



# ROLE OF AGADTANTRA IN AIR POLLUTION W.S.R TO JANAPADODHVAMSA DOOSHIVISHA – A REVIEW

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## ABSTRACT –

*Ayurveda* is holistic science; it helps to promote and preserve the well-being of a healthy individual and also delivered the numerous treatments for the diseases. Environmental pollution is the major problem in the current conditions. It consists of mainly air, water and soil pollution. Environmental toxicant induces respiratory disorders has been increased each day progressively in all over world including India. The toxicant emitted from air pollution has been affected to human being and causes health hazards. This problem of pollution should be taken very seriously, as it harms the natural elements of earth such as air, water, etc which are responsible for life on earth. The human being and plants could not be survived. *Ayurvedic toxicology (AgadTantra)* is a special 6<sup>th</sup> branch of *Ashtanga Ayurveda* which deals with the poison i.e. its identification, types of poison from plant, mineral and animals as well as artificial poison and its treatment. The concept of environmental pollution had been described in the various text and classical books. In *Ayurveda Acharyas* had summarily narrate the environmental health in *Dincharya*, *Rutucharya*, *Dooshivisha* and *Janpadodhvansa*. The review article is a principal approach to find out the remedy for upcoming environmental pollution through ancient & *ayurvedic science*.

Keywords: *Ayurveda*; Environmental pollution; *Agadtantra*; *Janpadodhvansa* , *Dooshivisha*

## 1. Introduction

The term environment widely includes all the peripheral factors such as living, non- living, material, and non-material which are encircled to the man. Three components i.e. physical, biological, and social are composed to form Environment.

- Physical: Air, Soil, Water, Housing waste, radiation etc.
- Biologic: Plant and animal life including viruses, insects, bacteria, rodents & animals.
- Social: Culture, habits, religion, income, occupation, etc.

The key to healthy life of man lies in the environment. Environmental Pollution refers to any addition of unwanted material in the environment due to human activities that lead to undesirable changes in the environment and ecology.<sup>1</sup> Pollutants can be chemicals, biological materials, or physical things that get added into the environment by accident that are directly or indirectly harmful to people and other living things. The universal problem of pollution in the environment leads to the physical and biological impact that vary according to their intensity.

Large quantity of people is called as *Janpada* and when this abundance people get impacted with diseased and destroy the whole area and it spread like an pandemics is called as "*Janpadodhvansa Rogas*". *Acharya Charaka* has been elaborate it in *Vimana Sthan*,<sup>3<sup>rd</sup></sup> chapter in which the explanation of *Vayu* (Air), *Desha* (Land), *Kala* (Season), and *Jala* (water) all are effected. *Acharya Charaka* has also described symptoms of *Samanya Vayu* (Normal air), *Vikrut Vayu* (Polluted

air) and *Vishdushit Vayu* (Poisoned Air). *Poorvarupa* (early science of *Janpadodhvansa*) are normal condition of stars, planets, moon, sun, air, fire and the environment which disorder the seasons<sup>2</sup>.

According to contemporary science, we get to know that above four factors gets degraded due to pollution and leads to epidemics continuous exposure to this factor leads to various disorders and complication. Their component get stored in the body and when favorable factors occurs it stimulate the constituent and forms various complication in the body<sup>3</sup>.

## 2. Air Pollution and its Ayurvedic Perspective -

As per WHO, Air Pollution is contamination of the indoor or outdoor environment by any chemical, physical or biological agent that modifies the natural characteristics of the atmosphere. According to WHO data, 99 percent of the world's population breathes air that contains high levels of pollutants and exceeds WHO guideline limits, with low and middle-income countries experiencing the highest exposures.<sup>4</sup> Air is the constituent on which all forms of life depends. Human beings, animals, and plants requires continuous supply of air to exist. In today's era, air pollution generates on main discussion in humanity . It is not bounded or recognized by geographical or political boundaries<sup>5</sup>. Air pollution act like as a silent killer as it is present all around us, and it preys to both young and old, To counteract, hygiene is most important, not only in terms of health but also in production performance and in terms of food safety<sup>6</sup>.

