

The Consequences of Pesticides on human health and Environment: A Review

Anupama Rajput^{1*}, Jan nashin², Arpitha Raj², Anamika², Tabish², Janice², Kashish Gogia², Kanishka² and Prachika Rajput³

^{1*}*Department of Applied Sciences, Manav Rachna, International Institute of Research and Studies, Faridabad, India*

²*School of Engineering and Technology, Manav Rachna International Institute of Research and Studies, Faridabad, India*

³*Netaji Subhas University of Technology, New Delhi, India*

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ABSTRACT

In spite of proceeding differences over the degree of hazard postured by pesticides, it shows that individuals have gotten to be progressively concerned about pesticide utilization and especially about their impacts on human wellbeing and natural quality. We have discussed many different kinds of pesticides, and their specific use cases. Contrary to what has been shown, these pesticides have a lasting effect on soil, plants and the ever important human health. Our findings then brought us to the pressing matter of the preventive measures that one can take in order to significantly reduce these hazardous chemicals from degrading the environment. Highlighting the costs that the agricultural sector will incur in reducing the risks involved with pesticide use, we also discuss the Integrated Crop Management (ICM) system, which includes guidelines for the production of safe agricultural products with respect to the environment. Another interesting fact is that the ICM system allows for pesticide use only through an Integrated Pest Management (IPM) program, which has specific criteria for pesticide selection and application. In summary, this report emphasizes that the introduction of the IPM system would significantly reduce the impact of pesticides on human health and the environment without affecting crop productivity or increasing the risk of crop losses.

Key words : Pesticides, Environment, Crop, Human Health

Introduction

Two centuries ago there were no significant bases for plant protection. Therefore primitive plant protection measures were employed. After that a substance named 'PESTICIDES' was introduced which plays a very vital role for the protection of plants. Pesticides are the chemical or biological substances used to control pests, including insects, weeds, fungi and other organisms that can damage or cause economical losses (Damalas, 2009). The development

and use of pesticides have been proved to be very useful in modern agriculture and farming practices by improving the food quality and by ensuring the food produced is totally secure, which is very important to meet the growing demands of a rapidly increasing global population (Tsakiris *et al.*, 2004) Use of pesticides also has a positive impact on human health as well by controlling pests and diseases that can cause risk to human health. There are different types of pesticides like insecticides, herbicides, fungicides and rodenticides and others

(Goulson, 2013). On the other hand the use of pesticides raises a discussion about their negative impact on the environment (Mariyono, 2008). Agricultural Health Study states that excessive uses of pesticides results in loss in biodiversity, water and soil contamination and farmers who work on fields are more exposed to headaches, fatigue, hand tremors and other neurological symptoms (Gentz *et al.*, 2010). To address these concerns governmental agencies have conducted pesticide regulation and risk assessment. Integrated Pest Management (IPM) has gained importance in the agricultural system by emphasizing an approach that includes various pest control strategies in order to overcome and to control its harmful impact on the environment (Akthar *et al.*, 2009)

Types of pesticide

There are many different types of pesticides, (Baker *et al.*, 2002) each is meant to be effective against specific pests (Table 1).

Effect of Pesticides on Soil

Pesticides can have both positive and negative effects on soil, depending on the type of pesticide, its application rate, and the soil type. Here are some of the effects of pesticides on soil:

Contamination: Pesticides can contaminate the soil, especially when they are over-applied or applied improperly. This can lead to the accumulation of toxic residues in the soil, which can harm beneficial organisms such as soil microorganisms, earthworms, and insects.

Alteration of Soil Microbial Communities: Pesticides can also affect the diversity and abundance of

soil microbial communities, which play important roles in nutrient cycling and soil fertility. Some pesticides have been found to reduce the populations of beneficial soil microorganisms, while others may promote the growth of harmful ones.

Soil Compaction: The repeated use of heavy machinery during pesticide application can lead to soil compaction, which can reduce soil porosity and limit root growth. This can negatively affect crop productivity and the overall health of the soil.

Reduction in Soil Organic Matter: Pesticides can also reduce the amount of organic matter in the soil, which is important for soil structure and nutrient retention. This can result in decreased soil fertility and reduced crop yields (Rajput, 2021).

Impact on Soil pH: Some pesticides can also affect soil pH, which can alter the availability of nutrients to plants. For example, acidic pesticides can lower the pH of the soil, making it more difficult for plants to absorb nutrients like phosphorus.

