The Biobrio ISSN : 2393-9508 e-ISSN: 2582-4902
An International Quarterly Journal of Life Sciences
Website: www.thebiobrio.in SJIF 2021:7.237
8 (3&4): 721-725, 2021

Impact of Pesticides on Environment

***Amita Srivastava**
Department of Zoology, D.G. P.G. College, Kanpur, Uttar Pradesh, India

ABSTRACT

Various types of pesticides have specific and crucial role in agriculture. Without the use of pesticides, it is not possible to feed about 7 billion people worldwide. Pesticides play a crucial role in preventing the crops from a large number of pests, insects and plant diseases leading to a significant increase in the crop production across the world. To control the insects, fungi and other harmful organisms, pesticides and several chemicals are used in agriculture. Every human and animal consumes food to keep its body fit and healthy. For a fit, immune and a healthy body, the purity of food is very important. However, the uncontrolled use of pesticides in the field of agriculture has become a matter of concern for the health of humans and animals because they have a great effect on our immune system and the functioning of our body. The present study deals with the effects of pesticides and other chemical substances used in agriculture on our body and is an effort to provide some suggestions to reduce this problem.

Key words: Pesticides, Health hazards, Environment etc.

***Corresponding author :** amitasrivastava159@gmail.com

INTRODUCTION

Harmful effects of chemical fertilizers and pesticides on human health as well as environment is well known to everyone. Since 5 decades, the usage of chemical fertilizers and pesticides have been very much promoted in the name of green revolution for increasing the crop production in India. This has resulted in increased crop production on one hand, but on the other hand, this has adversely affected the human and animal health as well as biodiversity and the environment. Fulfilling the food needs of ever increasing population worldwide is a challenge for crop production. This has forced to mass usage of chemical fertilizers and pesticides in farming. As a result, the absorption of harmful chemicals and pesticides in food crops increases which is very hazardous for not only the health of humans and animals, but for the biodiversity as well as the enrivonment. Most Indian farmers believe that more and more usage of chemical fertilizers and pesticides will lead to more and more crop production, but this condition is very undesirable for human health and environment.

Use of chemical fertilizers, pesticides, insecticides, herbicides etc. is considered to be essential for agricultural activities now a days. Apart from crop production, pesticides are heavily used for preventing the crop from insects and pests, crop storage and preventing the crop from a number of diseases. Insecticides and pesticides are mostly used in the production and storage of fruits and vegetables. Similarly, for ripening the fruits and vegetables, and preserving them for long periods of time, a large chain of pesticides and other chemicals are used heavily worldwide. Researches conducted in this field till today have concluded that the usage of chemical fertilizers, pesticides etc. is many times more than their desired and standard levels, which is highly harmful for humans, animals and environment.

Pesticide is a term that covers a significantly wide range of compounds, including insecticides, fungicides, rodenticides, nematicides, molluscicides, herbicides, rodenticides, plant growth regulators, and several others. However, out of these compounds, organochlorine insecticides

(OC) were used until the 1960s it was banned. It was being used to successfully works as resistance and control a significant number of diseases, including malaria and typhus. Moreover, carbamates, pyrethroids, herbicides, and fungicides were introduced during the years the 1960s and 1980s, and it was successfully contributed to controlling pest and agricultural output. This paper will discuss some positive uses such as Improving productivity, quality of food, vector disease control, and other areas like transport, sports, etc. In the second part, issues caused by pests will be discussed, such as negative affect on humans' health due to pesticides, food quality, soil and surface water contamination, Effect on soil fertility, Contamination of air, soil, and non-target vegetation

Uses of pesticides

Pesticides are used to control various pests which carry various deadly diseases, including grasshoppers, mosquitoes, mice, rats, and ticks. As stated above, it has been utilized in agriculture for several decades, and it is essential to increase the effectiveness and fertility of the soil and save the land from deadly diseases. Ideally, a pesticide must be lethal in what it is supposed to do. It should be effective on the target pest or species but should not be harmful to the non-target species, including human beings. Unfortunately, pesticides chemicals are used excessively as there is a saying, "if little is good, a lot more will be better" it is the same case with the use of pesticides which leads pesticides to affect both target and non-target species negatively. Following are some benefits of pesticides in Agriculture:-

Improvement in Productivity

There are immense benefits of using pesticides in forestry, the domestic sphere-public health, and in agriculture. There are several agricultural economies in the world, and India is one of the biggest agricultural economies. India has been doing food gain production since 1948/49 and production were only 50 million tons which were below par in comparison with the population; however, it needed to increase over time, and that is what happened in the next 48-50 years, by 1996/97 food grain production increased almost fourfold to 198 million tons from a massive 169 million hectares of permanently cropped land. The primary reason behind this massive jump in the number was due to the high yield varieties of seeds, agricultural chemicals, and advanced irrigation technologies (Employment Information: Indian Labour Statistics, 1994). Similarly, crop yield productivity increased in several other countries during the same time. Including crop yield in the US and wheat yield in the UK, where advanced machinery was used for high yield. Other than advanced machinery, one of the primary factors in the increase of yield was the use of fertilizers and a vast variety of seeds (Aktar *et al*., 2009).