### 2.1. Causes of Air Pollution <sup>7</sup> -

- Industrial emissions, household emissions , motor vehicles emissions, forest fires etc are some common sources of air pollution.
- Pollutants of major public health concern include Particulate Matter, Carbon Monoxide, Ozone, Nitrogen Dioxide, and Sulphur Dioxide.
- Indoor air Pollution: Stove, aerosol sprays, solvents tobacco smoke, resin products building material and insecticide sprays etc
- Industries: Through the chimney large amounts of pollutants is emitted into the atmosphere. Combustion of fuel to generate heat and power produces smoke, sulphur dioxide, nitrogen oxides, and fly ash.
- Domestic Sources: Usage of coal, wood, or oil smoke, dust, sulphur dioxide, and nitrogen oxide are gotten.
- Automobiles: Major factor is motor vehicles. These vehicles emit hydrocarbons, carbon monoxide, lead, nitrogen oxides, and particulate matter.
- Miscellaneous: These comprise burning refuse, incinerators, pesticide, spraying, natural sources (e.g. wind borne dust, fungi, bacteria), and nuclear energy programs.

Exposure of various pollutants daily in continue manner , accumulate in our body and produce manifestations like allergic skin disorders, asthma, hair loss, oligospermia, cardiac problems, neurological disorders, etc. which replicate with complications of *Dushivisha*<sup>8</sup>.

*Dushivisha* is a poison whether animal, vegetable, or chemical, not fully discredited from the body system and partially inherent therein, effectiveness by anti-poisonous remedies, the sun, the fire, and the wind, which is having fewer properties or lesser potency of all the ten properties of *Visha*. Due to the coverage of bodily *Kapha*, *Dushivisha* retains in the system for some years<sup>9</sup>.

### 2.2. Poorvarupa and Lakshana of Dushivisha –

<p>Early signs of <i>Dushivisha</i><sup>10</sup></p> <p>Excessive sleep, heaviness, yawning, laxity of joints, morpilation &amp; body ache</p>	<p>Symptoms of <i>Dushivisha</i><sup>11,12</sup></p> <p>Stiffness of stool (Diarrhoea), discolored complexion, fetor in the body, bad taste in the mouth, thirst, epileptic fits, vomiting, lassitude, confused speech, and all the symptoms of <i>Udyodara</i> (Ascites), the patient becomes rapidly atrophied and looks like a wingless bird. Its action on the body becomes aggravated on a cloudy day and by exposure to cold and wind. In <i>Charaka Samhita</i>, <i>Dooshivisha</i> vitiating <i>Rakta dhatu</i> causes skin lesions such as <i>Arunshika</i> (Eczema) <i>Vitibha</i> (Psoriasis) and <i>kotha</i> (Urticaria) symptoms and vitiates the <i>doshas</i> one by one and at last cause death.</p>
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**2.3 Health Implication** – The health effects of air pollution are both immediate and delayed. Major air pollutants and their adverse effects are mentioned as below.<sup>13</sup>

Major air pollutants and adverse effect	
Pollutant	adverse effect
Oxides of nitrogen -	Respiratory tract irritation, bronchial hyperactivity, impaired lung defences
Hydrocarbons -	Lung cancer
Ozone discomfort -	Cough, substernal broncho-constriction, decreased exercise performance, respiratory tract irritation
Sulphur dioxide -	Exacerbation of asthma and COPD, respiratory tract irritation, death may occur in severe exposure
Lead -	Impaired neuropsychological development in child
CO -	CO poisoning cherry lips, unconsciousness, death by asphyxiation

#### 2.4 Prevention and control of air pollution<sup>14</sup>

WHO had recommended the following methods for the avoidance and regulation of air pollution are as follows –

1. Containment – Prevention of evade of toxic substances into the open air.
2. Replacement – Replace a technical process which causing air pollution, by a new method that doesn't distress the natural component of air.
3. Dilution – Formations of 'green belts' between the industrial and residential zones for diluting the condense air.
4. Legislation – Air pollution is controlled in many countries by appropriate legislation, e.g. Clean Air Acts.
5. International action – To deals with air pollution on a global scale, the WHO has established an international network of laboratories for the monitoring and study of air pollution.

