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AYURVEDIC MANAGEMENT OF CHRONIC TOXICITY OF PESTICIDES. A REVIEW

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ABSTRACT

A pesticide is any substance or mixture of substances specifically intended to prevent repel, destroy or lessen the effect of a pest. The term pesticides are insecticide, herbicide, fungicide or any other chemical substances used to control pests. As pesticides are well absorbs through skin, oral & respiratory mucosa, most of the population is affecting directly, indirectly or both ways during working in industries or agriculture where production or spraying of pesticides occurs respectively. People can also directly expose due to consumption of green vegetables, fruits etc. or water which is already exposed by pesticides. Most of the pesticides like organochlorine are accumulate in human body & exist for several years, which produces adverse health effect after some exaggerated factor or after approaching a peak level. This type of cumulative toxicity of pesticides is already mentioned in *Ayurveda*& described under heading of *Dushee Visha* by accumulation of chemical (Kritrim) toxicant.

KEYWORD: *Dushee Visha*, Cumulative Poison, Pesticide.

1. INTRODUCTION

Pesticides accumulate in adipose tissue as well as other tissue. Adverse impacts can include mutagenic damage to DNA, cancer, neurological, reproductive & developmental toxicity, or immune system damage. In *Ayurveda* Cumulative effect of weak poison on human health describes under the heading of *Dushee Visha*. These poisons not eliminated completely & remain as residue in tissues for year & produce adverse effect after exaggeration. Clinical Feature, Complication & Management of *Dushee Visha* has given in *Samhitas*. *Acharya Sushruta* stated that a part of *Sthawar* (Inanimate), *Jangam* (Animate) or *Krutrim* (Artificial) poision, which accumulated and cannot be excreted from body completely due to its chronic and cumulative nature or becomes less potent after digestion or counter action of antidotes & stays in the body for a prolong period and vitiating the body slowly is called *Dushee Visha*. The *Veerya* of *Dushee Visha* being less, it does not show any immediate fatality. On the other hand, it becomes *avritta* by *kapha* (Lipophilic Binding) & stays in that state for years. Pesticides that are exposed continuous and persistent to the human being and accumulate in the body which Produce long term hazards is called as chronic cumulative toxicity of pesticides.as the toxicogenesis of both *Dushee visha* as well as chronic cumulative toxicity of pesticide is nearly similar the basic principal of management of *Dushee visha* will be applied in the management of chronic cumulative toxicity of pesticides. In this study the toxicogenesis, long term hazards and management of chronic cumulative pesticides has elaborated and discuss with special reference to *Dushee Visha*.

2. AIMS AND OBJECT

1. To discuss, evaluate & elaboration of cumulative Toxicity of Pesticides due to Bioaccumulation on human body essence.
2. To discuss, evaluate & elaboration of *Ayurvedic* Management for Cumulative Toxicity of Pesticides.

3. MATERIAL AND METHOD

This article is based on personal experiences & textual review. All the *Brihatrayi, Laghutrayi* and available commentaries of those has reviewed. Modern Texts & various websites to collect information on the relevant topics were referred.

4. Conceptual Study

Residue data on pesticides in Agricural samples like fruits, vegetables in India indicates their presence in sizable amounts. Monocrotophos, Methyl Parathion and DDVP, all organo phosphorus pesticides, are found to be most prevalent. One study identified certain contaminants of particular concern, including arsenic, chlordane, DDT, dieldrin, dioxins, and PCBs. The occupational Cumulative hazards of pesticides will be founds during manufacture and formulation of pesticides in industrial settings and their distribution and use in field conditions & post application hazards due to toxic

residues of pesticides in food.[1] Human exposure to pesticides may occur through occupational exposure in the case of agricultural workers in open fields and greenhouses, workers in the pesticide industry. Evidently, worker who mix, load, transport and apply formulated pesticides has the greatest exposure. Occupational exposure to pesticides often occurs in the case of agricultural workers in open fields and greenhouses, workers in the pesticide industry, and exterminators of house pests.

Metabolism, Distribution & Excretion of Pesticides

Distribution of toxicant to & accumulation at organ may result in toxicity. The physiology of the organism and physiochemical properties of pesticides are important factors in the distribution of absorbed pesticides. Pesticides do not have the same tissue partition coefficient for all tissue. For example Dimethioate has relatively high affinity for liver, muscle & brain, whereas the chlorinated insecticides DDT, Aldrin & Dieldrin are lipophilic & high affinities for adipose tissues.

Systemic symptoms of Bioaccumulation & Cumulative Toxicity of Pesticide

1. Gastro-Intestinal - Nausea, Vomiting, Stomach Cramp, Diarrhea, loss of Appetite.
2. Central Nervous System- Exhaustion, Dizziness, Headache, Muscle Weakness, Muscle Cramp, Tremor, Seizure. A study shows positive for increase in one or more neurologic abnormalities with pesticide exposure Skin- Dermatologic effects found 7/10 studies positive for dermatitis with pesticide exposure. Pesticides are reported to cause irritant dermatitis, allergic contact dermatitis, and other skin conditions, including photodermatitis, porphyria cutaneatarda, and chloracne.
3. Reproductive System- Study shows Birth defects, early pregnancy, infertility, altered growth, fetal death.
4. Genotoxicity- study shows increased chromosome aberrations with pesticide exposure.
5. Heamatotoxicity- Significant associations were also found for hemoglobin, hematocrit, RBC, WBC and platelet count due to pesticide exposure.

