



# Role Of Agada Tantra In Environmental Toxicity – A Review Article

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## ABSTRACT -

Pollution is one of the most dangerous environmental problems the world is facing today. To stop the impending perils that pollution could cause, it is necessary that we start taking some actions to keep our environment safe and healthy. Pollution is the process by which harmful substances (called pollutants) are released into the natural environment. Agadtantra, a branch of Astanga Ayurveda that deals specifically with poison identification, forms of poison from the mineral, plant, and animal kingdoms, as well as synthetic poisons and their treatment. The idea of air, water, and land pollution has also been explored in a number of significant literature, and its contribution to diseases and the downfall of civilizations has been clarified. Dincharya, Ritucharya, and Janpadodhvansa are three ways in which our Acharyas, the founders of Ayurveda, have already described environmental wellness. The cumulative toxicity has also been included in the Dushi Visha concept. Pollutants like dust, gases, metals, chemicals, etc. that are regularly exposed to build up in our bodies and act as Dushi Visha. This review article is a first step in using our ancient science to identify answers to problems with growing environmental degradation and their management.

Keywords- Agadtantra, ayurveda, pollution,toxicity

## INTRODUCTION-

Pollution is a complicated problem that affects both developing and developed nations. Pollution may be defined as an addition of undesirable material into the environment as a result of human activities. A pollutant may be defined as a physical, chemical or biological substance, released into the environment which is directly or indirectly harmful to human and other living organisms. Socioeconomic concerns are also important; those who reside in metropolitan or underdeveloped areas may be more exposed. Fighting pollution is a special problem because it can necessitate substantial involvement and financial backing from all governmental levels, from local towns all the way up to national authorities. These and other reasons make pollution a vast research topic. This article will therefore concentrate on some of ancient methods for treatment of environmental toxicity. The environment includes the habitat or conditions in which people, animals or plants operates, including air, water, soil, natural resources, flora, fauna, people and their inter relationships.

## Types

- Natural environment
- Man-made environment
- Social environment

Janpada means the whole people gets sick and destroys the whole area, the disease spreads in the form of an epidemic known as "Janpadodhvasa Rogas". This has been described by Acharya Charak in Vimana Sthan chapter 3 where Vayu (Air), Desha (Earth), Kala (Season) and Jala (Water) are all affected, Acharya Charaka also describes the symptoms of Samanya Vayu (Normal Air), Vikrutvayu (Polluted Air) and Vishdushit Vayu (Toxic Air). Poorvarupa (Early Signs) of Janpadodhvasa are abnormal conditions of stars, planets, moons, sun, air, fire and environment that disturb the seasons.<sup>[1]</sup> According to the contemporary view point, we can see that the above four components become contaminated by pollution, which also destroys communities (Epidemics). Regular exposure to numerous pollutants causes pathogenic illnesses including allergic skin disorders, asthma, hair loss, oligospermia, cardiac issues, neurological disorders, etc. to develop in our bodies, which simulate the effects of Dushivisha. <sup>[2]</sup> Dushivisha is a poison, whether it be animal, vegetable, or chemical in nature, that is partially inherent in the body and is weakened by anti-poisonous medicines such as the sun, fire, and wind, which have less attributes or less effectiveness than all ten of Visha's properties. Due to the physical Kapha's coverage, Dushivisha stays in the system for a long time.<sup>[3]</sup>

## Aims and Objectives-

To review the concept of environment toxicity and its management as per Ayurvedic Literature.

## MATERIALS AND METHODS –

Review of Ayurvedic Literature and their corresponding commentaries have undergone in-depth. Peer-reviewed medical publications and textbooks of contemporary medical sciences have also been cited as sources for this topic.

