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**A REVIEW: SIGNIFICANCE OF DOOSHIVISHA IN CURRENT ERA
W.S.R TO BIOACCUMULATION OF ENVIRONMENTAL TOXINS**

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ABSTRACT :

In Ayurveda the spectrum of ‘*Dooshivisha*’ concept is expounded in many ways. It can be applied to cumulative poisoning which is very common in today’s era. *Dooshivisha* is less potent part of *sthavar*, *jangama* or *krutrim visha* which is not fully eliminated from body & vitiates *dhatu*s when favorable conditions occur. In the modern era human body gets exposed to large number of poisonous substances due to industrialization, use of chemicals and agriculture. Heavy metal compounds, pesticides, some preservatives are accumulated in the body through contaminated air, water, soil & food. The heavy metal once absorbed, compete with other ions & bind to proteins resulting in impaired enzymatic activity resulting in damage to many organs throughout the body. Prolong use of certain medicines, cosmetics, cleaning products also caused cumulative poisoning. Bioaccumulation refers to the accumulation of substances, such as pesticides, other organic or inorganic chemicals in organism. Bioaccumulation occurs when an organism absorbs possibly toxic substances at a rate faster than that at which the substance is lost by catabolism & excretion. By using the concept *Dooshivisha* & bioaccumulation, we can properly understand the risk of cumulative poisoning caused by environmental toxins & treat them accordingly.

Keywords : *Dooshivisha*, *sthavar*, *jangam*, *krutrim*, Bioaccumulation

INTRODUCTION: *Dooshivisha* is important concept of *visha* which is explained by our ancient sages. *Dooshivisha* is denatured or attenuated poison which hidden in to the body in latent phase.

Sushrutacharya & vagbhatacharya described *Dooshivisha* as, it is less potent part of *sthavar*, *jangama* or *krutrim visha* which is not fully eliminated from body & vitiates *dhatu*s when favorable conditions occur. So this latent poison is cause for cumulative toxicity into the body. In India a number of cases of unintentional cumulative poisoning have been reported from household poisons & greater use of chemicals in industries. In today’s life human body gets exposed to lot of environmental toxins like air pollutants,

water pollutants, land pollutants which are the result of industrialization & plenty use of chemicals. In food also lot of toxins are present due to chemical fertilizer, polluted water & preservatives. After entering into the body these toxins bind with proteins & cause organ damage. Due to impaired excretion & lipid solubility they get accumulated in body & cause cumulative toxicity. Bioaccumulation refers to the accumulation of substances, such as pesticides, other organic or inorganic chemicals in organism. Bioaccumulation occurs when an organism absorbs possibly toxic substances at a rate faster than that at which the substance is lost by catabolism & excretion. The study of *dooshivisha* &

bioaccumulation is important to access cumulative poisoning cases in practice.

MATERIAL & METHODS:

- Literature was reviewed from ayurvedic classic texts & contemporary science.
- Information from related website was searched.

Literary review of Dooshivisha: A poison either *sthavar*, *Jangama* or *krutrima*, when ever not fully eliminated from the body & attenuated by anti-poisonous remedies or gets dried up by *davagni* (fire), *vata*(wind), *atapa*(the sun), or when the poison becomes less potent is called as *Dushivisha*. Because of its mild potency does not prove fatal for an individual & as it get enveloped by the *kapha* it resides in the body for many years.¹

Aggravating Factors for Dooshivisha: The poison which vitiates *dhatu*s because of

aggravating factors such as *Desha* (Place), *Kala*(season) , *Anna*(food) & *divanidra* (sleep during day time) is called *Dooshivisha*.²

These are the aggravating factors for *Dooshivisha*:

Place (Desh) like *Anupadesha*, extensive windy cold rainy place,

Particular time (Kala) like cloudy & windy day or rainy season,

Diet i.e wine, *sesamum*, *kulatha*, *pulse*,

Regular day sleep

Prodromal signs (Poorvaroopa) of Dooshivisha: When *dooshivisha* is about to flare up it produces some symptoms. When patient feels these prodromal symptoms he should take preventive measures. The prodromal signs are as follows:³

<i>Nidra</i>	Sleep
<i>Gurutwa</i>	Heaviness
<i>Vijrumbhan</i>	Yawning
<i>Vishlesh</i>	Feeling of loosening of the joint
<i>Harsha</i>	Horripilation
<i>Angamarda</i>	Bodyache

