

CONCEPTUAL STUDY OF MICROPLASTICS AS A NEW AGE DUSHIVISHA AND ITS TREATMENT ACCORDING TO AYURVEDA¹*Dr. Richi Jain and ²Dr. Manohar Khankhane¹PG Scholar, PG Department of Agadtantra, Sumatibhai Shah Ayurved Mahavidyalay, Hadapsar, Pune.²Head of Department, PG Department of Agadtantra, Sumatibhai Shah Ayurved Mahavidyalay, Hadapsar, Pune.

*Corresponding Author: Dr. Richi Jain

PG Scholar, PG Department of Agadtantra, Sumatibhai Shah Ayurved Mahavidyalay, Hadapsar, Pune.

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ABSTRACT

Introduction: Micro-plastics are the tiny Particles of synthetic plastics polymers of sizes less than 5 mm to a few micrometers. These particles enter the body through food, water and various modes and may accumulate in the body (bioaccumulation). Though plastic itself is not a recognized toxin but may cause inflammation in human body and also act as a substrate for other toxic or non toxic material and may cause various symptoms to occur. It thus, acts on the lines of the Concept and action that of Dushivisha. Plastics is heavily used in todays times from food packaging to clothing. Hence it becomes extremely relevant to look at this rising threat in ayurveda perspective.

Methodology: This study delves into the intertwined realms of microplastics and Dushivisha, aiming to draw parallels and distinctions between these two health phenomena. By exploring the literature and conceptual dimensions of both microplastics and Dushivisha, the research seeks to elucidate their comparable impacts on human health. The study adopts a comparative lens to analyze the similarities and differences in the nature and consequences of microplastics and traditional Dushivisha. **Aim and Objective:** Through this comparative approach, the research aims to contribute to a deeper understanding of the evolving challenges posed by microplastics and how they align with or diverge from established concepts such as Dushivisha. This study holds the potential to inform strategies for addressing both historical and contemporary threats human well-being. And if the Treatment can be done with similar approach to that of Dushivisha.

KEYWORDS: Microplastics, Dushivisha.**INTRODUCTION**

Microplastic are the particle of plastics of small size. These are the growing hassle in these modern era. Plastics are used widely in every area from food packging to stynthetic clothing. Hence, it has become a day to day part of our lives. Micro plastics are the particles of Synthetic plastic polymer of size less than 5 mm to a few nanometres. They enter natural environments through a range of channels, such as food packaging, clothes, cosmetics, and industrial operations, and this leads to pollution.

1. Primary- Plastic fragments that are already less than 5.0 mm in size before entering the environment. They are small pieces of fragmented plastic that are directly introduced in the environment.
2. Secondary- Arise from the degradation (breakdown) of larger plastic particles, due to microbial activity, etc.

Micro plastics: Oral intake, inhalation, and skin contact are the common ways. Among them, oral intake is the main exposure route.^[1]

Microplastics, can migrate between different environmental media.^[2] Human exposure risk is increased by the mobility of microplastics. Our everyday essentials, such as milk, tea bags, seafood, bottled water, salt, and sugar, contain microplastics.^[3]

They (especially with negative charge) can get into the water transport system of plants, and then move to the roots, stems, leaves, and fruits. Once microplastics enter agricultural systems through sewage sludge, compost, and plastic mulching, they will cause food pollution, which may increase the risk of human exposure.^[4]

DUSHIVISHA**Definition**

A part of sthavara, jangama or kritrima csha which cannot be removed from the body but instead becomes less potent after digestion or the counter action of antidotes (prativisha) stays in the body for a long period & vitiating it slowly is called Dushi Visha.^[5]

Avyakta avastha of Dushi Visha

The veerya of Dushi Visha is smaller and does not depict any deaths. Conversely, it turns kapha-covered (avritta) and remains that way for years. Its symptoms take time to manifest.^[6]

Vyaktatwa of Dushi Visha

An individual's immunity is lowered by an unfavorable environment (desha), time (kala), food (ahara), overexertion, mental struggle, rage, etc. The eastern/frontal winds, sunlight, rain, clouds, dyspepsia, ama visha, etc. under such conditions, help in the further vitiation of the dhatus & the symptoms of Dushi visha appear.^[7]

Complications of Dushi Visha

Pyrexia, burning sensation, hiccough, distension of abdomen, impotence/edema, diarrhoea, fainting, cardiac disorders, abdominal enlargement, insanity, tremors, and similar other complications^[8]

Sign and symptoms of Microplastic Toxicity

- Inhalation: The size of microplastics detected in lung tissue is smaller than that in the atmosphere. This raises awareness of the possible harm to the human body and provides additional evidence that humans might be exposed to microplastics by inhalation.^[9]
- Microplastics are detected in 15 human biological components, including the spleen, liver, colon, lung, faeces, placenta, breastmilk^[10], etc., they are also carried throughout the body by blood circulation.^[11]
- Bioaccumulation, adsorption and absorption.
- Induce immune response in the body.^[12]
- Microplastics are also toxic to the neural development.^[13]
- Exposure will cause intestinal injury, liver infection, flora imbalance, lipid accumulation, and then lead to metabolic disorder
- Expression of inflammatory factors, inhibits the activity of acetylcholinesterase, reduces the quality of germ cells, and affects embryo development.^[14]

Dushivisha^[15]

As in Sushruta, it has been clearly described that any type of toxins that obtained from any kinds of sources like either Sthavar, Jangam or Kritim, which is not completely eliminate from body and being less potent or inactive after exposure to sun, wind or application of medicine. Poison that has been lodged, which is not eliminated from the body, that have been formed from either plant, animal or any artificial sources that gets accumulated without being inactive or being less potent after exposure to sun, wind or after using medicines. Such poison is known as Dushi Visha.

