

# Comparative Study of Air Pollution with Ayurveda and its Management

Dr. Shweta Baswaraj Khanapure<sup>1</sup> and Dr. Manohar Khankhane<sup>2</sup>

MD (Scholar) Department of Agadtantra Avum Vidhivaidyaka<sup>1</sup>

H.O.D. and B.A.M.S. PG Diploma in Agadtantra Avum Vidhivaidyaka<sup>2</sup>

MAM's Sumatibhai Shaha Ayurved Mahavidyalaya, Hadapsar, Pune, India

shweta.khanapure425@gmail.com and khankhanemanohar@rediffmail.com

**Abstract:** *Background* Environmental pollution is increasing day by day and imposing severe and irreversible damage to the world. Air pollution is one of the biggest threats for the environment and affecting humans, animals, crops, cities, forests, aquatic ecosystems.

*Environmental Toxicology* is the science concerned with study of harmful effects of various chemical, biological and physical agents on living organisms. In Ayurveda Charakacharya has briefly described the environmental health in chapter named Janpadodhvansaniyavimanam. Ayurveda has a dedicated branch called Agadtantra which deals with the toxicological aspects of living entities of environment.

**Aims and objectives** We aim to relate and validate this knowledge pertaining to the air pollution.

**Material and method** the references available regarding the air pollution in classical texts were studied and compared with the available information in the contemporary medical literatures. Signs of air pollution given in the text compared and studied with signs of Air pollution.

**Discussion** Ayurveda terms of Vikrut and Prakrut Vayu described in Granthas are found to be relatable with contemporary findings.

**Conclusion** Air pollution described in Ayurveda are very precise and explanatory. Management of air pollution with this ancient science are the new open windows for healthy air breathing for every living organism.

**Keywords:** environmental pollution, air pollution, vikrut and prakrut vayu

## I. INTRODUCTION

Air pollution is a death-defying issue around the world. The quality of air that we breathe directly affects functioning of the respiratory system. The health of susceptible and sensitive individuals can be influenced even at low air pollution. Short-term exposure to air pollutants is closely related to Chronic Obstructive Pulmonary Disease (COPD), cough, shortness of breath, wheezing, asthma, respiratory diseases and high rates of hospitalization. The poisonous gases in the air, combined with the smoke and particulate matter has worsened upto a point that every air we breathe has become poison. Air pollution is due to the release of toxic fumes, gases, smoke and dusts in the atmosphere. To reduce this hazard, proper town planning and zoning should be acquired. The long-term effects associated with the air pollution are chronic asthma, pulmonary insufficiency, cardiovascular diseases and mortality.

In *ayurveda*, the signs of *Vikrut vayu*~ vitiated *vaat* dosh, are being mentioned as *rutuvisham* ~ as those winds which are not according the season, *Ati stimita* ~ Very stagnant, *ati abhishyandi* ~ excessive humid, *ati chala* ~ speedy, *ati ruksha*~ dry, *ati shit* ~ cold, *ati ushna* ~ fiery, *ati bhairvaravam* ~ noisy, *ati kundalinam*~ excessive clashing with each other, *asatmya gandh,bashpa,sikta,panshu,dhumopahat*~ with unsuitable smell, vapours, gravels, dust, and smoke. *Raja dhooma*~ droplets has been mentioned as the causative factor for respiratory illnesses like dyspnoea, cough, and rhinitis<sup>1</sup>

Signs of *prakrut vayu* are being mentioned as *dharanidharana*~ holding earth *jwalano-jwalanam*~ fire ignition, *aadityachandra nakshtragrahananam santangatividhanam*~ proper functioning of sun, moon, constellation, planets, *sushrutischa meghanam*~ cloud production, *apam visarga* ~ raining *pravartanam strotsam* ~ proper river flow,

*pushpafalanam chabhivartnam* ~ flowers fruits production, *vibhago dhatunam* ~ division of seasons, *bijabhisanskar* ~ seed implanting rites.<sup>2</sup>

## II. MATERIALS AND METHODS

About 91% population resides in areas where air quality exceeds World Health Organization (WHO) guidelines.<sup>2</sup> Every year, around 7 million deaths occur in the world due to the air pollution and 1/3rd deaths among them are due to lung cancer, stroke, and heart disease the major sources of air pollution are automobiles, industries, domestic sources, indoor pollutants etc. Urbanization and industrialization have got a significant role in degrading the air quality. The incident of Bhopal gas tragedy in the union carbide India limited pesticide plant in Madhya Pradesh has shown the ferocious effect of air getting polluted.<sup>3</sup>

The different pollutants that affect the air quality are as follows.

