blades in the place of one and kept a watch on them. What we did was to try and increase the resource base. If there was one insect on one blade of grass we then found one on each of the grass blades. If the resource base increases pests also increase. We need pesticides to protect our food. First, to ensure that pests do not come near food, and then to get rid of those that have already come.

INEP: Do organic farming and organic pesticides mean the same?

Dr. Chandrashekhar: No. Organic pesticides are made from natural substances. We need them to increase food production; and we need organic farming to have a sustainable development without affecting the environment. Organic pesticides are just one aspect of organic farming. But they are not one and the same.