

# INSECTICIDES AND HUMAN HEALTH

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**Abstract :** Insecticides are either natural or chemically synthesized compounds which are used to control a variety of insect pests. Insecticides are a type of pesticide that is used to specifically target and kill insect pests. They are the chemicals used to control insects by killing them or preventing them from engaging in undesirable or destructive behaviours. The term insecticide is not as old as prior for killing the insects since very early times. As early as 200 BC a boiling mixture of bitumen and blowing the fumes through grape leaves was applied to keep the insect away. Sulphur and arsenic were known to be toxic for insects in 100 BC and about 40- 90 AD respectively. Pyrethrum is being used widely for insect control since even before 1800 in Persia. Neem leaves are being used as an insecticide since ancient times. The history of modern insecticide starts from 1867 with the use of Pares Green for reducing the population of Colorado beetle. After the discovery of insecticidal spectrum of DDT in 1939, insecticide property of BHC and potentialities of phosphorus chemicals in 1941-42, the real concept of insecticide and insect control revolutionized, as a result insecticide has become the boon of entomology. Insecticides show their toxicity into the living system. The World Health Organization classified them based on their detrimental effects, emphasizing the relevance of public health. The use of insecticides can be minimized to a least level, which is beneficial to both human health and the environment. Major literature focused on potential uses of insecticides, its classification and toxicity and their adverse effects on natural system, water, plants, human health etc. I have described here about the probable strategies by which we can minimize the most destruction effects of insecticides to save nature and its components.

**IndexTerms -** Biodegradation, Environment, Insecticides, Microorganism, Toxicity

## I. INTRODUCTION

Insecticides are the chemicals used to control insect pests by killing them or preventing them from engaging in undesirable or destructive behaviour. Although most of the insect and butterflies are the main pollinating agents that plays and significant role in crop production but at the same time a number of harmful insects are there which are responsible for causing serious damage of crop production, destroying house hold goods and create threat for human health. Such type of destructive insects is called insect pests. To increase and save the plant product mainly use of different type of insecticides are normally used to prevent destruction spread by vectors, inducing crop production, food preservation etc. (Międzys et. al., 2015, Sharma et. al., 2019). Since ancient times, a variety of chemical compounds have been used to control pests. Sulphur compounds are best known example of such insect and mite control insecticides (Gyawali, 2018). Pyrethrum, an insecticide of botanical origin, has been used for over 2000 years, (Unsworth, 2010). However the use of DDT is helpful to raise the food productivity and longevity of food products. For this reason the global demand of DDT increased day by day, which opened the door to synthesize new chemical substances that act as insecticides. DDT was replaced by organophosphates (OPs) and Carbamates (CMs) in USA in 1975 (Barnhoorn et. al., 2009). As per record it is found that in 2019 china got the position of largest insecticide consuming country followed by USA, Brazil and Argentina, India became one of the major insecticide producing countries in Asia.

The main advantages of the use of insecticides are the expected immediate gains after application. Insecticides are regularly used to raise agricultural product and food preservation, ignoring their harmful effects. Many detrimental effects have been observed as a result of over use, exposure and harmful consequences can all be mitigated by applying it judiciously and utilizing different insecticide categories (WHO 2009). Biodegradation of insecticide may be a necessary of environmentally acceptable insecticide pollution control for a long term environmental benefit. Different types of microorganisms play a significant role in the breakdown of insecticides and have been recognized for their influence and many uses in human welfare.

## II. Review of Literature:

Insecticides can be classified into different categories depending on their mode of entry, mode of action and chemical composition.