#### 2.5 Ayurvedic view -

In *ayurvedic* text, during ancient time to harm or kill someone atmosphere poisoning was been done as fighting operation to harm the opponent during war by fumigation of noxious substances.

- *Vikrita Vayu Lakshana*<sup>15</sup> – This type of air is responsible for causing illness such as not following the season excessive moist speedy, harsh, cold, hot, blocking, rough, terrible sound, excessively clashing with each other and affected with an unsuitable smell, vapor, gravels, dust and smoke.
- Characteristics & Effects of polluted air<sup>16</sup> – Flying birds in the sky and fall down from the sky to ground in tired condition, it indicates that wind is polluted by the poisonous smoke. In human beings and attack of cough, nasal discharge, headache and Sevier eye disease among person inhaling the same wind and smoke.
- Purification of polluted air<sup>17</sup> – In *ayurvedic* text many drugs are mention which are helpful for the purification of atmospheric air by burning herbal drugs fumes coming out from this drugs helps in purification of poisonous air.

#### 2.6 Drug mentioned for Air purification<sup>18</sup> -

1	<i>Laksha</i>	<i>Shellac</i>
2	<i>Haridra</i>	<i>Curcuma longa</i>
3	<i>Ativisha</i>	<i>Aconitum heterophyllum</i>
4	<i>Abhaya</i>	<i>Terminalia chebula</i>
5	<i>Musta</i>	<i>Cyperus rotundus</i>
6	<i>Harenuka</i>	<i>Vitex negundo</i>
7	<i>Ella</i>	<i>Elettaria cardamomum</i>
8	<i>Tamalapatra</i>	<i>Cinnamomum Tamala</i>

9	Vakra	Valeriana officinalis
10	Kustha	Saussurea lappa
1	Priyangu	Semicarpus macrophylla

Dravya	Rasa	Vipaka	Virya	Guna/ Karma
1. Laksha	Kashaya	Katu	Sheeta (anoshana)	Kaphapittastra-hikka-kasa-jwarpranoot
2. Haridra	Katu -Tikta	Katu	Ushna	Kaphapittanoot
3. Ativisha	Katu -Tikta	Katu	Ushna	Pachini-dipani
4. Abhaya	Pancharasa (Alavana)	Madhura	Ushna	Ruksha-Dipani-Medhya-Chakushya
5. Musta	Katu -Tikta-Kashaya	Katu	Sheeta	Grahi-Dipani-Pachani
6. Harenuka	Katu -Tikta	Katu	Ushna	Laghu, Pittala, Dipani
7. Ella	Katu	Katu	Ushna	Kaphapittastra—kandu-shwasa-trushnapaha
8. Tamalapatra	Katu -Tikta-Madhura	Katu	Ushna	Kinchit-tikshna-picchil-laghu
9. Vakra	Katu -Tikta-Kashaya	Katu	Ushna	Snigdh-swadu-laghu
10. Kustha	Katu-Madhura-Tikta	Katu	Ushna	Shukral-laghu
11. Priyangu	Tikta- Kashaya-Madhura	Katu	Sheeta	Guru-kaphpittajeet

Dravya	Karmuktva
1. Laksha	Vishajanya upadrava(ra.ni)
2. Haridra	Varnya,twakadosha-vranapaha
3. Ativisha	Vishaghna-krimighna
4. Abhaya	Shwas-kasa-vaiswarya-chardi-hikka-kandu
5. Musta	Jwaraghna,trushnashamaka
6. Harenuka	Trut-kandu-visha-dahanut
7. Ella	Hrullas-visha-vami-kasnut
8. Tamalapatra	Ruchikar-pinasanashak
9. Vakra	Visha-apasmar-akshiroga-doshtrayapaha
10. Kustha	Kushtha-visarpa-kasaghna
11. Priyangu	Sangrahi

Acharya Charaka mentioned in Chikitsasthana 23rd , about fuming process that help in purifies the atmosphere <sup>19</sup>.