Overall, the impact of pesticides on soil can be significant and long-lasting. It is important to use pesticides responsibly and only when necessary, and to follow proper application techniques to minimize their effects on soil health.

Effect of Pesticides on Human Health

Pesticides can have negative effects on human health, both through direct exposure and indirect exposure through contaminated food and water.

Acute Poisoning: Pesticides can cause acute poisoning in humans if they are ingested, inhaled, or come into contact with the skin. Symptoms of acute poisoning can include headaches, nausea, vomiting,

Table 1. The Role of Pesticides

Type	Description
Algaecides	Killing and/or slowing the growth of algae
Antimicrobials	Controlling germs and microbes
Bio pesticides	Derived from living things, or found in nature
Disinfectants	Controlling germs and microbes such as bacteria and viruses
Fungicides	Used to control fungal problems like molds, mildew, and rust
Herbicides	Kill or inhibit the growth of unwanted plants (weeds)
Insecticides	Used to control insects
Miticides	Control mites that feed on plants and animals
Molluscicides	Designed to control slugs, snails, and other molluscs
Mothballs	Insecticides used for fabric pest control by fumigation
Organic Pesticides	Usually made from natural substances like soaps and sulfur
Rodenticides	Used to kill rodents like mice, rats, and gophers
Synergists	Make pesticides more effective when used in combination

dizziness, seizures, and even death.

Chronic Health Effects: Long-term exposure to pesticides has been linked to a variety of chronic health effects, including cancer, reproductive problems, developmental disorders, neurological problems, and respiratory problems.

Endocrine Disruption: Some pesticides have been found to interfere with the endocrine system, which can lead to hormonal imbalances and reproductive problems.

Allergic Reactions: Pesticides can also cause allergic reactions in some individuals, which can range from mild skin irritation to severe anaphylactic shock.

Contaminated Food and Water: Pesticides can contaminate food and water supplies, which can lead to indirect exposure for humans. Consuming food or water contaminated with pesticides can cause the same acute and chronic health effects as direct exposure. It is important to use pesticides responsibly and follow proper safety procedures to minimize the risk of exposure to humans. It is also important to eat a balanced diet and consume food that has been grown using safe and responsible pesticide practices (Agarwal *et al.*, 2010)

Effect of Pesticides on plants

Pesticides can have both positive and negative effects on plants, depending on the type of pesticide and its application rate. Here are some of the effects of pesticides on plants:

Control of Pests and Diseases: Pesticides are primarily used to control pests and diseases that can damage crops. When used properly, pesticides can effectively protect plants from damage and increase crop yields.

Toxicity: Pesticides can also be toxic to plants, especially if they are over-applied or applied improperly. Some pesticides can cause phytotoxicity, which is damage to plant tissue that can lead to reduced growth, yield, and quality.

Alteration of Plant Metabolism: Pesticides can also alter plant metabolism, which can affect the growth and development of the plant. For example, some pesticides have been found to affect photosynthesis and respiration, which can lead to reduced growth and yield.

Residue Build up: Pesticides can leave residues on plant surfaces, which can accumulate over time and potentially harm the plant. Residue build up can

also affect the quality of harvested crops and can cause contamination of the environment.

Impact on Beneficial Organisms: Some pesticides can harm beneficial organisms such as pollinators and natural enemies of pests. This can have negative effects on plant health and crop productivity. Overall, the impact of pesticides on plants can be complex and variable. It is important to use pesticides responsibly and only when necessary, and to follow proper application techniques to minimize their effects on plant health (Burger *et al.*, 2008).

Preventive Measures

In spite of proceeding differences over the degree of hazard postured by pesticides, it shows that individuals have to be progressively concerned around pesticide utilization and especially around their impacts on human wellbeing and natural quality. These expanded concerns come about basically from decreased belief within the rural and mechanical strategies of generation as well as on the authority's controls pointed at securing both the environment and human wellbeing. Subsequently, considering the existence of a few instabilities within the assessment of pesticide security, logical information, approach rules, and proficient judgment must be joined when evaluating whether a pesticide can be utilized usefully inside the limits of a satisfactory chance (Muller, 2002).

The likelihood of decreasing the natural chance related with the pesticide utilization is exceptionally good since the makers accept that bringing down hazard infers either diminished yield or expanded input coming about by the substitution for the pesticide inputs. Hence, arrangements pointing at lessening the dangers related with the utilization of pesticides will force costs on the rural community, which in turn has suggestions for agrarian product costs. This has been affirmed by the cost-function-based generation demonstrated utilized by (Paul *et al.*, 2002) which demonstrated that substantive costs would be forced on the rural division by the necessities to decrease natural chance determining using pesticides (Kogan, 1998). These costs are particularly related to the increasing demand for pesticides that can be used at the rural production level and indicate that development needs to be initiated to improve the chemicals that kill the good pests associated with the spread (Frangenberg, 2000).

