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## Review Article

# Environmental Toxins and Ayurveda: Understanding *Dushi Visha* in the Era of Pollution and Lifestyle Disorders — A Critical Review

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## Abstract

The rapid expansion of industrialization, urbanization, and modern lifestyle practices has resulted in continuous exposure to environmental pollutants including heavy metals, pesticides, air contaminants, chemical additives, and endocrine-disrupting compounds. Chronic low-dose exposure to these toxins contributes to oxidative stress, immune dysregulation, metabolic disorders, hormonal disturbances, and lifestyle-related diseases. Modern toxicology recognizes that persistent environmental toxins may accumulate within biological systems and produce delayed pathological manifestations. Ayurveda describes a similar phenomenon through the concept of *Dushi Visha*, referring to partially neutralized or accumulated toxins that remain in the body and produce disease after prolonged periods. Unlike acute poisoning, *Dushi Visha* manifests gradually due to interaction with *Dosha*, *Dhatu*, and *Agni*. This review critically analyzes the classical concept of *Dushi Visha* and its relevance in the contemporary era of environmental pollution and lifestyle disorders. Classical Ayurvedic texts including *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya* were reviewed along with modern literature from PubMed, Scopus, and Web of Science. Evidence suggests that chronic exposure to pollutants may correlate with impaired metabolism, inflammation, oxidative damage, and reduced

physiological resilience described in Ayurveda as *Agni Dushti*, *Ama* formation, and *Ojas Kshaya*. Ayurvedic interventions including *Vishahara Chikitsa*, *Shodhana Karma*, dietary regulation, and *Rasayana* therapy may offer preventive and restorative approaches. Integrative toxicological research combining modern environmental medicine with Ayurvedic principles may contribute to sustainable strategies for toxin-related disorders.

## Keywords

*Dushi Visha*, environmental toxins, Ayurveda, pollution, *Ama*, *Rasayana*, lifestyle disorders

## 1. Introduction

Environmental pollution has emerged as one of the major threats to global health. Rapid industrial development, increased vehicular emissions, chemical exposure, processed food consumption, and sedentary lifestyle patterns have increased human exposure to multiple toxic substances [1].

Unlike acute poisoning, modern environmental toxins often produce subtle and prolonged biological effects. Continuous exposure to low concentrations of pollutants may lead to:

- Oxidative stress
- Chronic inflammation
- Hormonal imbalance
- Immune dysfunction

- Metabolic disorders [2]

Children, elderly individuals, and individuals with reduced physiological resilience are particularly vulnerable.

Modern toxicology recognizes that certain toxins persist within tissues and gradually influence biological functions. This concept resembles the Ayurvedic description of *Dushi Visha*, where toxins remain concealed within the body and manifest disease after a prolonged period under favorable conditions [3].

Ayurveda explains health as a state of equilibrium between *Dosha*, *Dhatu*, *Mala*, and *Agni*. Disturbance in these factors due to external toxins, improper diet, and unhealthy lifestyle leads to accumulation of metabolic waste (*Ama*) and disease manifestation [4].

In the current era of pollution and lifestyle disorders, understanding *Dushi Visha* provides a valuable framework for interpreting chronic toxin-related illnesses.

## Aim

To critically analyze the Ayurvedic concept of *Dushi Visha* and its relevance in understanding environmental toxin-induced disorders.

## Objectives

1. To review classical descriptions of *Dushi Visha*.
2. To analyze modern environmental toxins and their health effects.
3. To correlate *Dushi Visha* with chronic toxic exposure.
4. To evaluate Ayurvedic preventive and therapeutic approaches.

## 2. Methodology of Literature Review

A narrative review was conducted using classical Ayurvedic literature and modern scientific databases.