- Powder of Yellow Mustard (*Brassica campestris*) and Chandana (*Santalum album*) + Ghrita (Clarified butter)
- Combination of Tagar (*Valeriana wallichii*), Kusthha (*Saussurea lappa*), flower of Shirisha (*Albizia lebeck*)
- Combination of equal quantity of Laksha (*Shellac*), Usheer (*Vetiveria zizanioidis*), Tejpatra (*Cinnamomum tamala*), Guggula (*Commiphora mukul*), Bhallatak (*Semicarpus anacardium*), flower of Arjuna (*Terminalia arjuna*), Raal (Extract of *Shorea robusta*), White Aparajita (*Clitoria ternatea*)

### 3. Ayurvedic perspectives towards Air Pollution , Recent Researches -

1. Medicinal smoke reduces airborne bacteria <sup>20</sup>.

This study shows the impression and ethnopharmacological features of medicinal smoke on airborne bacteria in an enclosed environment. Smoke was initiated by fiery wood and a complex combination of odorous and remedial herbs like *Aegle marmelos*, *Cedrus deodara*, etc. The obtained results show a 94% reduction on bacterial counts by 60 min and the effective time was upto 24 hr in the closed room.

## 2. *Agnihotra* – A non-conventional solution to Air pollution <sup>21</sup>.

Under the natural lab situations and local artificial indoor pollution attained outcomes show a visible decrease in SO<sub>2</sub> & NO<sub>2</sub> concentration by almost 51%, 60% respectively more by *Yagya* when was associated without *Yagya*. In this study materials used for fire rituals such as cow's *ghee* (clarified butter), *Pipal* wood (*Ficus religiosa*), *Guggula* (*Commiphora mukul*), etc.

3. In vivo studies on the effect of *Ocimum sanctum*, leaf extract in modifying the genotoxicity induced by chromium and mercury in *Allium* root meristems <sup>22</sup>.

Heavy metals are non-degradable, they gather in the body and also disrupt the food chains and biochemical cycles. The problem of heavy metals in contemporary conditions is global and is associated with contamination of soil and water with infrequent and dispersed elements that have a biocide effect. Hg and Cr are the chief heavy metals that are commonly used in several industries which produce a mutagenic and carcinogenic result. In this study, it was originate that the leaf extract treatment shows highly significant ( $p < 0.001$ ) regaining in mitotic index (MI) and chromosomal aberrations (CA) as equated to pre-treated samples. The lesser doses (5, 10, 20%) were found more effective than higher doses.

## 4. Preparation and estimation of Herbal *Dhoop* for cleansing the air <sup>23</sup>.

This study endorses the usage of the natural herbal product for room purifiers and air freshener instead of using chemical sources and the harmful UV rays. The obtained results show that the growth of the most aerial organism was inhibited. Microbiological evaluation of the cleansing activity of *dhoop* was conducted with Nutrient and Sabouraud Agar plates (in duplicates) mins. Herbal *dhoop* was equipped by using cow dung, cow *ghee*, cow milk, *Camphor* (*Cinnamomum camphora*), *Guggul* (*Commiphora mukul*), *Dhoop* (*Boswellia serrata*), *Kapurkachri* (*Hedychium spicatum*) and *Anantmula* (*Hemidesmus indicus*).

## 5. Study the Impact of Houseplant in the purification of Environment using Wireless Sensor Network <sup>24</sup>.

In this study, it was exposed how household plants help cleanse the environment. The air pollution monitoring system was advanced by using a wireless sensor network (WSN) and confirmed in dissimilar tree cover area and non-tree cover area. The impact of tree cover area/non-tree cover area was co-related with due consideration of CO<sub>2</sub> depletion and O<sub>2</sub> emission concentration. The gained results show that the concentration of CO<sub>2</sub> was decreased due to absorption by plants and O<sub>2</sub> concentration was increased. Plants were used in this study like *Tulsi* (*Ocimum sanctum*), Aloe Vera, Peace Lily, Snake Plant, Orchids, etc.