Concerns about the impacts of pesticide use on human wellbeing and the environment drove the

EU to create a 'Thematic Procedure on Feasible Utilize of Pesticides'. In addition, rural researchers began to create elective trim administration frameworks to play down the negative impact of crop growing (based on pesticide use only for safe pruning) on the environment and human health. Specifically, the Coordinate Cropping Administration (ICM) contains rules used by agricultural organizations to implement concurrent activities that create agricultural safety plans, regard to the environment. In expansion, ICM incorporates measures for execution of great rural homes (Hole), the security and cleanliness of specialists, Special activities for product safety, full traceability and environmental protection. To control pests, ICM allows the use of additional pest control strategies (such as treating pests and diseases, organic control, etc. social or physical measurement) to reduce pests or plants under their economic decline (Nwilene, 2008). The effect of pesticides on other products of the agro-ecosystem. Regarding the use of pesticides, ICM permits pesticide utilize as it were through an Coordinates Bug Administration (IPM) program, where certain criteria are utilized for pesticides determination, particular informational are taken after for their application on crops, and buildup investigation is utilized as one of the apparatuses for authorization. Pesticides that are chosen for utilize in IPM are:

1. Organically viable (tall selectivity, quick effect, ideal remaining impact, great plant resilience, moo hazard of resistance)
2. Client inviting (moo intense poisonous quality and moo persistent poisonous quality, ideal detailing, secure bundling, simple application strategy, long store soundness)
3. Environmentally friendly/compatible (moo poisonous quality to non-target life forms, quick debasement within the environment, moo versatility within the soil, no build ups in nourishment and feed over the MRLs, moo application rate)
4. Economical/profitable (high cost/profit compared to agronomist, many actions, impact on IPM, project evaluation, competition, patentable).

Particular informational that are taken after amid pesticide application on crops incorporate:

The utilize of pesticide at the prescribed measurements when a bug is found or a prudent treatment thought fundamental. The enhancement of pesticide utilize for financial sparing through balanced mea-

surements agreeing to bug populace thickness, and Reducing the amount of pesticides required by modifying the development process to reduce errors (Way 2000).

With respect to the investigation of the sum of dynamic fixing connected or the cash went through on pesticides, these factors ought to be utilized as it were as a to begin with guess, since the dosage of dynamic fixings isn't closely related to natural action, whereas natural neighborly and imaginative compounds are regularly more costly than out of date, perilous ones. All the already said clearly that the presentation of the IPM framework would contribute to a critical decrease of the pesticide effect on human wellbeing and the environment without influencing edit efficiency or expanding the likelihood of edit misfortunes (Chandler, 2008).

Over the final a long time, not as it were within the improvement of unused dynamic ingredients, but moreover within the assessment of the conduct of these chemicals within the environment, the build ups in trim plants, and of their potential harmfulness to people and the environment.

Usually ascribed to the awesome logical advance in numerous disciplines such as chemistry, science, and atomic science which has progressed significantly the way of looking for modern agrochemicals and the re-assessment of security for the as of now utilized pesticides (Neumann, 1997). In this way, new agrochemicals with new modes of action and improved safety profiles are now a reality. In addition, it is likely that the developments in agribusiness, which are aware of the fact that pesticide combinations are not used with appropriate precautions for safety and that the use of more pesticides is one of the most important techniques to ensure pruning safety, is likely to play an important role in agriculture. The agribusiness industry has had an incredible response to the rapid rise of new biotech technologies (Urech, 1999).

Conclusion

Pesticides that were once used for getting rid of insects now have greater drawbacks than advantages. Yes it is more effective in committing to its goal, but since we share almost 99% of DNA with the insects it affects us in a direct and an indirect manner. Humans have yet to create a pesticide that perfectly eliminates the insects without any side effects like harming crops and inhibiting good microbes which

I'm sure, they will near perfect it, when looking at the pace of time now.

We have also seen that usage of these in proper dosage according to the protocols of IPM will increase chances of proving effective. Knowing what to do and what not to do regarding pesticides is half of the problem solved. All that remains is putting it into practical use with enough guidance and experience.

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