

Synthetic Chemical Pesticides and Human Health

***Dr. Neetu Mathur**

ABSTRACT

Synthetic chemical pesticides came into widespread use after World War II and they were miracles of modern technology. They enhanced agricultural yields, feeding a burgeoning global population, a potent weapon that would permit humans at last to conquer nature, in field and forest, kitchen and garden. Science cannot say precisely how large the risks from these exposures are, for an individual. But a long-standing consensus holds that the collective risks to public health are substantial. Exponential increase in the production, use and chemical disposition of have had a profound impact on the environment and had created hazards to man's and animal's well-being. In total, almost 40% of pesticides currently in use were linked with at least one adverse effect. Most of the evidence on the acute health effects of pesticide exposure world-wide relates to accidental occupational poisoning and may increase the risk they pose to reproduction. today's extensive use of pesticides makes it impossible for us to avoid daily exposure to low levels of several different pesticide residues. Since there was plenty of food all around in earlier days, the loss due to insect damage was not considered to be of great importance. As food was becoming scarcer every day, there came an urgent need to curtail the losses caused by various pests. Reduction of losses by the use of pesticides was one of the many attempts made by man. A wide variety of control measures have been used to minimize the damage caused by pests. Pest control measures can be broadly classified into the following Introduction

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PEST CONTROL

Natural Control (Through climate, topographic features, insects as prey, diseases of insects etc.), Applied Control, Mechanical control, biological control, Chemical control, Cultural control, Legal control.

Pesticides are chemicals used to control the harmful organisms. The word 'pesticide' Literally refers to killer of pests but it also includes substances used for controlling, preventing, destroying, repelling or mitigating any pest. The early use of pesticides included a variety of substances, such as urine, lime, soap suds, vinegar, tobacco and similar simple compounds. Agrochemical production began as a relatively simple process, based primarily on combinations of a few chemical substances such as copper, mercury salt, elemental sulphur, arsenic and cyanide (Edward A., 1992). The development of highly complex, chemical methods of pest control started around World War II.

INDIAN SCENARIO

India produces over 193 pesticides and hundreds of formulations, but the health and environmental effects of less than 50% of them are known. It produces 90,000 metric tonnes of pesticides annually; production is the largest in Asia and ranks 12th in the world. The Indian pesticide industry has a turnover of more than 20 billion rupees, and its average growth rate is 2 to 5% annually. The production of pesticides in India had begun in the mid-50s when the first DDT and BHC plants were set up with the help of World Health Organization and has now reached a capacity of nearly 140000 metric tonnes. The agricultural sector consumes around 67% of the pesticides produced, within the agricultural sector, two thirds of the consumption is taken up by just a few crops like cotton, paddy, vegetables and fruits. India is nearly self-sufficient in its pesticide requirements around 95% of the use is met with local production. Further, there are many Indian companies which export to other countries.

Highest consumed pesticides in India include Monocrotophos, Endosulfan, Phorate, Chlorpyrifos, Methyl Parathion, Quinalphos, Phosphamidon etc. In volume terms, Organochlorine pesticides constitute 40% of pesticide use, followed by Organophosphates at 30%, Carbamates at 15%, Synthetic Pyrethroids at 10% and others at 5%. In value terms Organophosphates dominate at 50%, followed by Synthetic Pyrethroids at 19%, followed by Organochlorines at 16%, Carbamates at 4%,

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biopesticides at 1% and so on. The pesticide consumption varies vastly across different states, depending on several factors, including cropping patterns, irrigation facilities, pest resurgence, resistance situations and so on.

India unfortunately still uses some pesticides which some countries have banned. The pesticides have been responsible for the damage caused to the health of human beings and the environment. 44.5% of the total cost spent on pesticide consumption, equivalent to 2462.13 million rupees, cotton is supposed to consume 58% of insecticides in India, while consuming the highest share of pesticides. These days pollution of the environment by pesticides is a problem of great importance and is of everybody's concern. Pesticides are widely distributed in the environment due to widespread use and disposal of pesticides by farmers, institutions and the general public provide many possible sources of pesticides in the environment. These may accumulate in the environment and contaminate all the systems i.e., air, water, soil, plants, animals etc. by being transported from one system to another. Pesticides, which are sprayed can move through the air and may eventually end up in other parts of the environment such as in soil or water. They are progressively transferred from soil to edible crops, grass, herbivorous animals and eventually to man. Some Pesticides are applied directly to the soil, are washed off the soil into nearby water bodies or may percolate through the soil to ground water.

The application of pesticides directly to bodies of water for weed control or indirectly as a result of leaching from boat paint, run off from soil or other routes and build up pesticides in water and also contribute to air levels through evaporation. Insecticides, when present in water are taken up by planktons and through food chain accumulate in fish and other edible species, this resulted in their accumulation in almost every human being. This contamination of almost every component of human environment by various pesticides has assumed a problem of international status. Kraybill (1969) estimated that 85-90% of pesticides in human bodies are received through contaminated food. Although they are protecting the crops from pests for boosting up the agricultural produce but bring out ecological disturbances and pollution.

HAZARDOUS EFFECTS OF PESTICIDES

The landmark publication of Rachel Carson's *Silent spring* in 1967 sounded the alarm for harmful effects of chemicals on wildlife. The 1996 publication of *Our stolen future* by Theo Colborn, Dianne Dumanoski and Jhon Peterson Myere was a clarion call for recognition of similar effects on humans. The authors of *Our stolen future* revealed how many of the findings in animals correlate with disturbances in normal reproductive and developmental processes in humans, citing data from decades of research on wildlife that traced birth defects, sexual abnormalities and reproductive failure owing to synthetic chemicals that mimic natural hormones. In addition, concerns have been expressed regarding the potential dietary pesticide exposure of possibly sensitive sub populations such as infants and children (NRC, 1993). Occupational exposure to pesticides has been associated with different health hazards including a wide range of subclinical and clinical effects for the

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induction of cancer, adverse reproductive outcomes and other chronic illnesses (IARC, 1991; Arbuckle and Sever, 1998; Lander et al., 2000; Meinert et al., 2000; Jenner, 2001; Ji et al., 2001). Also, pesticides may increase parental risks of infertility and adverse pregnancy outcomes such as spontaneous abortion, preterm delivery and congenital anomalies (Greenlee et al., 2004).

Indians have a tendency to accumulate pesticides in body tissue in relatively higher amounts (Bindra and Kalra, 1973). Cases of kidney failure (Ronald et al., 1983), leukemia (Reeves et al., 1981), chromosome damage (Balaji and Sasikala, 1993) and testicular damage (Prakash and Venkatesh, 1996) have also been reported.

CONCLUSIONS

No pesticide is risk free, and certainly no pesticide is safe in any situation, all carry the potential to cause the adverse effects. Therefore, application of chemical pesticides should be limited to designed programme with special care in handling to limit or minimise its hazards to both wild life and humans. Natural control and biological control of pesticides should be used by innovating new techniques.

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