

AN AYURVEDIC APPROACH TO UNDERSTAND ENVIRONMENTAL TOXICOLOGY

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ABSTRACT

Environmental Toxicology is a burning issue of the century. Rachel Carson is the mother of environmental toxicology, as she made it a distinct field in 1962. In the 1970s scientists concerned with this field focused their research on the impacts of agents of biological warfare, industrial pollution, and on discharge from mines. In the next decade; the focus shifted to chemical and radiations associated with radioactive material with the occurrence of Bhopal disaster, in which 45 tons of poisonous methyl isocyanate gas escaped from an insecticide plant, and the Chernobyl accident, in which massive amounts of radioactive material were released into the atmosphere following the explosion of a nuclear reactor. Later in 20th and 21st centuries, the expansion happened with its major concerns as oil spills, the dumping of medical and nuclear waste, air and water pollution, and the impact of substances such as synthetic hormones

KEYWORDS: Environmental toxicology, Environment health, Warfare, Toxicology, Toxins, Poison.

INTRODUCTION

Environmental toxicology is a multidisciplinary field of science concerned with the study of the harmful effects of various physical, biological and chemical agents on living organisms. Among its primary interests are the assessment of toxic substances in the environment, the monitoring of environments for the presence of toxic substances, the effects of toxins on biotic and abiotic components of ecosystems, and the metabolism and biological and environmental fate of toxins. The Knowledge of how these factors interact is critical to understand to prevent or reduce exposure and to remove the toxins from the environment. Also, the advancement in understanding of environmental and occupational agents in human disease is to foster Prevention, Amelioration and Treatment.

Sources of Environmental Toxicity: There are many sources of environmental toxicity that can lead to the presence of toxicants in our food, water and air. These sources include organic and inorganic pollutants, pesticides and biological agents, all of which can have harmful effects on living organisms. There can be so called point sources of pollution, for instance the drains from a specific factory but also non-point sources (diffuse sources) like the rubber from car tyres that contain numerous chemicals and heavy metals that are spread in the environment.

Organisms can be exposed to various kinds of toxicants at any life cycle stage, some of which are more sensitive

than others. Bioaccumulation occurs when an organism stores toxicants in fatty tissues, which may eventually establish a trophic cascade and the biomagnification of specific toxicants. Biodegradation releases carbon dioxide and water as by-products into the environment. This process is typically limited in areas affected by environmental toxicants.

The identification of ways to monitor chemicals in the environment is an important aspect of environmental toxicology. Monitoring typically is based on the detection of sensitive biochemical markers (e.g., proteins), the levels of which change in the presence of a given toxin, or on changes in individual "indicator" species, the well-being of which serves as a measure of environmental conditions and the health of other species.

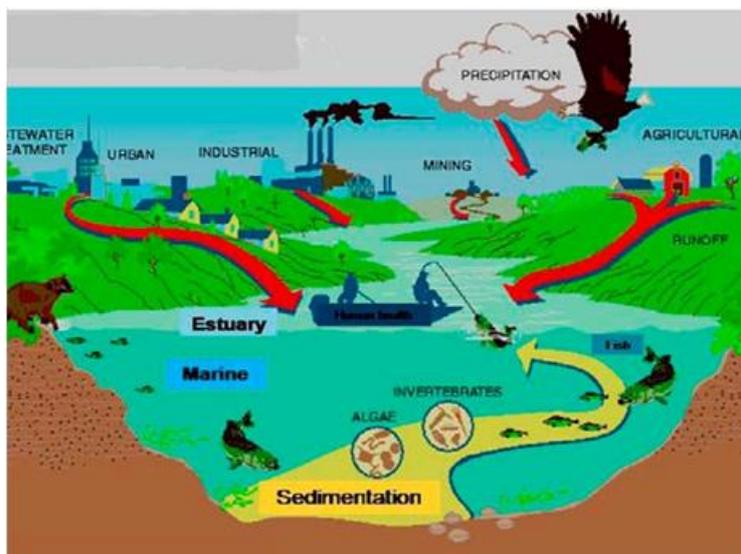


Fig: Sources of Environmental Toxicity.

