



Management of Herbicide Residue

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INTRODUCTION

Now a days herbicide usage become unavoidable in intensive agriculture system to minimize the yield loss due to weeds. Herbicide demand in India is rising intensely and could double in future as an acute labour shortage makes them a cheaper option and a rally in farm goods prices prompts farmers to grow crops with extra care. Usage of herbicides occupy 44% of the total agrochemicals globally and 30% in India. A persistence problem arises when the herbicides are applied continuously. The longer persistence of a herbicide cause a hazard to subsequent land use and is undesirable. Recent concerns of ground and surface water contamination by some of the herbicides has led to renewed interest on persistence and dissipation behavior of herbicides in the environment. Several monitoring programs have also been executed by different countries to check the environmental contamination and for ecological risk assessment of herbicides. However, the information on managing herbicide residue in the soil saving the crop from those situations are limited. Though the studies are conducted around the world and a few places in India, there is a lack in the published information. This article aims to reservoir the information on herbicide persistence and its management across the world.

- **Herbicide residue** means any specified substance in food, agricultural commodities or animal feed resulting from the use of a herbicide. The term includes any derivatives of a herbicide, such as conversion products, metabolites, reaction products and impurities considered to be of toxicological significance.

Harmful effect of herbicides

- ☐ On non-target plants
- ☐ On animals
- ☐ On soil
- ☐ On humans

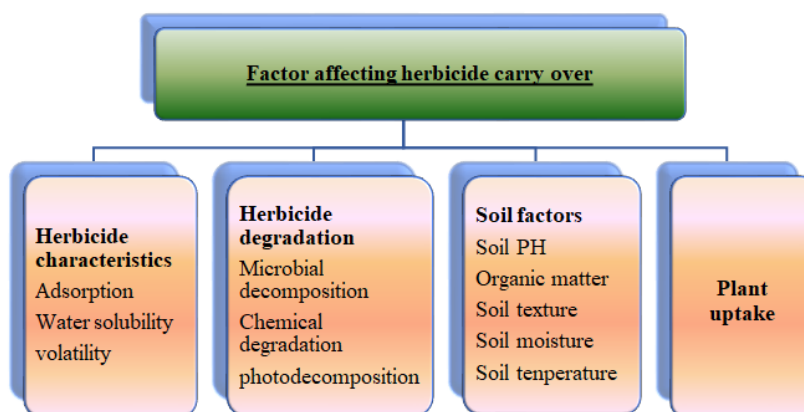


Fig. 1

Different methods for herbicide residue management

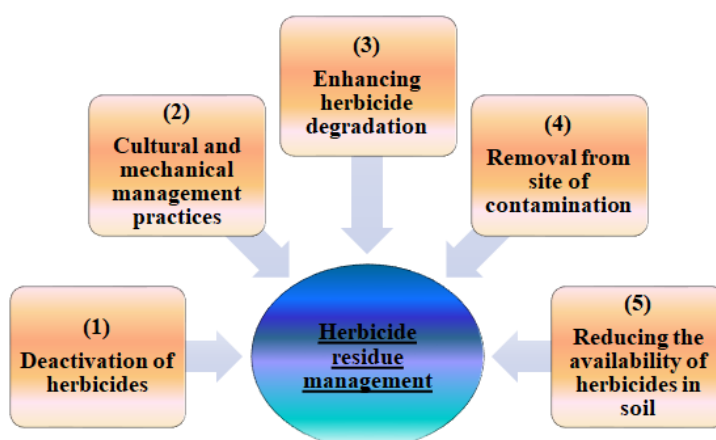


Fig. 2

DEACTIVATION OF HERBICIDES

❖ Application of FYM

- The microbial population residing in organic matter increase decomposing the residues due to high WHC.

❖ Use of adsorbent, protectants and antidotes

- Applied to soil, crop seed or transplanted plant to protect the crop from herbicide injury.

• Mode of action: -

- Either deactivation or adsorption of the herbicide.
- Preventing its absorption and translocation.

❖ Use of safeners

- The synthetic chemicals that protect crop plants from injury by certain herbicide.

- Improves herbicide selectivity between crops and weed species.

CULTURAL AND MECHANICAL MANAGEMENT PRACTICES

❖ Through integrated weed management

- IWM involves the application of variety of management practices to control weeds.
- Herbicide are used only when weed population high an economic threshold level.

❖ Growing herbicide tolerant crops

- Certain herbicide tolerant crops reduce herbicide residue in soil by absorbing and deactivating these in their tissues.
- Maize and millets-trizine herbicide.

❖ Light irrigation after application

- Create favorable condition for microbial activity.
- Moist soil often results in a more rapid breakdown of the herbicides.

❖ Ploughing or cultivating soil

- Tillage operation bring deep present herbicide residue to soil surface which help to decomposition by degradation.
- The applied herbicide is mixed to large volume of soil and gets diluted.

REDUCING THE AVAILABILITY OF HERBICIDES IN SOIL

❖ Use of optimum and reduced doses of herbicide

- More quantity of herbicides application, more will be residues releasing in to the soil.
- So, herbicides should be applied at least possible dose.

❖ Use of herbicide in combination and split doses

- The rate of application can be decreased by using herbicides in combination.

- Split application of herbicides will reduce the amount of herbicide availability to run off at any way at one given time.

❖ Method of application

- Band application of herbicide i.e, applying herbicides in a narrow band varying in width.
- Banded application of herbicide can reduce persistence over broadcast application.

❖ Use of alternative to herbicides

- Use of bioherbicides like college, Devine etc.

❖ Selection of herbicides with minimum carry-over potential

- Choosing a herbicide with little or no carry-over given your soil and weather condition will eliminate future crop injury problems.

REMOVAL FROM SITE OF CONTAMINATION

• Phytoremediation

- The use of vegetation in bioremediation schemes is termed as phytoremediation.
- Emerging technology for the cleanup of contaminated environment such as soil, water and sediments.
- Different tolerant plant is planted at the contaminated sites which remove, transfer, stabilize and destroys the main pollutant.

ENHANCING HERBICIDE DEGRADATION

• Biostimulation

- The addition of electron acceptors, electron donors or nutrients to stimulate naturally occurring microbial populations.

• Bioaugmentation

- The introducing of specific microorganism aims to enhance the biodegradation of target compounds.