Manifestations of Dooshivisha :⁴

<i>Bhinnapurish</i>	Diarrhoea
<i>Vaivarnya</i>	Discolouration of skin
<i>Vairasyamukha</i>	Anorexia
<i>Pipasa</i>	Intense thirst
<i>Murchha</i>	Fainting
<i>Vaman</i>	Vomiting
<i>Gadgad vani</i>	Stammering speech
<i>Dooshyodar</i>	Ascites
<i>Annamada</i>	Intoxication after food
<i>Avipak</i>	Indigestion
<i>Mandal</i>	Eruption of circular patches on skin
<i>Kotha</i>	Urticaria
<i>Moha</i>	Mental confusion

<i>Dhatukshaya</i>	Decrease of <i>Dhatu</i>
<i>Pad-Kar-Aasya shofa</i>	Edema on face & extremities
<i>Visham jwara</i>	Intermittent high fever
<i>Unmad</i>	Insanity
<i>Anaha</i>	Constipation
<i>Shukrakshaya</i>	Reproductive dysfunction
<i>Kushta</i>	Skin diseases

Clinical features of Dooshivisha according to site:⁵

When it is localized in the *amashaya*, it produces diseases of *kaphavata* like unconsciousness, vomiting, diarrhea, burning sensation, tremors etc

When it is localized in the *pakvashaya*, it produces diseases of *vatapitta* like burning sensation all over the body, fainting, anemia etc.

Other features- loss of hair, loss of strength, appearing like bird which has lost its wing, shows *dhatudushti lakshana* of affected *dhatu*.

Prognosis:⁶ *Atmavan rugna* (confidence & powerful resistive power of patient) & short duration of *vyadhi- sadhya*

Clinical features has been seen from one year- *Yapya vyadhi*

Weak body & mind, No control on diet- *Asaadhya*

Management :⁷

1) *Shodhan*: A Patient suffers from *Dooshivisha* should be first fomented & cleansed by both emetics & purgatives. The following anti-poisonous *agada* should be taken daily.

2) *Agad*:

Dooshivishari Agad: The *agad* is prepared from *Pippali, Dhyamaka, Mamsi, Savara, Paripelavama, suvarchika, sasukshma ela, toya, kanakgairikam* with honey & use for internally. It is also useful in other kinds of poisoning.

Complications of Dooshivisha:⁸

<i>Jwara</i>	Fever
<i>Daha</i>	Burning sensation
<i>Hikka</i>	Hiccough
<i>Anaha</i>	Constipation
<i>Shukrashyaya</i>	Loss of semen
<i>Shofa</i>	Swelling
<i>Atisara</i>	Diarrhoea
<i>Murccha</i>	Epileptic fits
<i>Hrudayaroga</i>	Heart disease
<i>Jathar</i>	Ascites
<i>Unmad</i>	Insanity
<i>Vepathu</i>	Shivering

Complications of *Dooshivisha* should be treated with remedies laid down under the respective heads of the aforesaid diseases.

BIOACCUMULATION: Bioaccumulation is a normal and essential process for the growth and nurturing of organisms. All animals, including humans, daily bioaccumulate many vital nutrients, such as vitamins A,D and K, trace minerals, and essential fats and amino acids. When toxicology concerns the Bioaccumulation refers to the accumulation of substances, such as pesticides or other chemicals in an organism. Bioaccumulation occurs when an organism absorbs a - possibly toxic - substance at a rate faster than that at which the substance is lost by catabolism and excretion. Thus, the longer the biological half-life of a toxic substance the greater the risk of chronic poisoning.⁹Toxic substances released into the environment can cause the pollution of air, surface and groundwater resources, and soil. Environmental toxins that are bioaccumulated come from many sources. For example: Pesticides, insecticides, compounds from industrial smokestacks & automobiles, heavy metals, etc. Once a toxic pollutant is in the water or soil, it can easily enter the food chain also. Usually, compounds that are highly water soluble have a low potential to bioaccumulate or they are easily removed unless the cells have a specific mechanism for retaining them. Heavy metals like mercury, copper, lead and certain other water-soluble chemicals are such an exception, because they bind tightly to specific sites within the body. When binding occurs, even highly water-soluble chemicals can accumulate.

Many fat-loving (lipophilic) chemicals pass into organism's cells through the fatty layer of cell membranes more easily than water-soluble chemicals. Chemicals that dissolve readily in fat but not in water tend to be more slowly eliminated by the body and thus have a greater potential to accumulate. Lipophilic compounds stored in body for longer time & show its toxic effects during remobilization.¹⁰

The amount of pollutants accumulating in living organisms depends largely on the size, age and health of the individual. Tissue accumulation is also greatly influenced by the bioavailability and absorbability of the given chemical. The bioconcentration factor (BCF) expresses the ratio of the tissue concentration measured in the tested living organism and the concentration detected in the environmental system (GRUIZ et al. 2001).

