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Pesticide and Public Health: A Review

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Abstract: ***Agadtantra, according to Acharya Sushruta, is a branch of Ayurveda that deals with the symptoms of various poisons, their combinations, and treatments for bites from poisonous animals like snakes, insects, spiders, rats, etc. The rising popularity of herbal medicines has also raised questions about the quality, efficacy, and safety of the raw materials used in their production, including food and fruits. Today, some people but the majority of foods contain highly polluted pesticide residue, and the public health is being impacted by the pesticide residue. Pesticides are the natural or synthetic agents are made to kill all types of pests. In different fields like agriculture, forestry, aquaculture, food industry etc. are use pesticides. The pesticides threaten public health and ecosystem by their higher consumption. For the importance of public health, WHO establish the classification of pesticides on the basis of toxicity with the comprehensive knowledge of classification of pesticides, gross use of pesticides can be minimized by using it judicially and it is helpful to public health & ecosystem.***
Keywords: Agadtantra , Pesticide residue, Pesticides, poisonous effect , hazardous effects ,Toxicity, Ecosystem.

I. INTRODUCTION

One of the eight traditional Ayurvedic disciplines, Ayurvedic Toxicology is a subset of Ashtang Ayurveda and has its own place in the Ayurvedic Chikitsa system. According to Vagbhatacharya, ayurvedic toxicology was also known as Danstrachikitsa, Jangaleechikitsa, Vishagara Vairodhik Prashamanam, and Agad tantra, respectively.

According to Sushruta, Agadtantra is the section of Ayurveda that deals with the symptoms of various poisons, their combinations, and treatments, as well as bites from venomous creatures including snakes, insects, spiders, and rats.

Pesticides are compounds or mixes of substances mostly used in agriculture or in public health protection programmes to protect plants from pests, weeds, or diseases, as well as humans from vector-borne illnesses like malaria, dengue fever, and schistosomiasis. Typical examples include pesticides including insecticides and fungicides as well as herbicides, rodenticides, and plant growth regulators. These items are also utilised for non-agricultural tasks including enhancing and maintaining public urban green spaces and athletic fields. As well as these more obscure uses, these chemicals are also used in building materials, boat bottoms and pet shampoos to get rid of or prevent the presence of undesirable species. Residues of pesticides can be found in a great variety of everyday foods and beverages, includ ing for instance cooked meals, water, wine, fruit juices, refreshments, and animal feeds. The simultaneous exposure to two or more chemicals, which happens in real-life situations and may have synergistic effects, illustrates how these "safe limits" may underestimate the true health risk. Human breast milk tests have also shown pesticide residues, raising worries about prenatal exposure and the health impacts on babies.

II. PESTICIDES & ITS VARIOUS TYPES

A. *Types Of Pesticides On The Basis Of Chemical Compositions*

1) *Organochlorine Insecticides:* Dichlorodiphenyltrichloroethane, also known as the insecticide DDT, is the most well-known organochlorine pesticide. Its unrestricted usage has led to numerous environmental and public health concerns (2, 48, 49). Other organochlorines that are employed as pesticides include methoxychlor, endosulfan, heptachlor, dieldrin, and endosulfan. The broad class of organochlorine insecticides has been linked to adverse health consequences, including haematological and hepatic changes , impacts on embryonic development , lipid metabolism , and endocrine abnormalities. Although their potential to cause cancer is disputed, potential carcinogenic effects should not be disregarded.
2) *Organophosphate Pesticides*: Organophosphates, which were marketed as a more environmentally friendly alternative to organochlorines, encompass a wide range of pesticides, glyphosate being the most popular. Other well-known pesticides in this class include dimethoate, parathion, and malathion; some of them are recognised for their propensity to cause endocrine disruption. This class of pesticides has been linked to cellular oxidative stress and issues with the nervous and endocrine systems, as well as effects on the function of cholinesterase enzymes , decreased insulin secretion, disruption of normal cellular metabolism of proteins, carbohydrates, and fats, genotoxic effects, and effects on mitochondrial function.

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3) *Carbamate Pesticides:* Aldicarb, carbofuran, and ziram are examples of the chemical pesticides in the carbamate class that have been linked to endocrine disruption, potential reproductive problems, and effects on cellular metabolic processes and mitochondrial function. The ability of carbamate insecticides to produce apoptosis and necrosis in human immune cells , natural killer cells , and also apoptosis in T lymphocytes , as well as cytotoxic and genotoxic effects in hamster ovarian cells has also been demonstrated by in vitro research.
4) *Others Pesticides* –

Pyrethroids - For agricultural and public health applications, synthetic pyrethroids like fenvalerate, permethrin, and sumithrin are regarded as some of the safest insecticides now on the market.

Another group of chemical pesticides that have been linked to endocrine disrupting effects and reproductive toxicity are the triazines, which include atrazine, simazine, and ametryn.