## Types of Toxins-

- Metals, healing drugs, commercial chemicals, pollutants, pesticides, fuels, herbicides and (exogenous) drugs abused.
- Bacterial toxins, parasitic products, bile, hormones (endogenous)
- Substances that accumulate in the body produce toxicity, even accumulated nutrients and drugs can be toxic (dose-dependent toxicity)
- Toxins cause a number of disorders and are also predisposing factors or constitutive causes of most diseases.
- Environmental toxins are carcinogenic chemicals and endocrine disruptors, man-made or natural, that can harm our health by disrupting sensitive biological systems.

**Environmental Toxicity** -Toxicity refers to the potential of a substance to cause adverse or harmful effects on an organism. Toxic substances refer to substances that can adversely affect biological systems, seriously damage their structures or functions, and even lead to death. Environmental toxicology is a multidisciplinary scientific field that studies the harmful effects of various chemical, biological and physical factors on living organisms. There are many sources of environmental toxicity that contribute to many diseases. The presence of toxins in our food, water and air Pollutants are a major source of environmental toxicity.

**Types & Causes of Pollution Air Pollution-** This is the best known and most dangerous form of pollution. It happens for many reasons. Excessive burning of fuel, driving and other industrial activities release large amounts of chemicals into the atmosphere every day. By this they pollute the air in large extent. Smoke from chimneys, factories, vehicles, or wood burning is essentially the result of coal burning. This releases sulfur dioxide into the air, making it toxic. The effects of air pollution are also evident. The release of sulfur dioxide and toxic gases into the atmosphere causes global warming and acid rain. As a result, the world is experiencing rising temperatures, extreme rainfall, and drought. It becomes difficult to live

### **Prevention and control of air pollution<sup>[4]</sup>**

The following procedures for the prevention and control of air pollution were recommended by WHO

- A) Containment - Prevent the release of toxic substances into the surrounding air. B) Replacement - Replacing technological processes that cause air pollution with new processes that do not affect the air. C) Dilution – Install “greenbelts” between industrial and residential areas to dilute condensed air. D) Legislation - Air pollution is controlled by appropriate legislation in many countries. E) International Action - To tackle air pollution around the world, WHO has established an international network of laboratories that monitor and study air pollution.

**Ayurvedic view** - During ancient times, atmosphere poisoning was being done as a military operation to harm the enemy by fumigation of toxic substances. Vikrita Vayu Lakshana<sup>[5]</sup> – Air of this type should be known as causing illness such as – not following the season, excessively moist, speedy, harsh, cold, hot, rough, blocking, terribly sounds; excessively clashing with each other and affected with an unsuitable smell, vapor, gravels, dust, and smoke.

**Characteristics & Effects of polluted air<sup>[6]</sup>** – When bird's are dropping from the sky in a tired condition, it indicates that the wind and the smoke (of the atmosphere) is poisoned. It is further attended with an attack of cough, nasal discharge, headache, and of severe eye diseases among persons inhaling the same wind and smoke.

Purification of polluted air<sup>[7]</sup> – In the case of poisoned air, the atmosphere should be purified by burning herbal drugs like Laksha, Haridra, Ativisha, Abhaya, Musta, Harenuka, Ella, Tamalapatra, Vakra, Kustha, Priyangu in the open ground. The fumes of these drugs would purify the poisonous air.

Acharya charaka has mentioned some fuming process that detoxifies the environment, in Chikitsa sthan 23rd chapter<sup>[8]</sup>

- Powder of Yellow Mustard (*Brassica campestris* L.) and Chandana (*Santalum album* L.) + Ghrita (Clarified butter)
- Combination of Tagar (*Valeriana wallichii* DC.), Kusthha (*Saussurea lappa* C.B. Clarke), flower of Shirisha (*Albizia lebeck* Benth.)
- Combination of equal quantity of Laksha (Shellac), Usheer (*Vetiveria zizanioidis* L.), Tejpatra (*Cinnamomum tamala* Buch.-Ham. T.Nees), Guggula (*Commiphora mukul* Hook ex Stocks), Bhallatak (*Semicarpus anacardium* L.), flower of Arjuna (*Terminalia arjuna* Roxb.), Raal (Extract of *Shorea robusta* Gaertn.), White Aparajita (*Clitoria ternatea* L.)