### Ayurvedic Classical Sources

Reviewed texts:

- Charaka Samhita
- Sushruta Samhita
- Ashtanga Hridaya
- Madhava Nidana
- Bhava Prakasha

### Modern Databases

Searches were performed using:

- PubMed
- Scopus
- Web of Science

- Google Scholar

## Keywords Used

“Environmental toxins”

“Chronic toxicity”

“Dushi Visha Ayurveda”

“Pollution and health”

“Ama and toxic accumulation”

## Inclusion Criteria

- Classical references related to *Visha*
- Environmental toxicology studies
- Reviews on pollution-related diseases
- Ayurveda toxicology literature

## Exclusion Criteria

- Acute poisoning studies only
- Non-authenticated sources
- Non-human studies without relevance

## 3. Historical Perspective of Dushi Visha

The concept of poisoning (*Visha*) is extensively described under *Agada Tantra*, one of the eight branches of Ayurveda.

Ayurveda classifies poisons into:

- *Sthavara Visha* — plant and mineral origin
- *Jangama Visha* — animal origin
- *Kritrima Visha* — artificial toxins [5]

Among these, *Dushi Visha* represents a unique category where poison remains in the body for a prolonged period and produces delayed effects.

## 4. Concept of Dushi Visha

According to classical texts, *Dushi Visha* is a poison that:

- Has reduced potency
- Is not completely eliminated
- Remains hidden in tissues
- Produces disease after accumulation [6]

It may become active due to:

- Weak digestive power (*Manda Agni*)
- Seasonal changes
- Improper diet
- Physical weakness

## Characteristics of Dushi Visha

Classical descriptions include:

- Delayed manifestation
- Chronic disease production
- Tissue involvement
- Variable symptoms [6]

This closely resembles modern concepts of:

- Bioaccumulation

- Chronic toxicity
- Low-dose exposure effects

## 5. Environmental Toxins in Modern Era

Modern environmental toxins include:

### 5.1 Air Pollutants

Examples:

- Particulate matter (PM2.5)
- Nitrogen oxides
- Sulfur dioxide

Effects:

- Respiratory disease
- Cardiovascular disorders
- Inflammation [7]

### 5.2 Heavy Metals

Major examples:

- Lead
- Mercury
- Cadmium
- Arsenic

Sources:

- Industrial waste
- Contaminated water
- Food chain accumulation

Effects:

- Neurological damage
- Kidney injury
- Hormonal disturbance [8]

### 5.3 Pesticide Exposure

Long-term exposure is associated with:

- Endocrine disruption
- Neurotoxicity
- Immune alteration [9]

### 5.4 Food Additives and Lifestyle Chemicals

Modern diets involve exposure to:

- Artificial preservatives
- Plastic-associated chemicals
- Processed food compounds

These may contribute to metabolic imbalance.

## 6. Correlation Between *Dushi Visha* and Environmental Toxicity

The classical concept of *Dushi Visha* demonstrates similarities with chronic environmental toxin exposure.

| Ayurveda                  | Modern Science  |
|---------------------------|-----------------|
| Hidden toxin accumulation | Bioaccumulation |

|                       |                                           |
|-----------------------|-------------------------------------------|
| Reduced toxin potency | Low-dose exposure                         |
| Delayed manifestation | Chronic disease development               |
| <i>Agni Dushti</i>    | Impaired metabolism                       |
| <i>Ama</i> formation  | Oxidative stress/inflammatory metabolites |
| <i>Ojas Kshaya</i>    | Reduced immunity                          |

## 7. Pathophysiological Mechanism

### Ayurvedic Perspective

Environmental toxins disturb:

#### **Agni**

Reduced metabolic capacity results in improper transformation of nutrients.

↓

#### **Ama Formation**

Accumulated improperly metabolized substances circulate through body channels.

↓

#### **Srotodushti**

Channels become functionally impaired.

↓

#### **Disease Manifestation**

Chronic disorders develop.

### Modern Perspective

Environmental toxins cause:

- Mitochondrial dysfunction
- Reactive oxygen species generation
- DNA damage
- Chronic inflammation [10]

The clinical presentation of *Dushi Visha* is described as variable because the toxin remains latent and expresses symptoms according to the involvement of *Dosha*, *Dhatu*, and affected channels (*Srotas*) [6].