Quality of food

The quality of food is subject to several pesticides used in cropping them. In the first world countries where crops are yielded in strict monitoring fresh fruits, and vegetables reduce the risk of suffering from various diseases compared to eating food with a high amount of pesticides used. However, the human body is resistant against the very low residue of pesticides, and eating fresh food decreases the risk of high blood pressure, many types of cancers, heart disease, diabetes, and several other chronic diseases.

Vector disease control

Vectors are killed using insecticides to effectively reduce several vector-borne diseases. There are several deadly diseases like malaria and dengue, which cause more than 5000 deaths each day. Malaria is considered one of the deadliest vectors in the developing world, including India, which is the primary cause of morbidity and mortality; it has been a significant public health problem in India for a long time. Other than reducing the risk for humans, it is necessary to control such diseases by strategic planning to protect the vast population of livestock.

Use of pests in transport, and sports complex

Cricket and golf ground staff use herbicides and insecticides to maintain the turf of a cricket pitch,

grounds, and golf courses. However, herbicides are also used in the transport sector, primarily for transporting food without fearing food loss. Moreover, insecticides also protect woodworks in buildings and houses or any other wooden structure from the damages by the woodboring and termites' insects. These insects have proven severely costly as it eats woodwork in a building or house and effectively forces owners to rebuild their woodwork across the house. It is deadly for the house in the US because most of the houses are made of wood in that continent of the world.

Harmful Effects of Pesticides:

Following are some harmful effects of pesticides:-

Diseases in humans

Pesticides are causing many short-term as well as chronic effects on human health. As our body is exposed to these pesticides, the symptoms may appear as dermal irritation and allergic reactions, including redness, pimples, swelling, blistering, etc. Research has shown that pesticides have caused nausea, diarrhea, vomiting, asthma. Chronic diseases include cancer, diabetes, sclerosis, infertility, damage to reproductive organs, and many more. Serious effects can also cause neurodegenerative disorders like Parkinson which is a brain disorder that leads to shaking of the body and difficulty in body balance and coordination. Alzheimer's caused by pesticides is a brain disorder that weakens memory and thinking skills. So, the pesticides that are used for the betterment of crops have proved to be detrimental to human health.

Reduced Food Quality

Pesticides used in agriculture are used to protect crops against weeds, insects, fungi, and other pests. They increase the crop yield per year and the number of times a crop can be grown on the same land. Besides beneficial effects, pesticides are causing many harms to the quality of fruits and vegetables. They penetrate deep into the peels of the fruits and vegetables, damaging the quality of the food. The relish of the fruits has been lost due to these chemicals. Vegetables, when cooked, don't give the authentic taste that was in the past when pesticides were rare. Sulfur gas is emitted when these vegetables are cooked prolonged. When such food is eaten, it also damages our health.

Soil and surface water contamination

Pesticides are usually soluble in soil and contaminate the surface water. Due to the excess use of these chemicals, the soil's ability to grow crops weakens gradually. It causes alkalinity or acidity of the soil, thus damaging the soil quality. These pesticides percolate deep into the soil layers and contamination the surface waters. The contaminated water cannot be adequately used for drinking or agriculture purposes. These pesticides also affect the soil invertebrates that are sometimes useful for agriculture. Thus, they can cause the total infertility of the soil and unavailability of the clean underground water. They add to the water cycle, and along with the contamination of soil, they also pollute the environment.

Effect on soil fertility

Excessive usage of anything is wrong for human health; similarly, heavy treatment of the soil with several pesticides to increase productivity can cause fair damage to the population of soil microorganisms and effectively reduce their population. Research states that if soil loses fungi and bacteria due to the overuse of pesticides, the soil degrades. Pesticides enter the environment in two ways one is soluble in water, and the other is not and is called fat-soluble pests. Insecticides are the most toxic pests which also affect humans and non-target species. However, fungicides and herbicides are second and third on the list of toxicity, respectively. The water-soluble pests get dissolved into the water and enter into the soil, decreasing soil fertility and damaging fungi and bacteria on the surface. It also enters the rivers, streams, lakes and causes severe damage to the untargeted species. The other type of pesticides, also called fat-soluble, enter the ecosystem through animal bodies by a process known as "bioamplification," as shown in fig 1. They got absorbed in the fatty tissues of animals, thus affecting the whole food chain supply for a long time (Mahmood *et al*., 2016).