Air pollutants	Effects
Hydrocarbons	many serious health issues and even result in lung cancer
Sulphur dioxide	respiratory illnesses like asthma, respiratory tract irritation, chronic obstructive pulmonary disease (COPD) and death
The oxides of nitrogen	respiratory tract irritation, impairs the lung defence mechanisms, and cause bronchial hyperactivity
Lead	impaired neuropsychological development
Carbon monoxide poisoning	cherry lips, asphyxia, unconsciousness, and death.
Depletion of ozone layer	cough, broncho constriction, skin diseases, and respiratory irritation. <sup>4</sup>

In *charaka samhita*, the important environmental threats that can possibly happen has been described in the chapter *janapadhotwamsavimaniyam*. This chapter deals with the demolitions or mis happenings ~ *udhwamsa* with respect to community~ *janapada*. The possible environmental hazards as described in text are *vayu* ~ air, *udaka* ~ water, *desha* ~ land, and *kaala* ~ season which become more dangerous and difficult to manage in the successive order.

Again, resemblance in the origin and results of Air pollution and vitiated Air makes the concept more convincing and authentic. Lord Aatreya has mentioned in treatise that unrighteousness (*Adharma*) initiated by the error of the intellect (*Pradnyaparadha*) is the root cause of all four types of vitiations. There are four root causes are mentioned as -

1. *Adharm* ~ unrighteousness or unjust behaviour

Practical example of unrighteousness, like - it starts when the authorities of country, society and community break Social, Ethical or Government laws, and don't deal righteously with people. This unrighteousness is further carried forward by their officers, underlings, traders and even laymen. Thus righteousness and righteous people disappear from the place and unrighteousness overrules them. As a result, Gods get annoyed; hence either it does not rain sufficiently in time or there is very heavy rainfall. Even winds, land and water reservoirs get affected and the herbs give up their natural properties. Then epidemics break out due to polluted contacts and edibles.<sup>5</sup>

Many industries like chemical plants, steel, fertilizers, sugar and cement manufacturing units emit a large amount of smoke and pollutants like oxides of sulphur and nitrogen, lead particles and chlorofluorocarbons pollute the air. For example, the emissions from the oil refinery at Mathura and the numerous coal-burning Industries at Agra contain sulphur dioxide, which causes acid rain. In addition, many industries produce chemicals, some of which escape into the atmosphere causing air pollution but when norms of industrial waste are not followed properly by officers it creates environmental disturbances like pollution.<sup>1</sup>

2. *Abhishap* ~ curse

due to harmful conduct done by any person which harms community and then curse given by any *sidhapurush*, *rushi* or *guru* cause *janpaddhwas*.<sup>1</sup>

3. *Shashtra astra* ~ weaponry,

now a days in war different types of poisonous and hazardous substances are used to destroy enemies. To make soldiers nerveless, to vanquish them poisonous bombs are used it causes air pollution.<sup>1</sup>

4. *Bhutosang* ~ bacterial germs

It states that bacterial, fungal, viral, protozoal infections can cause air pollution. For instance tuberculosis, measles, staphylococcus infections, influenza are known to be transmitted by air.

Due to greediness man makes efforts to make out as much possible from all the available resources around, without considering the ill-effect or fate of the Earth we live, edging his future generations at stake.<sup>1</sup>

**II. AYURVEDIC MANAGEMENT OF AIR POLLUTION**

Several methods to overcome the ill effects of polluted air has been mentioned in Ayurveda of which *dhoopana* (fumigation) has got an important place..

*Acharya Charaka* has mentioned some fuming process that help in detoxifies the environment.<sup>6</sup>

Powder of Yellow Mustard (*Brassica campestris L.*) and *Chandana* (*Santalum album L.*) + *Ghrta* (Clarifiedbutter)

Combination of *Tagar* (*Valeriana wallichii DC.*), *Kusthha* (*Saussurea lappa C.B. Clarke*), flower of *Shirisha*(*Albizzia lebbeck Benth.*)

Combination of equal quantity of *Laksha* (*Shellac*), *Usheer* (*Vetiveria zizanioidis L.*), *Tejpatra* (*Cinnamomumtamala Buch.-Ham. T.Nees*), *Guggula* (*Commiphora mukul Hook ex Stocks*), *Bhallatak* (*Semicarpus anacardiumL.*), flower of *Arjuna* (*Terminalia arjuna Roxb.*), *Raal* (*Extract of Shorea robusta Gaertn.*), *White Aparajita* (*Clitoria ternatea L*)

Many drugs have been indicated for fumigation which may have an action on fungal, bacterial and other microbial growth.<sup>7</sup> Some of them are -

Name	Scientific Name
Laksha	<i>Shellac</i>
Haridra	<i>Curcuma longa L</i>
Ativisha	<i>Aconitum heterophyllum L</i>
Abhaya	<i>Terminalia chebula Retz</i>
Musta	<i>Cyperus rotundus L</i>
Harenuka	<i>Vitex negundo L.</i>
Ella	<i>Elettaria cardamomum L</i>
Tamalapatra	<i>Cinnamomum Tamala (Buch.- Ham.)T.Nees</i>
Vakra	<i>Valeriana officinalis L</i>
Kustha	<i>Saussurea lappa C.B. Clarke.</i>
Priyangu	<i>Callicarpus macrophylla Vahl</i>

Recent studies on fumigation indicated in Ayurveda -

1. *Aparajitha dhooma choorna* is a formulation indicated for purifying the air.