Dushivisha contemporary view^[16]

Any toxic material that the body gradually rids itself of and may nevertheless accumulate in the body is referred to as cumulative poison. Therefore, even a small amount of these toxins taken repeatedly can cause chronic poisoning. These toxins can exist in three different states: mechanical, chemical, and physical.^[17]

Although the precise definition of cumulative toxicity is unknown in modern research, it can be linked to chronic poisoning because of its gradual build-up within the body and its long-lasting toxic consequences.

Therefore, various harmful effects in various organs may manifest after prolonged exposure to those organic or inorganic compounds, potentially leading to the stage of failure.

In contemporary science, Dushi Visha is referred to as bioaccumulations, in which chemical chemicals that have entered the body either directly or indirectly from many sources interfere with the body's proper functioning.

When an organism accumulates a harmful material at a pace faster than it is eliminated, this process is known as bioaccumulation. Toxic chemicals with a prolonged biological half-life therefore pose a higher danger of chronic poisoning.

Symptoms of Dushivisha Contemporary View^[18]

- Delayed Toxicity
- Bioaccumulation
- Cumulative Toxicity
- Carcinogenicity and Mutagenicity
- Oxidative Stress
- Environment Toxicity
- Cumulative Toxicity

Treatment^[19]

The Treatment mentioned for dushivisha is basically based on the following principle :

1. Eliminating the toxins out of the syetem
2. Balancing the Disturbed doshas and
3. Relieve the symptoms

Therefore the above mentioned method of treatments can be applied to the treatment of Microplastics as the target to achieve is the same.

Sushruta has described the treatment plan for Dushi Visha, which starts with Swedana karma and progresses to Shodhan karma, or Vamana and Virechana karma, based on Dosha involvement. Then, following Shodhan Karma, it was recommended to take the anti-toxic drug Dushi Visari Agad Paana, which contains Suvaichika, Kattrin, Jatamamsi, Shavar Lodhra, Ketavimotha, and Swarnagairik, every day. Table below contains all of the Dushi Visha therapy methods that have been suggested by numerous traditional texts.

Table 1: The general Treatment principles by Different Classical Text.^[20]

Sr. No.	T/t modalities	Charak	Sushrut	Ashtanga sangraha	Ashtang Hridaya
1.	Sudation (Swedan)	-	✓	✓	✓
2.	Induced Emesis (Vaman)	-	✓	✓	✓
3.	Purgation (Virechan)	-	✓	✓	✓
4.	Blood Letting (Rakta Mokshan)	✓	-	-	-
5.	DushiVishari Agad (Anti-Toxic Drugs)	-	-	-	-

Method

The Signs and Symptoms of Microplastic toxicity and Dushivisha are Similar and hence can be compared.

Comparison of Microplastics and Dushivisha

- Though there is a huge scope of study regarding microplastics and a lot of research is to be yet done, but from the available material about the effects of microplastics are nearly comparable to the signs and action caused by Dushivisha.
- Hence in conclusion we can say that microplastics and the problems caused by it can be looked and approached with the perspective on Dushivisha.
- A new scope of study is thus Open in front of us i.e MICROPLASTICS AS A NEW AGE DUSHIVISHA.

DISCUSSION

The Microplastic are widely used almost in every field. From packaging to production, we are exposed to Microplastic daily, through water, soil, food, clothes, etc. Thus resulting its release in the environment and ultimately affecting humans and causing toxicity. More research and studies are happening to understand the threat of Microplastics. But from the available material we can deduce that, though the Microplastic is not mentioned in Ayurveda, but based on its effects on human health its potential of Disturbing the dosha and Agni cannot be denied. The particles of Microplastics can be found in Blood, Faeces, saliva, etc and also it accumulates in the body and manifests the toxicity symptoms which makes it a Dushivisha by definition and also cause local to generalized symptoms. Thus microplastic can be classified as Dushivisha and the treatment of Microplastic toxicity can be done by following the protocol or the treatment modalities of the Dushivisha Treatment.

CONCLUSION

The toxicity manifestations of Microplastics can be treated as and on the lines of Dushivisha Treatment., as mentioned in the classical texts. The selection of the karma and medicine will be dependent on the Dosha, dhatu, agni conditions.

REFERENCE

1. Prata, J. C.; da Costa, J. P.; Lopes, I.; Duarte, A. C.; Rocha-Santos, T. Environmental Exposure to Microplastics: An Overview on Possible Human Health Effects. *Sci. Total Environ*, 2020;

702: 134455.