## 4. Management of *Janpadodhwansa* as per *Charakacharya* - <sup>25</sup>

*Panchkarma* therapy {*Vamana*(Emesis), *Virechana*(Purgation), *Niruha*, *Anuvasanam*, *Nasya*(Errhines)} is the superlative treatment. Subsequently proper use of *Rasayan* (Rejuvenative therapy/Immuno-modulator) measures and managing with the drugs collected in a normal environment is suggested.

*Sadvritta* & *Aachar Rasayan* (Good behavioural activity and personal cleanness) is also supportive for reducing the result of *Adharma* (i.e. not following the instructions & regulations said by ancestors) which is the main cause of *Janpadodhwansa* (Imbalance of ecosystem).

## 5. Treatment of *Dushivisha* (Cumulative toxicity)<sup>26</sup>

*Dooshivisha* is a condition where toxins stays in body for long period of timewithout producing any symptoms. In present, Modernised world diseases due to cumulative toxicity are increasing due to constant exposure to radiations, chemicals, preservatives, etc these are producing pathogenic conditions like allergic skin disorders, Asthama, hairloss, Oligospermia, Cardiac problems which stimulate with complications of *dooshivisha*. Due to hazardeous effects of air pollution, many allergic conditions may happens. In modern, Mast cells are major effectors cell in pathology of allergy and its much more similar to concept of *Dooshivisha*.

*Sushrutacharya* has defined that, if a person suffering from *Dushivisha* then the first line of treatment should be *Swedana* Karma followed by *Vaman* & *Virechana* Karma as per dosha predominance. After cleansing (*Shodhan*) of the body, the anti-toxic drugs (*Agadapaan*) like *Dushivishari Agada* mix with *madhu* should be consumed daily by the affected person. It is choice for many *ayurvedic vaidyas* for management of diseases caused due to *Janpadodhvansa*. It contains ingredients like *Pippali*, *Dhyamaka*, *Jatamansi*, *Lodhra*, *Ela*, *Suvarchika*, *Kanakgairika* etc<sup>27</sup>.

These Ingredients are proved to have anti-inflammatory, immunomodulatory activities, Beneficial in allergic condition. Undoubtedly exhibits its antimicrobial, antifungal, antitoxiant potential. Majority ingredients mainly have *kaphahara* & *Vishaghna* (Anti-poisonous) properties & *Kushtanghna* (skin diseases alleviator), *Raktashodhaka* (blood purification). This exhibit their action & cure *dooshivishajanya vikara*.

*Charakacharya* has definitely stated that if *Dushivisha* is present in *Rakta dhatu* (Blood) should be treated with *Raktamokshana* (Bloodletting) by *Shira* (Veins).

## 6. Summary and conclusion -

The atmosphere is the furthest essential factor for a healthy life as well as the socio-economic growth of civilization and the country. Will of comprehensively development in today's time gradually terminates our ecosystem in the form of contaminations, which is the most red-hot problem for all the countries in the world. The present era will be more terrifying in the future if we will not take it seriously. Our *Acharyas* has well defined the treatment of *Dushi visha* and also *Janpadopdhvansa* associated conditions and diseases which can prove to be very effective in the pollution associated difficulties. *Agadtantra* is one of the most substantial branches of *Ayurveda* which deals with different types of toxicity and their management, so primarily, environmental toxicology comes under in it. Numerous researches disclosed that some of these methods of *Ayurveda* have the potential to depollute the environment from several pollutants. To prove the potency of these procedures of *Ayurveda* for detoxifying the body as well as the environment, more research has to be carried out. Experimental researches can be done to demonstrate the effectiveness of these valuable methods of *Ayurveda*, through which they will detoxify the body and environment without triggering any harm to other necessities factors.

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