### **Water Pollution-**

Water pollution wreaks havoc on all surviving species on Earth. Almost 60% of species live in water. It occurs due to several factors. Industrial waste dumped into rivers and other water bodies upsets the water balance, leading to severe pollution and death to aquatic life. Spraying insecticides, DDT, and other insecticides on plants also pollutes ground water systems, and oil spilled into the sea causes irreversible damage to water bodies.



Eutrophication is also a major cause. It is caused by everyday activities such as washing clothes and dishes near lakes, ponds and rivers. This allows the detergent to dissolve in the water, preventing sunlight from entering and reducing oxygen, making it unlivable. Water pollution not only harms aquatic life, it pollutes the entire food chain and seriously affects the people who depend on it. In addition, water-borne diseases such as cholera and diarrhea are increasing in various places.

**Purification of water on a large scale** A) Storage – Water is drawn out from the source and impounded in natural or artificial reservoirs. When water is stored, it helps provides a reserve of water from which further pollution can be avoided. B) Filtration – Filtration is a second stage in the purification of water, and quite an important stage because 98-99% of the bacteria are removed by filtration, apart from other impurities, e.g. „biological or slow sand“ filters, „rapid sand or mechanical“ filters. C) Disinfection – For a chemical or an agent to be potentially useful as a disinfectant in water supplies. Ayurvedic view Pratinam prana’ – Water is the life of all living beings.<sup>[9]</sup> Causes of water pollution – Drinking water will be contaminated by decomposed dead bodies of aquatic animals (like an insect, snake, etc.), decomposed aquatic plant, unexposed to the sun, moon, air, micro-organism, mixed with rainwater.<sup>[10]</sup> Vikrita Jala Lakshana – Water should be known as devoid of merits when it is excessively deranged in the six categories namely as Sparsha (touch), Roopa (sight/color), Rasa (taste), Gandha (odor), Veerya (potency), Vipaka (chemical transformation).<sup>[11]</sup>

**Characteristics & Effects of polluted water**<sup>[12]</sup> A sheet of poisoned water becomes slimy, strong-smelling, frothy, and marked with (black-colored) lines on the surface. Frogs and fish living in the water die without any apparent cause. In Birds and beasts that live in the water and on its shores, roaming about wildly in confusion can be seen as the effects of poison, and if a man, a horse or an elephant bathe in this poisoned water, they may suffer from vomiting, fainting, fever, a burning sensation and swelling of the limbs.

**Diseases due to ingestion of contaminated water** – Excessive thirst (Trishna), flatulence (Adhmana), abdominal disease (Udarvyadhi), fever (Jwara), cough (Kasa), loss of appetite (Kshudhamandhya), Goiter (Granthi), heaviness (Angagaurav), abdominal pain (Udarshool), constipation (Kosthabaddhata), edema (Shotha), anemia (Pandu), indigestion (Ajeerna), asthma (Shwasa) & rhinitis (Pratishaya), and Diseases due to contact of contaminated water – Contact of contaminated water using a bath or any other ways causes skin disorder (Kustha), itching (Kandu) & conjunctivitis (Netrabhishyanda).<sup>[13,14]</sup>

**Purification of polluted water** – To purify the poisoned water, drugs like Dhava (dhaya), Ashwakarna, Asana, Paribhadra, Patala, Siddhaka (Nigundi), Mokshaka (Makha), Amalatas, Somavalka should be collected and burnt. The cold ashes should be then cast into the poisoned water, it will make the water pure (nonpoisonous) or a handful (1 Anjali = 160 gm) of this ash should be put into the pot containing drinking water to be used when needed.<sup>[15]</sup>

In Ayurvedic classics, there have been discussed some tools which can make Kalushita Jala (defected water) acceptable. They are as follow.<sup>[16,17]</sup>