Environmental Toxicity in Ayurveda: Though the term Environmental Toxicology is coined few decades ago but the age old science of Ayurveda had discussed this elaborately in Kalpasthana of Sushruta Samhita. The sources of environmental toxicity, means by which the environment can be poisoned especially related to warfare purpose, indicators/features to identify the toxicity in the environment and the treatment plan to prevent and remove poison from the environment and also the ways by which it is made fit to be used by the human beings. The four main sources which are mentioned in the Susruta Samhita through which poisoning can be done in the environment are Water, Land, Fodder, Air.

Poisoned water: It becomes slimy, possesses strong odor and froth, lines on the surface, frogs and fish of water die, birds living in marshy places fly around intoxicated, and men, horse and elephant which immerse in the water will develop vomiting, delusion, fever, burning sensation, swelling.

Treatment: Dhava, asvakarna, asana, paribhadra, patala, siddhaka, moksaka, rajadruma and somvalka, all these drugs are burnt and the collected ash is spread on water body and a handful of this ash is put into the pot containing drinking water to be used.^[1]

Poisoned Land/ Grounds: Ground, surfaces of stones, banks of rivers and sand dunes which have been poisoned and which come in contact with the body parts of cows, oxen, horses, elephant, camel, donkey and men produces swelling, burning sensation and makes hairs and nails to fall off.

Treatment: Ananta (durva) along with sarvagandha (fragrant drugs example ela, karpura etc and sweets (honey, jaggery etc) made as paste should be dissolved in sura (beer) or water and sprinkled on the poisoned road

or water boiled with vidanga, patha and katabhi be sprinkled.^[1]

Poisoned Fodder: Animal becomes weak, faint, vomit, purge and some even die.

Treatment: Animal should be made to hear the melodious sound of musical instrument such as drums, kettle drum etc which are beaten hard being smeared with the paste of silver, mercury, gold, sariva, musta all in equal quantity macerated in the bile of brown colored cow.^[1]

Poisoned Air/Smoke: If air/smoke is poisoned birds fall on the ground, exhausted develop cough, nasal catarrh, headache and severe eye diseases.

Treatment: Laksha, haridra, ativisa, abhaya, musta, harenuka, eladala, tagara, kustha, and priyangu should be put on fire and the resulting smoke purifies the air.^[1]

Acharya Vagbhata in Ashtanga Hridayam elaborates further that not just human beings but even animals and birds get affected by presence of poison and show some peculiar behavior. He mentions that after eating poisoned food flies die, the crow loses its voice, the parrot begins to hoot on the very sight, swan loses its gait, pond heron becomes exhilarated, monkey eliminate feces, peacock becomes exhilarated by seeing poisoned food.^[2]

Also, the physical, biological and chemical properties of various food items change if poison is present in it. Blue lines appear in meat, coppery lines appear in milk, black lines appear in curd, yellowish white lines appear in butter milk, lines resembling water appear on ghee, resemblance that of pigeon appear in whey, green line appear in honey, crimson lines appear in oils.^[2]

DISCUSSION

The presence of poison in the environment which enters the ecosystem and eventually leads to development of many diseases is an area of great concern especially in today's era as anything and everything is a poison. As the toxicity level is very high, there is an urgent need not just to reduce and remove the poison from the ecosystem but also to find effective plan to treat the disease caused by these toxins.

As in Ayurveda not just the sources of poisoning, but also its impact on the ecosystem, treatment plan, animals and birds test as indicators of poisoning, testing of food for its physical, biological and chemical change has been discussed, hence all these traditional and scientific knowledge can be utilized as a full proof solution to understand and fight this menace.

Also, the scientific knowledge in Ayurveda textbook and the modern advancement in Environmental toxicology if combined together to deal with the existing problem may be a great achievement and will help us to get highly successful plan to save our wonderful planet and the beautiful life existing on it. Hence, a specialized study and research in the area is needed which may open a new window to deal with the Environmental toxicity and its hazards.

CONCLUSION

Environmental Toxicology is a very important discipline especially when environmental toxin is posing a serious health threat to mankind. The modern approach to understand the contemporary sources of environmental poisoning, its causes, and its overall impact on different aspects of human health is very essential to prevent, remove and treat it and hence improving the health status of a person. However, the traditional and scientific knowledge from Ayurveda if combined together with the contemporary knowledge may be a great achievement and will further enhance the understanding to deal with the problem more effectively.

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