It contains ingredients -

Name	Scientific name
<i>Agaru</i>	<i>Aquillaria agallocha</i>
<i>Mayoorasikha</i>	<i>Actiniopteris dichotoma</i>
<i>Nimba</i>	<i>Azadiracta indica</i>
<i>Arka</i>	<i>Calotropis gigantea</i>
<i>Devadaru</i>	<i>Cedrus deodara</i>
<i>Vacha</i>	<i>Acorus calamus</i>
<i>Guggulu</i>	<i>Commiphora mukul</i>
<i>Saala</i>	<i>Shorea robusta</i>

2. A study on *aparajitha dhooma* has proven that it has got potential action on microbial growth. Continuous fumigation with *aparajitha dhooma choorna* for 5 days has shown total inhibition of coliforms and reduced fungal growth.<sup>8</sup>

3. Another study on fumigation with *Bilwa* (*Aegle marmelos*) and *Devadaru* (*Cedrus deodara*) has proven that medicinal smoke reduces airborne bacteria. It showed a 94% reduction in bacterial growth in 60 min upto 24 hours in a closed room.<sup>9</sup>
4. In another study on fumigation with cow dung, cow ghee, cow milk, camphor, *guggulu* (*Commiphora mukul*), *anantamula* (*Hemidesmus indicus*), *kapurkachri* (*Hedychium spicatum*) and *sallaki* (*Boswellia serrata*) it was found that growth of most aerial microorganisms was inhibited.<sup>10</sup>
5. Another study on the environmental effect of ornamental and common house plants like *tulsi* (*Ocimum sanctum*), aloe vera, peace lily, devil's ivy, snake plant, and orchids has shown that CO<sub>2</sub> concentration decreased and O<sub>2</sub> conc. increased in tree cover area.<sup>11</sup>
6. In a study on *agnihotra* (fire ritual), which is part of rituals has proven that it is a non-conventional solution to air pollution. Performance of *agnihotra* with cow's ghee, pipal wood (*Ficus religiosa*), and *guggulu* (*Commiphora mukul*) has shown 51% reduction in SO<sub>2</sub> and 60% reduction in NO<sub>10</sub>. Non degradable heavy metals like Hg, Cr are yet another potential threat to ecosystem.<sup>12</sup>

### III. RESULTS

Incorporating Ayurvedic principles into our daily life, we should involve a holistic approach to reduce air pollution. By embracing natural remedies, sustainable practice and mindful living we can protect our environment and create a cleaner, healthier planet for generations to come. Ayurveda serves as a timeless guide, reminding us of our intrinsic connection with nature and urging us to preserve it for sustainable future.

A healthy environment is most important factor to live a healthy life. It's not only important for proper healthy growth of human beings but also socioeconomic group of society and the nation. Our in discriminatory progress in today's era leads to gradual destroy of our eco system in the form of pollution which is the most iconic problem for all the countries in the world. If this burning problem of pollution is not taken seriously than it will create a frightening future. In ancient contemporary science our Acharyas has described the treatment associated with *Janpadopdhavnasa* which proves very effective in pollution associated problems. Various studies shows that some of these methods of *Ayurveda* have the potential to detoxify the environment from various pollutant. To prove the potential of the *ayurvedic* drugs for detoxifying the body as well as environment, more research has to be carried out. Many experimental researches can be done to signify the efficacy of these *ayurvedic* drug and methods mentioned in the *Ayurveda* through which they will help in detoxify the body and environment without causing any harm to other essential factors.

### IV. DISCUSSION & CONCLUSION

Ayurvedic management has focus on two things - prevention as well as cure. Ayurveda always promotes the benefits of preventing a cause rather than disposing of its effect. In order to tackle with the diurnal, seasonal variation of dosha ayurveda has recommended observance of daily regimen, seasonal regimen, special attention to overcome the ill effects that may occur at the juncture of seasons (*ritusandhi*) through recommended panchakarma therapy, modulation of lifestyle according to variation in the status of dosha, practice of yoga and pranayama. The practice of yogic breathing is found to increase elasticity and strength as well as mechanical efficiency of lungs. Regular practice of pranayama helps to down and regulate the lipid peroxide production and increases the activity of super oxide dismutase (SOD). It also helps to reduce the free radicals and improve the antioxidant status.<sup>13</sup>

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Dr. Manohar Khankhane  
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Dr. Shilpa Kolarkar  
MD ( Forensic Medicine & Toxicology )

Dr. Pratiksha Gujar  
PG Scholar (Forensic Medicine & Toxicology )

Dr. Chiranka Ghorpade  
PG Scholar (Forensic Medicine & Toxicology )