Classical manifestations include:

- Fatigue (*Klama*)
- Digestive impairment (*Agni Dushti*)
- Skin manifestations
- Edema
- Fever-like symptoms
- Altered consciousness
- Weakness



- Respiratory complaints [5]

These can be correlated with modern chronic toxicity manifestations.

| Ayurvedic Manifestation | Modern Correlation                          |
|-------------------------|---------------------------------------------|
| <i>Klama</i>            | Chronic fatigue syndrome-like symptoms      |
| <i>Agni Dushti</i>      | Metabolic dysfunction                       |
| <i>Twak Vikara</i>      | Dermatitis, allergic manifestations         |
| <i>Shotha</i>           | Inflammatory edema                          |
| <i>Oja Kshaya</i>       | Immune dysregulation                        |
| <i>Srotorodha</i>       | Cellular dysfunction and impaired transport |

## 9. Environmental Toxins and Lifestyle Disorders

The modern lifestyle has created continuous exposure to multiple toxic influences. Unlike classical acute poisons, modern toxins act slowly and influence multiple systems.

### 9.1 Metabolic Disorders

Exposure to endocrine-disrupting chemicals has been associated with:

- Obesity
- Insulin resistance
- Metabolic syndrome [11]

Ayurvedic interpretation:

Impaired *Agni* and accumulation of *Ama* disturb metabolic transformation leading to *Medo Dhatu* imbalance.

### 9.2 Cardiovascular Disorders

Air pollutants and heavy metals contribute to:

- Vascular inflammation
- Hypertension
- Atherosclerosis [12]

Ayurvedic correlation:

Disturbance of *Rasa* and *Rakta Dhatu* along with impaired *Srotas* function.

### 9.3 Respiratory Disorders

Pollution exposure increases risk of:

- Asthma
- Chronic bronchitis
- Reduced lung function [7]

Ayurveda correlates this with:

- Pranavaha Srotodushti

- Kapha Dosha aggravation

## 9.4 Neurological Disorders

Heavy metals and pesticides may affect:

- Neurodevelopment
- Cognitive function
- Nervous system regulation [8]

Ayurvedic interpretation:

Involvement of:

- Majja Dhatu
- Manovaha Srotas

## 10. Ayurvedic Management of *Dushi Visha*

Ayurvedic management aims at:

1. Removal of toxins
2. Restoration of metabolism
3. Strengthening immunity

The approach includes:

- Vishahara Chikitsa
- Shodhana
- Shamana
- Rasayana

### 10.1 Vishahara Dravyas (Anti-toxic Drugs)

#### 1. Guduchi (*Tinospora cordifolia*)

**Dose**

Guduchi Satva:

250–500 mg twice daily

**Duration**

4–8 weeks

**Action**

- Detoxification support
- Immunomodulatory activity
- Antioxidant effect

Modern studies demonstrate anti-inflammatory and antioxidant properties of Guduchi [13].

#### 2. Haridra (*Curcuma longa*)

**Dose**

500 mg powder twice daily with warm water

**Duration**

6–8 weeks

**Action**

- Reduces oxidative stress
- Anti-inflammatory

Curcumin has demonstrated protective effects against toxin-induced inflammation [14].

### 3. Neem (*Azadirachta indica*)

#### Dose

250–500 mg twice daily

#### Duration

4 weeks

#### Action

- Blood purification support
- Antimicrobial action
- Antioxidant effect

### 10.2 Shodhana Therapy

*Shodhana* aims at elimination of accumulated morbid factors.

#### A. Virechana Karma

Indicated when *Pitta* and toxin accumulation are involved.

#### Common drugs

##### Trivrit Churna

Dose:

3–6 g with warm water

Duration:

Single therapeutic sitting after proper preparation

##### Avipattikara Churna

Dose:

3–5 g at bedtime

Duration:

7–14 days

#### Expected effects:

- Improved digestion
- Removal of accumulated metabolites
- Regulation of *Pitta*

#### B. Basti Karma

Basti is considered important for systemic regulation through *Vata* balancing.

