

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.

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 of Environment

- 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 "*Janpadodhvansa 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 *Janpadodhvansa* are abnormal conditions of stars, planets, moons, sun, air, fire and environment that disturb the seasons.^[1]

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*.^[2]

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.^[3]

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^[4]

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

- Containment - Prevent the release of toxic substances into the surrounding air.
- Replacement - Replacing technological processes that cause air pollution with new processes that do not affect the air.
- Dilution - Install "greenbelts" between industrial and residential areas to dilute condensed air.
- Legislation - Air pollution is controlled by appropriate legislation in many countries.
- 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^[5]- 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^[6]- 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^[7]- 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.^[8]

- 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 lebbek* 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

Praninam prana’ – Water is the life of all living beings.^[9]

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.^[10]

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).^[11]

Characteristics & Effects of polluted water^[12] 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*).^[13,14]

✓ **Purification of polluted water** – To purify the poisoned water, drugs like *Dhava* (*dhava*), *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 (non-poisonous) or a handful (1 *Anjali* = 160 gm) of this ash should be put into the pot containing drinking water to be used when needed.^[15]

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

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*^[18] 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^[19] 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^[20] 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^[21] 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 CO₂ 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 CO₂, 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 his CO₂ emissions in the environment. Rising CO₂ 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*,^[22] management of *Janpadodhwansha* includes *Panchkarma* therapy, which

includes *Vamana-Emesis*, *Virechana- Purgation*, *Niruha*, *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 *Janpadodhvansa*. *Adharma* is defined as not following to the principles & regulations stated by ancestors (Imbalance of ecosystem).

Treatment of *Dushi Visha* (Cumulative toxicity)^[23]

According to the *Dosha* predominance, *Swedana Karma*

Ingredients of *Dushivishari Agada*.

S. NO.	Ayurvedic Name	Botanical Name	Part Used
1	<i>Pippali</i>	<i>Piper longum</i> Linn.	Phala (Fruit)
2	<i>Pippalimula</i>	<i>Piper longum</i> Linn	Moola (root)
3	<i>Jatamamsi</i>	<i>Nardostachys jatamamsi</i> DC	Mula (Root)
4	<i>Dhyamaka</i>	<i>Cymbopogon martinii</i> (Roxb.) Wats.	Patra (Leaves)
5	<i>Lodhra</i>	<i>Symplocos racemosa</i> Roxb.	Twak (Stem Bark)
6	<i>Ela</i>	<i>Elettaria cardamomum</i> Maton.	Phala (Fruit)
7	<i>Suvarchika</i>	<i>Tribulus terrestris</i> Linn.	Phala (Fruit), Mula (Root)
8	<i>Katunnatum</i>	<i>Oroxylum indicum</i> (Linn) Benth.	Mulatwak (Root bark)
9	<i>Natam</i>	<i>Valeriana wallichii</i> D.C.	Mula (Root)
10	<i>Kusta</i>	<i>Saussurea lappa</i> C.B. Clarke.	Mula (Root)
11	<i>Yastimadhu</i>	<i>Glycyrrhiza glabra</i> Linn.	Mula (Root)
12	<i>Rakhtachandana</i>	<i>Pterocarpus santalinus</i> Linn. f.	Khandasara (Heartwood)
13	<i>Gairika</i>	Red ochre	

Recent study

Air Pollution

1. Medicinal smoke reduces airborne bacteria^[24]

➤ This study shows the impact and ethnopharmacological aspects of medicinal smoke on aerial bacteria in an indoor environment. Smoke was originated by burning wood and a complex mixture of odoriferous and medicinal herbs (*havan* material) like *Aegle marmelos* (L.), *Cedrus deodara* (Roxb. Ex D. Don), etc. The obtained results show a 94% reduction on bacterial counts by 60 min and the effective time was up to 24 h in the closed room.

2. *Agnihotra* – A non-conventional solution to Air pollution^[25]

➤ Under the natural lab conditions and local artificial indoor pollution obtained results show a noticeable reduction in SO₂ & NO₂ concentration by almost 51%, 60% respectively more by *Yagya* when was compared without *Yagya*. In this study materials used for *Yagya* (fire rituals) such as cow's ghee (clarified butter), Pipal wood (*Ficus religiosa* L.), *Guggula* (*Commiphora mukul* Hook. ex stocks), etc.