- A) Impregnation of Kataka (Strychnos Potatorum L.), Gomeda (Hessonite), Bisagranthi (Root of Lotus), Shaivala moola (Root of Algae), Vastra (Cloth), Mukta (Pearl) and Mani (Potash alum). B) Heated by fire, exposure to sunlight, or by immersing red hot iron balls into it. C) It should be made clear by putting Parnimula (a kind of grass that has the property of diluting the water) and knots (tubers) of lotus plants into the water. D) Bad smell being removed by putting the flowers of Naga (Mesua ferrea L.), Champaka (Michelia chmpaca L.), Utpala (Nymphaea sellata Willd.), Patala (Stereospermum suaveolens DC.), Karvira (Nerium indicum Mill.) and such other perfuming herbs into the water. E) Water should be drunk perfumed in a golden, silver, copper, or an earthen goblet, or in a bowl made of bell metal or precious stones. Water stored in copper containers overnight and consumed the next day is believed to impart „health benefits“. According to the Ayurveda classics, copper produces a scrapping effect (Lekhana), heals and nourishes when administered in a small dose. F) Chandrakanta mani (moonstone) – When exudates in water it removes harmful bacteria, insects, worms, and poison. G) Hanshodaka<sup>[18]</sup> In Sharada ritu (autumn season) water which is exposed to sun rays during the day time and to the moon's rays at night is

the „best“ quality water. It is Rasayana (rejuvenating), Balya (strength promoting), Medhya (intellect promoting), alleviates three doshas, anabhishtyandi (which does not obstruct channels of circulation).

**Soil Pollution-** Soil pollution occurs when unwanted chemicals are absorbed into the soil through human activities. Nitrogen compounds are absorbed through the use of pesticides and pesticides making it unsuitable for plants to obtain nutrients. Industrial waste emissions, mining and deforestation are also depleting the soil. As plants cannot grow properly, they cannot hold the soil, leading to soil erosion.

**Ayurvedic view** -Vikrita Bhumi/Desha lakshan<sup>[19]</sup> The desha (bhumi) of the following description is to be known as unwholesome; having color, odor, taste, and touch that are unnatural; excessively damp; abounding in serpents, beasts of prey, mosquitoes, locusts, flies, mice, owls, birds and animals such as the jackal and abounding in woods of weeds and Ulupa grass; abounding in creepers where crops have either fallen, withered or been destroyed in an unprecedented manner; where the winds are smoky; where the sound of birds is unceasing; where the baying of dogs always assails the ears; where herds of animals and flocks of birds of various kinds are always in a state of alarm and pain.

### Characteristics & Effects of polluted ground<sup>[20]</sup> –

A poisoned ground or stone slab, landing stage, or desert country gives rise to swellings in those parts of the bodies of men, bullocks, horses, asses, camels, and elephants that may chance to come in contact with them. In such cases, a burning sensation is felt in the affected parts, and hair and nails (of these parts) fall off.

**Purification<sup>[21]</sup>** The poisoned surface should be purified by sprinkling it over with a solution of drugs like Ananta (Sariva), Sarva-Gandha along with wine (Suraa) or with (an adequate quantity of) black clay dissolved in the water or sprinkling with a decoction of drugs with Vidanga, Pathaa, Katabhi. Noise Pollution Noise pollution occurs when unpleasant noise affects our ears, leading to psychological problems such as stress, high blood pressure, and hearing impairment. They are caused by industrial machinery, loud music, etc. Radioactive Pollution Radioactive contamination is very dangerous when it occurs. It can be caused by malfunctioning nuclear power plants, improper disposal of nuclear waste, accidents, etc. It causes cancer, infertility and blindness at birth. It can sterilize soil and affect air and water.