DOI:

2. Rillig, M. C.; Lehmann, A. Microplastic in Terrestrial Ecosystems. *Science*, 2020; 368(6498): 1430–1431. DOI: 10.1126/science.abb597
3. Praveena, S. M.; Laohaprapanon, S. Quality Assessment for Methodological Aspects of Microplastics Analysis in Bottled Water - A Critical Review. *Food Control*, 2021; 130: 108285. DOI: 10.1016/j.foodcont.2021.10828
4. Schwab, F.; Rothen-Rutishauser, B.; Petri-Fink, A. When Plants and Plastic Interact. *Nat. Nanotechnol*, 2020; 15(9): 729–730. DOI: 10.1038/s41565-020-0762-x
5. AgadTantra Dr. P.V.N.R.PrasadChukhambha Sanskrit Sansthan, Varanasi 3rd ed., 2016; 40.
6. KavirajaAtridevagupta. AcharyavagbhataAstangaHridyam. Chaukhambhaprakashan Varanas, 2016; 787.
7. KavirajaAmbikaDuttashasrti. MaharsiSusrutaSusrutaSamhitaharya. Chaukhambha Sanskrit sansthan Varanasi, 2015; 25.
8. Dr. S. R. Inchulkar. Agada Tantra Evum Visha Vighyan. 1st ed. Vaibhav Prakashan Raipur, 2017; 143.
9. Amato-Lourenço, L. F.; Carvalho-Oliveira, R.; Júnior, G. R.; dos Santos Galvão, L.; Ando, R. A.; Mauad, T. Presence of Airborne Microplastics in Human Lung Tissue. *J. Hazard. Mater.*, 2021; 416: 126124. DOI: 10.1016/j.jhazmat.2021.12612
10. Kutralam-Muniasamy, G.; Shruti, V. C.; Perez-Guevara, F.; Roy, P. D. Microplastic Diagnostics in Humans: "The 3Ps" Progress, Problems, and Prospects. *Sci. Total Environ*, 2023; 856: 159164. DOI: 10.1016/j.scitotenv.2022.159164
11. Leslie, H. A.; van Velzen, M. J. M.; Brandsma, S. H.; Vethaak, A. D.; Garcia-Vallejo, J. J.; Lamoree, M. H. Discovery and Quantification of Plastic Particle Pollution in Human Blood. *Environ. Int.*, 2022; 163: 107199. DOI: 10.1016/j.envint.2022.107199
12. Yuan, Y.; Sepúlveda, M. S.; Bi, B.; Huang, Y.; Kong, L.; Yan, H.; Gao, Y. Acute Polyethylene Microplastic (PE-MPs) Exposure Activates the Intestinal Mucosal Immune Network Pathway in Adult Zebrafish (*Danio Rerio*). *Chemosphere*, 2023; 311: 137048. DOI: 10.1016/j.chemosphere.2022.13704

13. Prüst, M.; Meijer, J.; Westerink, R. H. S. The Plastic Brain: Neurotoxicity of Micro- and Nanoplastics. *Part. Fibre Toxicol*, 2020; 17(1): 24. DOI: 10.1186/s12989-020-00358-y
14. Potential Health Impact of Microplastics: A Review of Environmental Distribution, Human Exposure, and Toxic Effects, Yue Li, Le Tao, Qiong Wang, Fengbang Wang, Gang Li, and Maoyong Song *Environment & Health*, 2023.
15. Dr. S. R. Inchulkar. *Agada Tantra Evum Visha Vighyan*. 1st ed. Vaibhav Prakashan Raipur, 2017; 143.
16. Pandey, Narayan & Sharma, Anita & Kadu, Amol & Ali, Rahesh & Yadav, Praveen. Critical Review of Ayurvedic and Contemporary Concept of Dushi Visha and its Treatment. *International Journal of Ayurveda and Pharma Research*, 2022; 120-125. 10.47070/ijapr.v10i2.2267
17. Vd. Jaiprakash S. Ukey, & Dr. Pranali Abaji Dudhe. Classical and contemporary aspect of Dushi Visha. *Journal of Ayurveda and Integrated Medical Sciences*, 2021; 6(02): 96-100. <https://doi.org/10.21760/jaims.v6i02.1254>
18. C.K. Parikh, Text book of medical Jurisprudence forensic medicine and Toxicology. 7th ed. New Delhi; CBS publisher and distributors, 2016; 7.
19. Shastri Ambikadutta, Sushruta Samhita of Maharsi Sushruta. Kalpasthan, 3/50-52. Varanasi; Chaukhamba Sanskrit Sansthan, Kalpasthan, 2019; 1: 37.
20. Pandey, Narayan & Sharma, Anita & Kadu, Amol & Ali, Rahesh & Yadav, Praveen. Critical Review of Ayurvedic and Contemporary Concept of Dushi Visha and its Treatment. *International Journal of Ayurveda and Pharma Research*, 2022; 120-125. 10.47070/ijapr.v10i2.2267.