- Depending on the mode of entry, insecticides are divided into following types-
  - a. Stomach poison like Paris green, lead arsenate etc.
  - b. Contact poison like BHC, DDT.
  - c. Systemic poison like acephate.
  - d. Fumigants like parathion, hydrogen cyanide, SO<sub>2</sub> etc.
- Depending on the mode of action, insecticides are divided into following types-
  - a. Physical poison like aluminium oxide.
  - b. Protoplasmic poison like arsenites, formaldehyde etc.
  - c. Respiratory poison like HCN, H<sub>2</sub>S etc.
  - d. Nerve poison like pyrethrum, parathion, CCl<sub>4</sub>, DDT etc.
- Depending on chemical nature, insecticides can be divided into following types-
  - a. Inorganic insecticides like NaF, Paris green etc.
  - b. Organic insecticides like nicotine, pyrethrum, rotenone etc.

### Effects of Insecticides on Human Health:

Long term exposure to insecticide may lead certain acute health effects like- stinging eyes, rashes, blisters, blindness, nausea, dizziness, diarrhoea and death. Example of some known chronic effects of insecticides are cancers, birth defects, reproductive harm, immune toxicity, neurological and developmental toxicity and disruption of the endocrine system.

Some people are more vulnerable than others to insecticide impacts. For example, infants and young children are main susceptible than adults to the toxic effects of insecticides. Moreover farm workers and insecticide applicators are more vulnerable as they receive more exposure includes irritation of the nose and throat, burning, stinging and itching on the skin along with nausea, dizziness and diarrhoea. People with asthma are very sensitive to some insecticide like pyrethrin, organophosphate etc. Chronic health effects include cancer, brain and nervous system damage, birth defects, infertility and other reproductive problems and damage of liver, kidneys, lungs and other body parts. Children are more vulnerable to insecticides

### III. Materials and Methods:

- Search Strategy- I have conducted a systemic literature review to generate an overview of research studies reporting a past and present, and agriculture insecticides involving human subjects or environmental samples. Here some peer reviewed original research papers were searched.
- Data Extraction: For each article that reported on more than one study site, a separate extraction was made.

### IV. Result and Discussion:

With the observed increased use of insecticides all over the world, there is a potential of increasing environmental exposure. No doubts insecticides have saved millions of human and animal lives since the date of their synthesis and use. They have played an important role that brought revolution in the field of agriculture and human health, on control of insect pests of crops and vector-borne diseases. Most of the insecticides are used to increase the productivity of food and fibre as well as to prevent the incidence of vector borne disease. Unfortunately misuse and overdose of different insecticides creates threatened for the beautiful creation of nature.

After the study of different paper of different authors it is revealed that the industrialization of the agricultural sector has increased the chemical burden on natural ecosystems. Insecticides are the chemicals used in agriculture fields, public health programmes and in urban green areas in order to protect plants and human beings from different vector oriented diseases. Especially in developing country like India the modern agricultural practices are best on wide use of chemical insecticides that have been associated with a number of negative impacts on human health, wildlife and natural environment. Several epidemiological and molecular researches highlighted a close association of some insecticides with different diseases like neurodegenerative disorders, endocrine disruption, respiratory complications, reproductive disorder and birth defects. In addition the carcinogenic, teratogenic and mutagenic nature of insecticides is also believed to be a major reason of cancer development in human population. My brief study and observation reveals the fact that extensive use of different types of harmful insecticides can help in raising the production of food as well as in controlling certain vector dependent diseases but overall use of insecticides may be the root cause of certain diseases. It indicates that insecticides are functioning as slow poison in human life. Moreover insecticides are responsible for the destruction of various beneficial insect races like honey bee. Most of the authors advocated against uncontrolled and unjustified use of insecticides. Better for the sake of protection of natural ecosystem and human health we are to choose such type of alternative ways which are less harmful and eco-friendly.

### V. CONCLUSIONS

Most of the insecticides have the potential to be harmful, not only to human but most of the living organisms also the environment if used incorrectly. The key to reduce health hazards are to prefer minimum use of destructive insecticides. In agriculture field the farmers should apply alternate method for pest control. Otherwise we would be unable to increase agriculture products but over life will move towards destruction. Insecticides are used in controlling pests of agricultural and public health importance and their use will continue in failure because of food security and vector control. It is not easy to stop the use of insecticide in the near future but they should be used with care and caution.

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