#### Yapana Basti

Contents:

- Madhu
- Saindhava
- Taila
- Kalka drugs
- Kwatha

Duration:

8–16 days depending on indication

Action:

- Restores physiological balance
- Supports elimination pathways

### 10.3 Rasayana Therapy

Rasayana aims to improve tissue strength and immunity.

#### Amalaki (*Emblica officinalis*)

#### Dose

3–5 g powder daily

#### Duration

2–3 months

Action:

- Antioxidant
- Supports immunity

#### Chyawanprasha

#### Dose

5–10 g daily with milk

#### Duration

3 months

Action:

- Improves *Ojas*
- Supports respiratory health

### 11. Dietary Management (*Ahara*)

Ayurveda emphasizes correction of diet as a primary preventive approach.

Recommended:

- Freshly prepared food
- Seasonal vegetables
- Adequate hydration
- Avoidance of processed foods

Avoid:

- Excessive packaged food
- Artificial additives
- Improper food combinations (*Viruddha Ahara*)

### 12. Preventive Lifestyle Measures (*Dinacharya*)

Important measures include:

- Regular exercise (*Vyayama*)
- Adequate sleep (*Nidra*)
- Stress reduction
- Oil massage (*Abhyanga*)

These practices support:

- Metabolism
- Detoxification pathways
- Immune function

### 13. Modern Approaches to Environmental Toxin Management

Modern toxicology focuses on:

### Exposure Reduction

- Pollution control
- Safe food practices
- Occupational safety

### Nutritional Support

Antioxidants such as:

- Vitamin C
- Vitamin E
- Selenium

may reduce oxidative damage [15].

### Chelation Therapy

Used in selected heavy metal poisoning cases:

Examples:

- EDTA for lead toxicity
- Dimercaprol for arsenic/mercury toxicity

However, it is not recommended for routine environmental exposure without confirmed toxicity.

### 14. Comparative Analysis

| Aspect                | Modern Toxicology       | Ayurveda                   |
|-----------------------|-------------------------|----------------------------|
| Toxic exposure        | Environmental chemicals | <i>Visha</i>               |
| Chronic accumulation  | Bioaccumulation         | <i>Dushi Visha</i>         |
| Metabolic disturbance | Oxidative stress        | <i>Agni Dushti</i>         |
| Inflammation          | Cytokine activation     | <i>Ama</i>                 |
| Immune weakness       | Immunotoxicity          | <i>Ojas Kshaya</i>         |
| Treatment             | Exposure reduction      | <i>Shodhana + Rasayana</i> |

### 15. Research Gaps and Limitations

Although *Dushi Visha* provides an interesting framework for chronic toxicity, several research limitations exist:

1. Lack of validated biomarkers for *Dushi Visha*
2. Limited clinical studies evaluating Ayurvedic detoxification approaches
3. Difficulty correlating *Ama* with measurable molecular parameters
4. Need for standardized protocols of *Vishahara Chikitsa*

Future studies should include:

- Toxicological biomarkers
- Metabolomic analysis
- Clinical trials
- Environmental health assessment

### 16. Future Perspectives

The increasing burden of pollution-related disorders creates opportunities for integrative research.

Future directions include:

- Development of Ayurvedic preventive protocols for pollution exposure
- Evaluation of Rasayana drugs through molecular studies
- Integration of environmental medicine and Ayurveda
- Personalized detoxification strategies based on *Prakriti*

### 17. Conclusion

Environmental toxins represent an emerging challenge of modern civilization. Chronic exposure to pollutants, chemicals, and lifestyle-related toxic substances produces gradual physiological disturbances resembling the Ayurvedic concept of *Dushi Visha*. The classical understanding of latent toxicity involving impaired *Agni*, *Ama* accumulation, *Srotodushti*, and reduced *Ojas* provides a comprehensive framework for understanding chronic toxin-related disorders. Ayurvedic approaches including *Vishahara Dravyas*, *Shodhana Karma*, *Rasayana*, dietary correction, and lifestyle regulation may support preventive healthcare. However, scientific validation through well-designed clinical and molecular studies is required to establish their role in modern environmental toxicology.

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