BCF = C in the given organism / C in the given environmental system

Manifestations of chronic metal poisoning:

Lead- anaemia, weakness, anorexia, foul breath, dyspepsia, discoloration of gums, delirium, alopecia, paralysis, sterility etc

Mercury- excessive salivation, metallic taste, skin eruptions, eethism, discoloration of gums, GIT disturbances etc.

Arsenic- Alopecia, pigmentation of skin, hoarseness of voice, loss of appetite, weakness etc. Copper- Purple lines on gums, nausea, vomiting, giddiness, diarrhea, laryngitis, bronchitis, anemia, dermatitis etc.

Manifestations of chronic pesticides poisoning:

Pesticides like aldrin, chlordane, DDT, dieldrin, endrin, heptachlor, mirex, and

toxaphene cause cancer, endocrine disruption, reproductive dysfunction, behavioral abnormalities, birth defects, and interference with the immune and nervous systems.

Manifestations of chronic fertilizer poisoning:

Mainly nitrites causes the toxicity gray blue coloured finger nails, bronchitis, rhinitis, hypotension, seizures, and carcinogenicity¹¹

DISCUSSION:

Cumulative toxicity:

- According to *Sushrutacharya* & *vagbhatacharya* –*Dooshivisha* is less potent part of *sthavar*, *jangama* or *krutrim visha*. It is not fully eliminated from body & vitiates *dhatu*s when favorable conditions occur.

It causes cumulative toxicity into the body.

- Bioaccumulations of environmental toxins cause cumulative toxicity in human beings.

Accumulation in body:

Dooshivisha:

- *Dooshivisha* get enveloped by *Kapha*
- Remains in the body for long time
- Shows its manifestations on favorable conditions

Bioaccumulation of environmental toxins:

- Lipid soluble compound have greater potential to accumulate because they easily enter into the cell & slowly eliminated from body
- Show its toxic effects during remobilization

Clinical manifestations of Dooshivisha & cumulative poisoning by environmental toxins: The *lakshanas* of *dooshivisha* & manifestations of cumulative environmental toxins are similar to greater extent.

<i>Dooshivisha Lakshan</i>	Cumulative metal Toxicity
<i>Bhinnapurish</i>	Diarrhoea
<i>Vaivarnya</i>	Skin & gum discolouration
<i>Vairasyamukha</i>	Metallic taste in mouth
<i>Pipasa</i>	Thirst
<i>Murchha</i>	Fainting
<i>Vaman</i>	Vomiting
<i>Annamada</i>	GIT manifestation
<i>Avipak</i>	GIT Manifestations
<i>Mandal</i>	Eruption of circular patches
<i>kotha</i>	urticaria
<i>Moha</i>	Unconsciousness
<i>Dhatukshaya</i>	Weakness
<i>Pad-Kar-Aasya shofa</i>	Edema
<i>Visham jwara</i>	Irregular fever
<i>unmad</i>	Insanity
<i>Anaha</i>	GIT manifestations
<i>Shukrakshaya</i>	Reproductive dysfunction
<i>Kushta</i>	Dermatitis

Manifestations of cumulative pesticide toxicity are cancer, endocrine disruption, reproductive dysfunction, behavioral abnormalities, birth defects, and interference with the immune and nervous systems .

Dooshivisha – unmad, shukrakshaya

Manifestations of cumulative fertilizer toxicity are gray blue coloured finger nails, bronchitis, rhinitis, hypotension, seizures, and carcinogenicity

Dooshivisha- discoloration, Giddiness, etc

CONCLUSION: *Dooshivisha* is less potent part of *stavar, jangam or krutrim visha*. It is not fully eliminated from body thus resides in body for long time. Bioaccumulation of toxins shows similarity to this concept.

The bioaccumulation of environmental toxins depend on their concentration in environment, the amount of chemical coming into an organism from the diet, water or air, and the ability of organism to degrade & excrete it.

Preventive measures should be taken to avoid health hazards due to environmental toxins in affected area. For that in industrial workers regular detoxification methods & regular check up is necessary. People who are living in affected area should take precautions about drinking water & food.

The study of *dooshivisha* & bioaccumulation is important to access cumulative poisoning cases in practice, mostly in the industrial area. *Shodhan & shaman chikitsa* for *dooshivisha* narrated by our ancient sages can be helpful to treat the cumulative toxicity cases due to environmental toxins.

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