Additionally, it was discovered that triazine herbicides and the incidence of breast cancer may have a statistical relationship.

Neonicotinoid pesticides, such as imidacloprid, thiacloprid, and guadipyr, are relatively new and also the most extensively used insecticides. Recent research has shown that neonicotinoid pesticides can enhance the expression of the enzyme aromatase, which is involved in breast cancer and is crucial for development in bees and animals.

B. Types Of Pesticides On The Basis Of How Or When They Work

1) *Contact Pesticides* – These pesticides control a pest as a result of contact. Insects are kill when sprayed directly or when they crawl across surfaces treated with a residual contact insecticide.
2) *Systemic pesticides* – Pesticides which are absorbed by plants or animals and move untreated tissues. Systemic insecticides or fungicides move throughout treated plants and kill certain insects or fungi.
3) *Foliar Pesticides* – These are applied to plants leaves, stems and branches.
4) *Soil applied Pesticides* - These are applied to soil. Some of these are taken up by roots and trans- located inside the plant.
5) *Fumigants* – Chemicals that are applied as toxic gas or as a solid or liquid which forms a toxic gas and it will penetrate cracks and crevices of structures or soil.
6) *Pre-plant herbicides*- These are applied to soil before seedling or transplanting.
7) *Pre-emergent herbicides*- These are applied to soil after planting but before emergence of crop or weed.
8) *Post-emergent herbicides*- These are applied after crop or weed has emerged.
9) *Selective Pesticides* – They will only control certain pests.
10) *Non-selective (or broad- spectrum) pesticides* – They will control a wide range of pests.
11) *Suffocating pesticides*- They clog the breathing system of insects and may affects eggs.
12) *Residual pesticides* – They do not break down quickly and may control pests for long time.
13) *Non-residual pesticides* **–** They are quickly made inactive after application and do not affect future crops or pests.

III. POISONOUS EFFECT ON HUMAN HEALTH

Pesticides generally enter into body during applying, mixing, or during farming spray. It can enter in following ways-

1) Through the skin (dermal)
2) Through the lungs (inhalation)
3) By mouth (ingestion)

Chemical pesticides pose the greatest risk to our environment and health. Regular users of chemical pesticides, such as farmers and workers, are most at danger of developing toxic levels in their systems.

The majority of fruits and vegetables purchased at the local market are heavily pesticide and chemical-treated. These are generally used by farmers to protect fruits and vegetables from pests and dangerous insects during farming. High concentrations of pesticides and other chemicals in food and vegetables have been linked to the development of diseases like cancer, kidney disease, and lung disease, according to a number of publications and research conducted by different institutions.

Children are prone to obtaining a number of infections and illnesses. Children who are exposed to these high chemical residues are at risk for developing cancer, as well as mental health issues like autism and attention deficit hyperactivity disorder.

However, the chemicals and pesticide residue remain on the fruits and vegetables' skin. Pesticides on fruits and vegetables do not lose their damaging effects when rinsed with ordinary water. By consuming it raw or cooked, it combines with food, enters the stomach, and causes a variety of illnesses in our bodies.

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The use of carbide gas to ripen fruits is forbidden by PFA Rule 44-AA from 1955. This law states that it is prohibited to sell, expose for sale, offer for sale, or keep on one's premises for the purpose of sale any fruit that has been artificially ripened using acetylene gas, also known as carbide gas.

Pesticides can have negative effects on the nervous system, some of them are dangerous and can cause cancer, liver, kidney, and lung damage, as well as loss of appetite, agitation, insomnia, fatigue, skin irritations, nausea, vomiting, breathing difficulties, and even death. Exposure to pesticides can have a variety of negative impacts on neurological health, including memory loss, loss of coordination, a slower reaction time to stimuli, behavioural disorders, and dermatological issues. Fruit and vegetables can include pesticide residue from both banned (such as Aldrin, Chlordane, Endrin, Heptachlor, and Ethyl Paration) and restricted (such as DDT, Endosulfan) pesticides used in India. In addition to harming human metabolism, heavy metals can also result in cardiac issues, skin conditions, and other health issues.