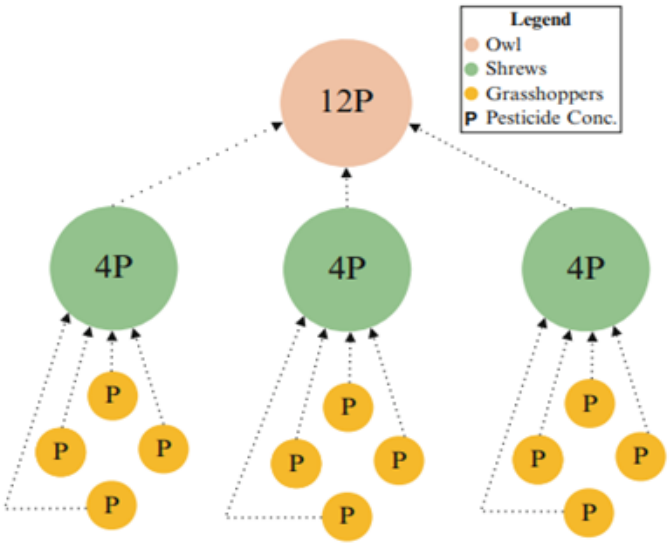

Fig. 1 Bioamplification of pesticide in the environment

Threat to biodiversity

Pesticides are harmful to biodiversity; it has several threats associated with humans and animals alike. The uncontrollable use of toxins should not be overlooked, and it is time to consider the damage caused by these pesticides on the population of aquatic and terrestrial plants, animals, and birds (Mahmood *et al*., 2016). Spraying insecticides, fungicides, and herbicides on the crops also result in the reduction in the rare species of land, water, and air animals and birds.

Threat to Aquatic Animals

In agricultural regions of Northern India, earthworms have vanished completely. In the ponds of urban area, one can find some frogs, earthworms and a number of aquatic animals, but they have gone extinct in rural areas. Similarly, due to consumption of pesticide induced cereals, peacocks and other animals and birds die very often. Because of excessive use of herbicides, it has become very difficult to find a number of herbs and medicinal plants in these areas.

CONCLUSION

Although pesticides are not dangerous as many individuals perceive it; however, it is in a similar situation as other things when they are used excessively. Normal use of pesticides helps remove the insects or pests from the soil hence reducing the crop damages and various diseases that these pests or insects carry. Moreover, if used excessively, it can damage a wide range of areas; it doesn't even consider boundaries. It can be deadly for animals, fisheries, birds who drink water from rivers or lakes, and also for humans. Governments should monitor the use of pesticides in the farms and educate farmers about the usage of this chemical and also order companies to print usage sizes on the product. To uplife the quality of agricultural products and to reduce the harmful effect of pesticides on human health and environment, it is very essential to find some environment friendly options of chemical pesticides. It is very important to decide the limitation of pesticide use so that they could not make much loss to human and animal health.

REFERENCES

Agarwala, A., Pandey R.S. and Sharma. B. 2010. Water Pollution with Special Reference to Pesticide Contamination in India. *Journal of Water Resource Protection.* 2(5): 432-448.

Agnihotri, Nikhil. 2011. Soil-Plant Relationship as Influenced by Azolla as Organic Compost, Ph.D. Thesis, C.S.J.M. University, Kanpur.

Aktar, W., Sengupta, D., & Chowdhury, A. 2009. Impact of pesticides use in agriculture: Their benefits and Hazards. *Interdisciplinary Toxicology*, 2(1): 1–12.

Bhattacharya Anjan, Barik S.R. and Ganguly Pritam. 2009. New Pesticides, Molecules, Formulation technology and Uses: Present Status and Future Challenges. *The Journal of Plant Protection Sciences* 1(1): 9-15.

Brown C.L., Hock W.K. 1990. The Fate of Pesticides in The Environment and Ground Water Protection. *Agricultural Factsheet # 8*, Penn. State Cooperative Extension.

Chandigarh: Labour Bureau, Ministry of Labour; 1994. Employment Information: Indian Labour Statistics. 1996.

Dubey, R.K. 2013. Organic Farming Beneficial to Biodiversity Conservation, Rural livinghood and nutritional security. *Indian Journal of Applied Research.* 3:18-21.

Global Strategy on Diet, Physical Activity and Health, 57th World Health Assembly, WHO, Geneva.

Gupta, P.K. 2011. Herbicides and Fungicides. In Gupta RC Ed. Reproductive and Development Toxicology, Academic Press.

Gupta, Suman. 2010. Biopesticides: An Ecofriendly Approach for Pest Control. *Journal of Biopesticides.* 3(1):186-188.

Helfrich LA, Weigmann DL, Hipkins P, Stinson ER. 2009. Pesticides and aquatic animals: a guide to reducing impacts on aquatic systems. In: Virginia Polytechnic Institute and State University.

Mahmood, I., Imadi, S. R., Shazadi, K., Gul, A., & Hakeem, K. R. 2016. Effects of pesticides on environment. *In-Plant, soil, and microbes* (pp. 253-269). Springer, Cham.

Maksymiv Ivan. 2015. Pesticides: Benefits and Hazards, *Journal of Vasyl, Stefanyk Precarpathian National University.* 2(1): 70-76.

Sharma, Nayana and Singhvi Ritu. 2017. Effects of Chemical Fertilizers and Pesticides on Human Health and Environment: A Review. *International Journal of Agriculture, Environment and Biotechnology*. 10(6): 675-679.

Thuy, T.T. 2015. Effect of DDT on Environment and Human Health. *Journal of Education and Social Sciences.* 2:108-114.

US Department of Agriculture. 2004. www. healthierus.gov/dietaryguidelines.

US Dietary Guidelines. 2005. US Department of Health and Human Services.