**Effects of Pollution** A) Degradation: The environment is the first sufferer of increasing weather pollution of air or water. The increased amount of CO<sub>2</sub> in atmosphere creates smog that can block sunlight from reaching earth. This interferes with the process of photosynthesis in plants. Gases such as sulfur dioxide and nitrogen oxides can cause acid rain. Water pollution in the form of oil spills can kill several species of wildlife. B) Human Health: Poor air quality causes several respiratory problems, such as asthma and lung cancer, chest pain, constipation, sore throat, cardiovascular disease, and respiratory disease are some of the ailments air pollution can cause. Water pollution is caused by contamination of water and can cause skin problems such as skin irritation and rashes. Noise pollution can also lead to hearing loss, stress and sleep disturbance. C) Global Warming: Emissions of greenhouse gases, especially CO<sub>2</sub>, contribute to global warming. Every other day, new industries are established, new cars knock the streets, and trees are cut down to make way for new homes. All of them directly or indirectly lead to an increase in CO<sub>2</sub> emissions in the environment. Rising CO<sub>2</sub> is causing melting polar ice caps, raising sea levels and threatening people living near coasts. D) Depletion of the ozone layer: The ozone layer is a thin protective shield high in the sky that prevents ultraviolet rays from reaching the earth. As a result of human activity, chemicals such as chlorofluorocarbons (CFCs) are released into the atmosphere, contributing to the depletion of the ozone layer. E) Barren land: The constant use of pesticides and pesticides can make the soil barren. Plants may not grow well. Various chemicals made from industrial waste are released into running water and also affect quality of life

**Sign and Symptoms-** Environmental toxins can cause harm by creating inflammation, causing oxidative stress, interfering with our hormones and thyroid function, causing mitochondrial dysfunction, blocking our absorption of essential minerals, and disrupting our balance of gut bacteria, among other effects. Because of these varied mechanisms of harm, environmental toxicity can cause a wide array of different symptoms, and often mimics

other illnesses including fibromyalgia and Chronic Fatigue Syndrome. Toxicity from chronic, low-grade toxicity is much harder to identify than cases of acute toxicity or poisoning in which symptoms are more extreme and come on very quickly following exposure.

**Treatment According to Acharya Charaka** <sup>[22]</sup> -management of Janpadodhwansa includes Panchkarma therapy, which Anuvasanam, and Nasya-Errhines. After that, it is advised to apply Rasayan (Rejuvenative therapy/ Immuno-modulator) measures and manage the pharmaceuticals gathered in a typical setting. Sadvritta & Aachar Rasayan (Good Behavioural Activity and Personal Hygiene) are also beneficial for minimising the impact of Adharma, which is the primary cause of Janpadodhwansa. Adharma is defined as not following to the principles & regulations stated by ancestors.

## DISCUSSION-

Our Acharyas details treatments for conditions and ailments associated with Dushi visha and Janpadodhwansa, which have proven to be very effective for problems related to environmental pollution. Agatantra is one of the most important branches of Ayurveda, dealing with various types of toxicities and their treatments, and eco toxicology basically falls into this branch. Various studies have shown that some of these Ayurvedic methods may detoxify the environment from various pollutants. There are many Vishaghana dhryvas mentioned in Ayurvedic literature that has proven their efficacy in eradicating various kinds of toxins by virtue of there pharmacodynamics. Alots of reference regarding the Bhumi Shodana, Jala Shodna, Vayu Shodana proves the effectiveness of different kinds of Aushdi Yogas in environmental toxicity.

## CONCLUSION-

In Charak Samhita under the title “Janpadodwamsa”, the great seer mentioned the cause of unhealthy environment is the Adharma of rulers and residents of that particular area which leads to the impairment of the ecosystem and its components. Modern progress is gradually destroying ecosystems in the form of pollution, it is the most serious problem for all countries in the world. If we don't take it seriously, the current scenario will become even more terrifying in the future. Various studies have shown that some of these Ayurveda methods have the potential to detoxify the environment from various pollutants More research is needed to prove the effectiveness of these Ayurveda methods to detoxify the body and the environment. Experimental studies can be conducted to prove the effectiveness of these valuable Ayurvedic methods in detoxifying the body and environment without harming other vital factors.

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