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Pesticidal Residue in Horticultural Crops

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Introduction

India is the second most populated country with a population of 1.38 billion. And With increase in population Day by day, the demand of food is growing in an exponential rate. Hence, the production of Agronomic and horticultural crop must be increased for the rising population in India. For meeting this increasing food demands, farmers across India are taking multiple steps in order to grow different horticultural crops in same seasons by different cropping practices. But to make this possible, farmers have to rely on artificial chemical supplements like fertilizer, pesticides fungicides etc. are increasing day by day. And as the attack of pests and the infestation of various diseases affect the economic stage of a crop, farmers are forced to compromise the quality for the sake of quantity. Hence for their better yield of fruit and vegetables crops, the farmers apply a variety of pesticides and other chemicals for safeguarding the horticultural crop against pests and disease. And through the years the use of chemical pesticides has increase because of their rapid action in horticultural crops and is less labor intensive than other pest control measure.

According to food and agriculture organization in 1986, a pesticide is defined as any substance or compound used to control or prevent a pest. As per this definition we can also include substances like plant growth regulators (PGR), defoliants, or desiccants under the category of pesticides. As we go through statical data, Asia is where more than half of all pesticides are used globally. And as per surveys conducted in Asian countries, India ranks third, behind China and Turkey for the use of pesticides. This trend of increased pesticide use is found mainly in developing countries and also chemical fertilizers have become an important part of agricultural inputs in modern agriculture. However indiscriminate use of pesticides especially its economic stage and avoiding or reducing safe waiting periods results in the accumulation of pesticide inside the body of people as they consume the edible portions of crops.

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As researches proved that these residues are harmful even to non-targeted organisms. Various steps are taken to guarantee that the presence of pesticides in fruit or vegetable crops are below a threshold level. The term "maximum residue limit" was first used by the Food and Agriculture Organization to control residue levels in international food trade.Joint FAO/WHO Expert Committee on Food Additives first proposed the idea in 1955, and the Codex Alimentarius Commission was founded in 1964 to implement it. The goal was to limit pesticide residue to a safe level. As per EFSA 2010The highest levels of residues anticipated to be present in food when a pesticide is used in accordance with approved agricultural practices are known as maximum residue levels. The MRL is a trading standard established by national and international authorities (such as Codex Alimentarius) to ensure that residues are controlled in global food trade and is not a toxicological parameter. The MRL is established through a small-scale farm study in which the pesticide to be tested is applied to the specific crop and the proper withdrawal period is allowed between application and harvest. After the crop is harvested, the residue levels are assessed.MRL setting is typically handled by the health, agriculture, and environmental agencies but may also fall under the purview of one or more national authorities. MRL enforcement is also done by one or more organizations, and it may also be influenced by the kinds of foods consumed. The estimated likely residue from the supervised trials means residue (STMR), ADI, and ARfD, as well as the national registered good agriculture practice (GAP) data.

Pesticide residues in food products and their entry into the food chain are now a major global health concern. All parties involved in the value chain now place a high priority on food safety, and consumers must have confidence that they won't be exposed to non-acceptable levels of pesticide residues. Pesticide monitoring programs are designed to make sure that maximum residue levels (MRLs) in fruits and vegetables do not exceed those permitted by the government, Monitoring is also to check that pesticides are not misused in a way that could leave unexpected pesticide residues in food, and that good agricultural practices (GAP) are upheld. Some initiatives are carried out as a result of demands placed on them by international trade, primarily in developing nations. The outcomes of these monitoring programs are also utilized by regulatory bodies for upcoming MRL developments and public health risk assessment exercises. The agencies can do more than just monitoring, Like supervised trials. In supervised trials factors like persistence, degradation, half-life

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period and safe waiting period are completely studied for a specific pesticide. Supervised trials are mainly conducted to obtain data regarding registration of pesticide, finding safe waiting period and to obtain maximum residual limit (MRL). The procedure involves growing crops using good agricultural practices (GAP). While their growth is tested in various agro-climatic conditions, pesticides are applied at their different growth stages. But their application are regulated on the bases of plant necessity and approved usages. After harvesting, they are sent into laboratories to check pesticidal residue in the respective horticultural crop variety. Then these data are collected and stored for future uses.

In addition to rising production costs, excessive and indiscriminate use of chemical pesticide is found out to have negative effects on both human health and environment. As per WHOs food safety studies, if a person ingests food products which have pesticidal residue above threshold limits, they are likely to have adverse health effects such as asthma, Parkinson's disease, cancer etc. It also has negative effects on reproductive as well as nervous and immune systems. As per the WHO database, case studies conducted by experts have estimated over 385 million cases of acute unintentional pesticide poisoning (UAPP) annually across the world with around 11,000 fatalities. As per farming population of 860 million worldwide, about 44% of farmers are exposed to pesticide poisoning. And as per surveys the most cases of UAPP occurs in southern Asia, followed by southeast Asia and then by east Africa.If this trend continues a lot of people will suffer. But governments across the world are introducing new schemes to reduce these cases. Therefore, finding an effective and environmentally acceptable alternative to control pests is therefore urgently needed.

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