Complication of Chronic effect of Pesticides

Pesticide compounds are well absorbed through the mucous membrane of GI tract, respiratory tract and through the skin. Some pesticides are stored in the body fat and slowely realsed in the circulation, prolonging the duration of its action. Route of exposure of pesticide in human being, Dermal (absorption through skin) Inhalation (through the lungs) Ingestion (by mouth) Eye, Parenteral. The high risk groups exposed to pesticides include the production workers, formulators, sprayers, mixers, loaders and agricultural farm workers. Signs & Symptoms of long-term or chronic illness from pesticides are Weight loss, constant weakness, numbness in hands or feet, poor balance, skin irritation, loss of vision, very fast or very slow heartbeat, sudden mood changes, confusion, memory loss, and trouble concentrating in general.

Table No. 1: Management of Cumulative Pesticides w.s.r.to *Dushee Visha*.

Sr.	Procedure & Drugs	Sushrit	Charak	Ashtang Sangrah	Ashtang Hrudaya	Yogratnakar	Bhavprakash	Vang-sen
1	Sudation (*Swedan*)	✓	-	✓	✓	✓	✓	✓
2	Induced Emesis (*Vaman*)	✓	-	✓	✓	✓	✓	✓
3	Induced Purgation (*Virechan*)	✓	-	✓	✓	✓	✓	✓
4	(*IkshvakuKalp*)	-	✓	-	-	-	-	-
5	Mild Purgative (*KashyopoktaVirechak*)	-	-	✓	-	-	-	-
6	(*SudhaKalp*)	-	✓		-	-	-	-
7	*Dushee Vishari Agad*	✓	-	✓	✓	✓	✓	✓
8	Blood Letting (*Sira Karma*)	-	✓	-	-	-	-	-

All the *Acharya* except *Charak* mentioned the Sudation followed by Induced Emesis or Induced Purgation or both able to excrete the *Dushee Visha* from human body by means of purification and then administration of *Dushee Vishari Agad* after conciliating step (*Samsarjan Krama*). Acharya *Charak* has suggested Bloodletting & Medicine prepared from milky juice of Euphorbia, while *Acharya Vagbhat* has suggested Mild Purgative which is already mentioned in *Kashyap Samhita* in addition.

Table No. 2: Contain of *Dushee Vishari Agad.*

Sr. No.	Feature	*Sushrut*	*Ashtang Sangrah*	*Ashtang Hradaya*	*Yograt Nakar*	*Bhavpr Akash*	*Vang-sen*
1	Piper Longum (Pippali)	✓	✓	✓	✓	✓	✓
2	Vitiveria Zizanoidis (Dhyamak)	✓	✓	✓	✓	✓	✓
3	NardostachysJatamansi (Mansi)	✓	✓	✓	✓	✓	✓
4	SymplocosRacemosa (Lodhra)	✓	✓	✓	✓	✓	✓
5	CyperusRotundus (Motha)	✓	✓	✓	✓	✓	✓
6	Gynandropis Gynandria (Tilparni)	✓	✓	✓	✓	✓	✓
7	Elettaria Cardamomum (Ela)	✓	✓	✓	✓	✓	✓
8	Ferrous Oxide (Gairik)	✓	✓	✓	✓	✓	✓
9	PipperNigrum (Marich)	-	-	-	✓	-	-
10	OroxylumIndicum (Kutnut)	-	✓	✓	-	-	-
11	SaussureaLappa (Kushta)	-	✓	✓	-	-	-
12	GlycerrhizaGlabra (Yasti)	-	✓	✓	-	-	-
13	Santalum Album (Chandan)	-	✓	✓	-	-	-
14	Honey (Madhu) as a Anupana	✓	✓	✓	✓	✓	✓

6. DISCUSSION

Chronic toxicity of pesticides which persistently accumulate in human being and exist for several years produced long term hazards. When the cellular level of pesticides increases within the body, it produces toxicity by interfering cellular metabolism which causes various clinical manifestation according to saturation & weak immune response of that system (Strotas) or Organ (Koshtanga),.Most of the clinical manifestation & complication of the cumulative toxicity of pesticides are mimic with *Dushee Visha* like Nausea, Vomiting, Diarrhea, loss of Appetite, Exhaustion, Dizziness, Headache, Muscle Weakness, Muscle Cramp, Tremor, Seizure, rashes & patches on Skin, dermatitis, Insanity and Impotency. Cancer is the most danger & probable major complication of cumulative toxicity of pesticides though it is not mentioned as manifestation or complication of *Dushee Visha*by any of *Acharya* in *Ayurveda*. *Dushivishari Agad* having herb & mineral has antitoxic effect. It also helps to balance the body essence as *Acharya* mentioned that for complete health, body essence may be balance .As the *Kashyopokta Virechak Kalpa* having mild purgative property in therapeutic doses, it helps to excrete metabolic toxicant from body.

7. CONCLUSION

Cumulative toxicity of pesticides is complicated problems which are increasing day by day in all over world due widely uses of pesticides. As India is being Agricultural Predominant Country &utilization of pesticides after green revolution increased hence have most probable affected by cumulative toxicity of pesticides. Cumulative toxicity should be managed by method of Bio Purification (Induced Emesis &Purgation) along with herbal & herbominaral products, which has already mentioned in *Ayurveda.*

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