

Pesticide Residues due to Agricultural Practices and its Human Health Effects

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Abstract— Use of pesticides, although increases productivity and economy of the nation, it adversely affects the environment and human health. Pesticide residues are found in all vectors of the environment viz., water, soil, sediment, fruit and vegetables. The presence of pesticide in food commodities is of serious concern as it directly enters the human body which results in serious health effects. This paper is a review of pesticide exposure due to agricultural practices and its health effects.

Key Words: Agriculture, Pesticides, Contamination, Health Effects.

I. INTRODUCTION

Most of the population in India is involved in agriculture activities. Application of pesticides in agriculture fields to protect them from diseases is a common practice. However, pesticide use is linked with cancer cases. Cancer cases among the rural agriculture population of Punjab in North India were reported [1]. A higher correlation between brain tumors patients and orchards farmers of Kashmir, India was reported [2]. A strong correlation of occupational exposure to insecticides and herbicides with risk of adult brain tumors was also found in USA [3].

Several pesticides including organ chlorine, organophosphate, carbonate and synthetic pyrethroid are commonly used in vegetable and other crops [4]. Organ chlorine Pesticides are very stable and their half-life can range from a few months to several decades [5]. Accumulation of these organic compounds in the food chain through agricultural practices is widely observed.

Application of pesticides: The total area under crop in India was 63.2 million hectare in 1990-91 now it has increased to 86.42 million hectare in 2009-10 [6]. Due to environmental pollution and problems like climate change is developing the multiple diseases and other problems in plants have become a major concern [7]. Increase of pollutant in the atmosphere leads to

increase in temperature and humidity which is the favorable condition for insect, pest and fungus problems in crops and the problem is spreading over large area. It is necessary to control diseases thus million of tones of pesticides, insecticides and fungicide are being used by the farmers. They spray on agriculture farms at different stages of growth especially in fruits. Insecticide is more poisonous as compare to other. Use of insecticide is as high as in India is 80 % Source: [8]

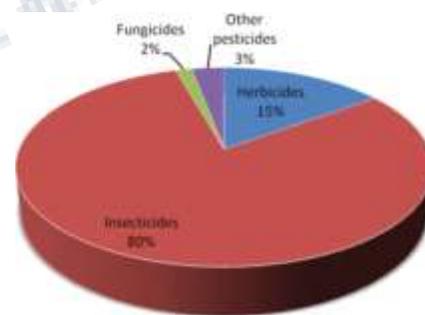
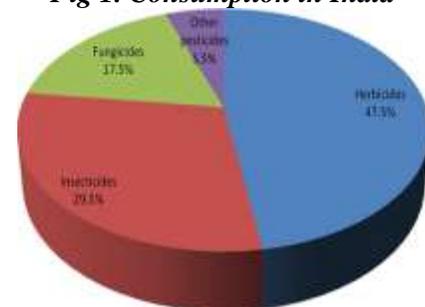


Fig 1. Consumption in India



S No	Trade Name	Long –term effects
1	Camphechlor	Cancer suspect , toxic to fish , very persistent
2	Chlordane/ Heptachlor	Leukaemia suspect , toxic , very persistent
3	Chlordimeform	Cancer suspect , Bladder damage
4	DDT	Cancer causing , damage liver , nerve , brain extremely persistent and toxic
5	Aldrin	Cancer suspect , birth defects , lung , liver damage , very persistent
6	Lindane	Proven cancer cause , miscarriage , leukaemia suspect , very toxic and persistent
7	Paraquat	Lung problems
8	Endosulfan	Nervous system damage

Use of pesticides puts a very large Indian population at risk of developing serious diseases. The number of people occupationally exposed to pesticides is very high.

Epidemiological studies were performed in pesticide exposed agriculture workers and compared with controlled group. More health problems were found among the exposed group as compare to controlled group. Table 2 summarises the occupational health effects on pesticide exposed population

Occupational health effects from pesticides:

Pesticide residue in food, air, water is one aspect of the risk that all are exposed. Workers, especially ones that handle pesticides are exposed to them at increased dose. Farmers and workers are exposed to pesticides in a number of situations such as

- ❖ Mixing / loading
- ❖ Application / spaying
- ❖ Selling , transporting and storing
- ❖ Re-entry into the field
- ❖ Spillage
- ❖ Disposal
- ❖ Handling the equipment

Table 2. Occupational health effects of exposed group from pesticides

S No	Exposed Group	Health problem	References
1	Agricultural workers	Fever, nausea, headache, decrease in RBC, haemoglobin	[14]
2	Grapes garden workers	Liver, heme-biosynthesis and decrease in cholinesterase.	[17]
3	Mongo orchards Farmers	Reparatory, Gastrointestinal, skin and eye problem	[16, 18]
4	Cotton field workers	Increase in chromosomal aberration	[19]
5	Cotton grower	Tremors, skin lesions and wheezing	[20]
6	Pesticide manufacturing workers	Genome damage in somatic cells	[21]
7	Pesticide formulation workers	Elevation of thyroid	[22]
8	Farm worker	Change in haemoglobin and electrocardiograms	[23]

Pesticide residue have been detected in the blood samples of farmers and workers. In some of the studies samples has been taken from the patient and correlation has been developed, the residue found in the blood sample of patients with their occupation. Which gave the significant results that residue were more frequent and high in the agriculture workers and pesticide exposed workers in Industries. In Table no 3 represents the different studies in which pesticides were detected in blood samples.

Table 3: Pesticide residue in human blood

Samples	Pesticide residue found	References
Breast Cancer patients	HCH, DDT	[24]
Agriculturist	BHC, DDE	[25]
Village farmers	Endosulfan	[26]
Spray men	HCH	[27]
Agriculture workers	DDE, DDT	[28]

IV CONCLUSIONS AND RECOMMENDATIONS:

Most of the studies on the monitoring of pesticide residue indicated increased level of exposure of human being through pesticide contamination. There is a significant increase in crop area and the application of pesticides. Higher pesticide residues are reported in the food commodities. Epidemiological studies indicated higher health problems in pesticide exposed population.

Most of the agriculture activities taking place in rural areas where workers are unaware of pesticide poisoning could be a larger cause of concern. It is recommended that there should be awareness programmes and demonstration of occupational safety practises for the rural agricultural workers especially through media. Proper monitoring, assessment and reporting should be implemented to reduce the pesticide exposure and health risk. Farmer's regular health check-up should be a mandatory activity.

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