3. Preparation and evaluation of Herbal *Dhoop* for cleansing the air^[26]

➤ This study promotes the use of the natural herbal product for room purifiers and air freshener instead of

should be used as the foremost line of treatment for anyone suffering from *Dushivisha*, followed by *Vaman & Virechana Karma*. The sick person should take anti-toxic medications (*Agadapaan*) such as *Dushivishari Agada* mix with honey everyday after body purification (*Shodhan*). *Raktamokshana* should be done (blood-letting) if *Dushivisha* is present in the *Rakta Dhatu* (blood), according to *Acharya Charaka*.

Dushivishari Agada is a compound Herbo-mineral preparation which is explained in the context of *Dushivisha*.

using chemical sources and the harmful UV rays. The obtained results show that the growth of the most aerial micro-organism was inhibited. Microbiological evaluation of the cleansing activity of *dhoop* was conducted with Nutrient and Sabouraud Agar plates (in duplicates) which exposed to garbage area, the kitchen of the restaurant, washroom, and hospital laboratory for 10 mins. Herbal *dhoop* was prepared by using cow dung, cow ghee, cow milk, Camphor (*Cinnamomum camphora* (L.) J.Persl.), *Guggul* (*Commiphora mukul* Hook. ex stocks), *Dhoop* (*Boswellia serrata* Triana & Planch.), *Kapurkachri* (*Hedychium spicatum* Sm. In A.Rees) and *Anantmula* (*Hemidesmus indicus* (L.) R.Br.).

Water Pollution

2. Study on the Antibacterial activity of selected Natural Herbs and its application in Water Treatment^[27]

➤ This study emphasizes the uses of medicinal plants for purification of water. The authors attempted to find the antibacterial properties of selected herbs such as *Ocimum sanctum* Linn. (Krishna Tulsi), *Ocimum kilimandscharium* Guerke. (Karpooora Tulsi), *Azadirachta indica* A.Juss. (Neem), *Saraca indica* Linn. (Ashoka tree) etc. against different bacteria such as total coliforms, fecal coliforms, *Escherichia coli*, etc., determined by spread plate method, Kirby-Bauer disc diffusion method, most probable number (MPN) method and Petrifilm method. The obtained result shows

Ocimum sanctum has the most efficient anti-bacterial activity in all herbs.

3. Experimental study of *Shushrutokta Jalaprasadana vidhi* wsr to *Gomeda*^[28]

> The objective of this study was to discover the possibility of *Jalaprasadana vidhi* with help of *Gomeda* (Hessonite). Containers used for water in this study were made up of glass and earthen vessels. Values were observed by applying the ANOVA test and Unpaired 't' test and the obtained results show a very significant effect of *Gomeda* on water impurities. In this experiment, 1 carat of *Gomeda* was used against 1 liter of water. One carat is approximately equal to 200

5. Effect of soaking of *Phyllanthus emblica* wood in drinking-water for purification^[29]

> 1.5 L of water was taken in two different containers one and was controlling the other was a testing container. *Phyllanthus emblica* Linn. wood pieces (75gm) were soaked in test containers for 48 hrs. Samples were filtered and investigated for physical properties, elements, and levels of organisms. pH, total hardness, sulphate, and magnesium levels were decreased and the level of *Escherichia coli*, total coliforms, and fecal coliforms was reduced in test containers.

Land Pollution

1. Reclamation of tannery polluted soil through Phytoremediation^[30]

> Phytoremediation is a new technology that employs plants for reclamation of the contaminated soil strewn with heavy metals (metalloids) and toxic compounds. This study was explored the impact of the application of tannery sludge on biochemical properties of 6 months old tree saplings of *Azadirachta indica* A. Juss. (Neem), *Melia azedarach* Linn. (Wild neem) and *Leucaena leucocephala* (Lam) de wit (Subabool). The Control Plants was raised over the garden soil and Tested Plants was raised over the tannery sludge for phytoremediation. The result showed significant uptake and transport of chromium in all three tree species, so these plants could be employed in phytoremediation of soils contaminated with heavy metals.

2. Extraction of cadmium and tolerance of three annual cut flowers on Cd-contaminated soils^[31]

> The main objective of this study was to find out the production potential and Cd removal by three flower crops namely marigold (*Tagetes erecta* L.), chrysanthemum (*Chrysanthemum indicum* L.), and gladiolus (*Gladiolus grandiflorus* L.), an experiment was conducted on differentially contaminated soils. The obtained results show Cd removal was the maximum with chrysanthemum and gladiolus with the highest tolerance and Cd-content in the saleable part holds the potential to clean up the moderately contaminated soils.

DISCUSSION

Our *Acharyas* details treatments for conditions and ailments associated with *Dushi visha* and *Janpadopdhvansa*, 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 their pharmacodynamics. Lots 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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