IV. DISCUSSION

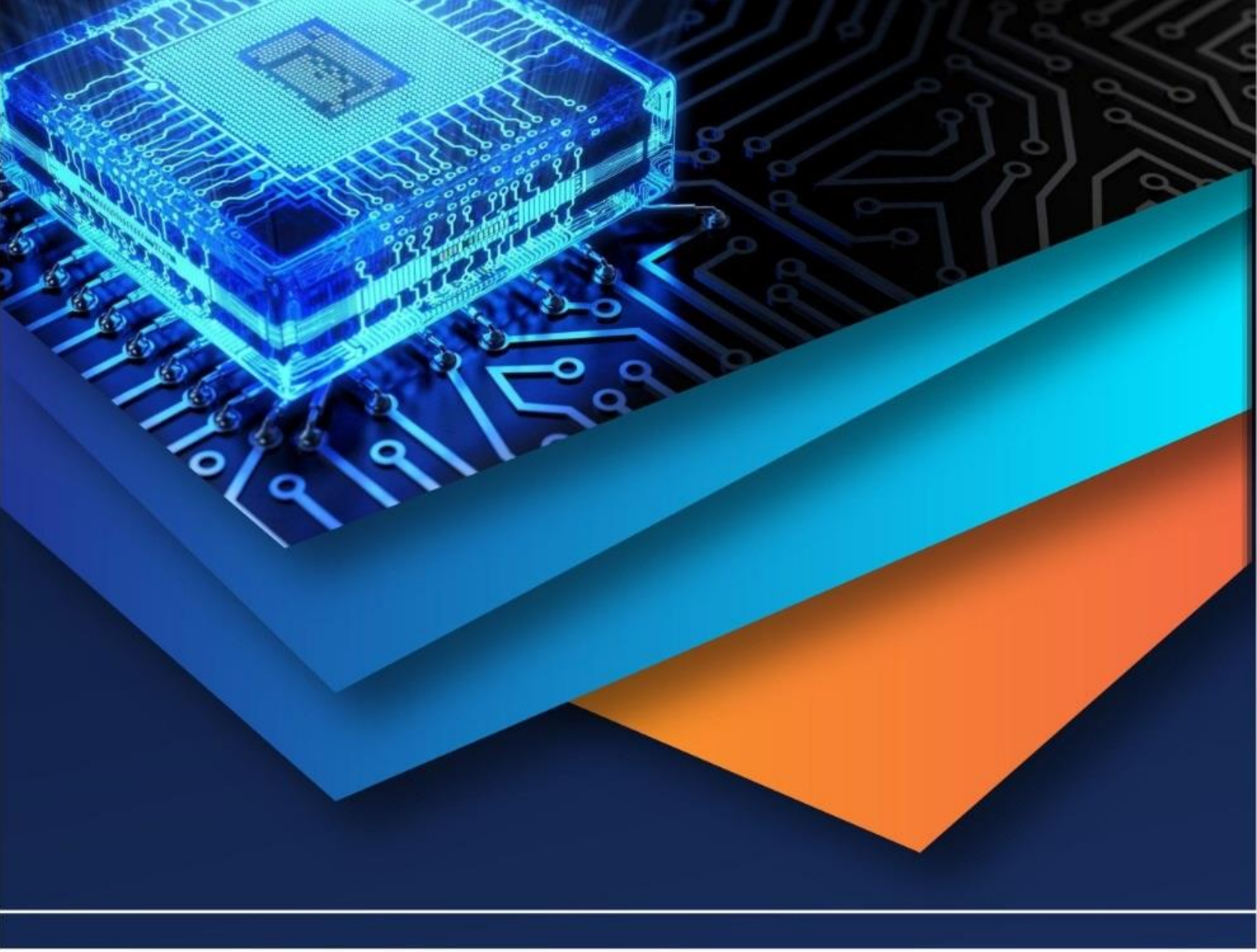
A common practise in the agricultural production of food goods is the usage of pesticides. Ancient farmers relied on using organic farming practises and methods to cultivate their crops. As commercial farming gradually gained ground on organic farming in terms of popularity, artificial fertilizers, insecticides, and weed killers gradually supplanted natural farming practices. The selling point of these compounds is the potential for a greater yield in less time. However, a significant reliance on chemicals is beginning to have an impact on both the health of the populace and the enormous farmlands. Today, there is a lot of concern about toxic residues from agricultural chemicals getting into human food. Studies and research have shown that pesticides have negative impacts on children, which may be quantified in a number of ways. The impacts can be observed and evaluated both now and later after the child has grown up because their internal organs are still growing and maturing. When exposed to pesticides, you may experience certain health problems right away, and you may also experience symptoms hours, days, or even years later. As soon as the exposure to pesticides is stopped, certain symptoms will disappear. Some people might take some time to go. Before using pesticides, women who are pregnant or nursing should see their doctor since some pesticides can harm an unborn child or an infant who has been breastfed. When a pregnant woman consumes pesticide-tainted vegetables, the baby may be exposed to the dangerous substance and develop birth abnormalities. In addition to being neurotoxins that can cause a person to feel faint, disoriented, and confused, pesticides can also impair short-term body coordination and mental capacity. These may eventually lead to a decline in mental agility and learning potential.

V. CONCLUSION

Pesticides are extremely dangerous to human health and can lead to fatal illnesses in people. These issues are caused by a variety of factors, including direct or indirect human exposure with pesticides. Starting an organic farm can help to maintain high cleanliness in the future while using less chemicals for farming.

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