



Research Article

AN OVERVIEW ON PLASTIC AND ITS IMPACT IN AYURVEDA

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ABSTRACT

Ease of production, transportation and low cost made plastic to become a major part of human life in many ways especially in packaging and for storage of materials. In Ayurvedic pharmaceutical industry also we can see its influence. Though plastics are having many advantages, its disadvantages are more when coming to health of living beings. Besides pollution, plastics also impart some health hazards and in Ayurvedic science also, we can see many effects. Many of the times, we may have witnessed about the shrinkage and bulging of bottles, distaste of medicine, etc. These are due to drug and plastic reactions. Modern research works in pharmaceuticals termed some reactions as leaching, sorption, etc. As we are claiming to be the ambassadors of a traditional natural science; we, the Ayurvedic doctors should be more aware about this.

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INTRODUCTION

Invention of plastic made human life very easier as it can be used in each and every thing in day to day life, or in other words it can be said that plastic became one among the life style of human. From the feeding bottle to aeronautical instruments it is widely used. Plastic industry became one among the world's leading industry. But now everybody is worried about its ill effects. The most dangerous thing the whole world is facing is pollution related with plastics. Plastics also play an important role in Ayurvedic medicinal packaging and storing. There are chances of drug and plastic interaction. But no studies were conducting and our Ayurvedic community is simply neglecting these things.

Plastics and Its Chemistry¹

Plastics are organic compounds which can be molded into different shapes. They may be synthetic or semi synthetic which can be molded into different shapes. The term derived its name from Greek word "plastikos" which means a molded substance. They are polymers of high molecular mass and derived from petro chemicals. Many plastic polymers contain chains of carbon atoms alone or with other chemicals such as nitrogen, sulphur, oxygen, etc.

Role of Additives In Plastics²

For improving the performance of plastics certain materials are mixed with pure plastic polymers. They are collectively called as additives. They are of many kinds like fillers, anti-oxidants, heat stabilizers, light stabilizers, etc. So these additives will help plastic to become more attractive, stable, colorful and cheap. Some examples of additives include

phthalates, BPA (bisphenol A), etc. They are proved to be hazardous to health.

Types of Plastics Used In Ayurveda³

Mainly plastics are divided into two - thermoplastics and thermosetting plastics. The common market available plastics are as follows.

- PET (Poly Ethylene Terephthalate)
- HDPE (High Density Poly Ethylene)
- PVC (Poly Vinyl Chloride)
- LDPE (Low Density Poly Ethylene)
- PP (Poly Propylene)
- PS (Poly Styrene)

Among these plastics Ayurveda uses mainly PET, HDPE, PVC and PP.

Plastic and Drug Interactions⁴

Modern pharmaceuticals has mentioned 5 kinds of drug and plastic interactions. These may or may not happen in Ayurvedic pharmaceuticals. But there is a big lacuna of research studies in the field of Ayurveda related with this. Through research only we can come to a conclusion. The major drug and plastic interactions are

Permeation

The passage of gases, vapours, etc. through the wall of plastic vessels is known as permeation. This will negatively affect shelf life of medicines. There is also chances of escape of volatile matters of medicine.

Leaching

From the bottle the additives like dyes, etc. go into the drugs. This may result in drug contamination.

Sorption

The packaging material may absorb or adsorb certain chemicals like preservatives, etc. from the medicines. This will affect the pH of medicine, shelf life, etc.

Chemical reactivity

There will be chemical reactions between drug and chemicals present in the plastic containers.

Modification

There will be alterations to the containers because of drug interaction.

So these are the major drug and plastic interactions. In our medicinal field also we can observe pH variation of the drugs, distaste, loss of aroma, bulging of bottles, shrinkage of bottles, etc. These indicate the possibilities of chemical reactions. Anyhow more studies are needed.

Health Hazards

Pollution related problems: Major issue is the waste plastic bottles cause pollution all over the world. This affects our ecosystem very badly; especially aquatic, marine and wild life. The one of the cause for global warming is plastic waste. Then incineration of plastic may release some unwanted chemicals which are harmful to health.

Carcinogenic effects⁵: Some of the chemicals like additives are proved to be cancerous. One is Bisphenol A (BPA) which is one of the additive used in plastic. Excess amount of BPA in medicine which is leached from the plastic mimic like estrogen hormone and may cause many hormonal imbalances, even cancer.

Other problems: Endocrine disruption, birth defects, immune suppression

DISCUSSION

Going through the history of Ayurveda, we can see the references of different kinds of vessels prepared out of gold, silver, copper, mud, glass, wood etc. for storing and packaging of medicines and also our ancestors told the advantages of each in detail. But now because of industrialization everything is replaced by plastics. So the study and practice of traditional methods has to be promoted in Ayurveda. Also the practice of fresh drug preparations and single drug therapies etc. has to be encouraged. Even though there are reactions of plastic and drugs they are unnoticed or neglected in our field. These things have to be changed for better practices.

CONCLUSION

All over the world, the health hazards of plastics are having its adverse effect. So we, the Ayurvedic people should know more about these issues. We have to treat chronic disorders with long term of medications and these medications are kept inside plastic containers. There may be possibilities of drug and plastic interactions which may sometimes lead to health problem. Research works should be done in these areas. Usage of glass bottles or other alternatives should be encouraged. Following classical methods and also promoting fresh medications, etc. will be good solutions for these kinds of problems.

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