

THE ONGOING REPERCUSSION OF PLASTIC ON ENVIRONMENT AND HUMAN HEALTH OF SOME CITIES OF BIHAR

Prabhash kumar* & Dr. MD Arshad Jamal**

*Research scholar P.G Deptt of Environmental Science, Magadh University, Bodh Gaya.

**Research guide, Soghra collage, Biharsarif, Nalanda,

Abstract

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Plastics are extremely diverse in terms of chemical composition, properties and possible applications, and are widely distributed in the society and the environment. In the last 15 years the global annual production has doubled. Several of the chemicals used to produce plastics are hazardous for human health and the environment. These, and their degradation products, may be released during the life cycle of a plastic product. The plastic polymers are not considered as toxic, but in plastic products there may be non-bound residual monomers, polymerisation chemicals, degradation products, and additives which have toxic properties. The study presents an alarming fact: these tons of plastic waste reputed to be virtually indestructible, do decompose with surprising speed, at much lower temperature than previously thought possible, and release toxic substances into the seawater, namely Bisphenol A (BPA) and PS Oligomer. These chemicals are considered toxic and can be metabolized subsequent to ingestion. Plastic degrades extremely slowly under typical environmental conditions; depending on the type of plastic, it may take 50 years or more for plastics to degrade in nature. The study will be done in different major cities of Bihar demarcated in three zonal areas named as-commercial zone, industrial zone and residential zone based on the activity profile of the city to get a clear cut idea of its effect and preventive measures we can take. All aspects of households such as: use of cloth and paper bags rather than plastic bags, safe recycling of plastic wastes and miscellaneous will be taken into consideration.

Introduction

Industrial revolution has led to invention of many materials which are man-made and not resembling to natural ones. The term xenobiotic (stranger to life) is derived from the Greek word 'xenos' – a strange and 'bios' – life. For environmental chemist, xenobiotic means foreign to the biosphere and Anthropogenic is the specific term for man-made. The first man-made plastic was invented by Alexander Parkes, a British metallurgist, in 1862, and the result was publicly displayed at Great International Exhibition in London (Bellis, n.d.). In 1907, Leo Hendrik Baekeland invented the first fully synthetic resin, called Bakelite, which experienced commercial success. A simple walk on road, streets, anywhere, and the plastic waste spectacle is present. All over Bihar, the statistics are growing, staggeringly. Tons of plastic debris (which by definition are waste that can vary in size) is discarded every year, polluting lands & rivers. Animals like cows, buffaloes & bulls are the most harmed living beings in Bihar region. The reason is simple, engulfing and chewing plastic debris directly or indirectly in the form of plastic made items. Not only this debris harms them but also causes death at times, due to choking and entanglement within the internal organs.

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typical environmental conditions; depending on the type of plastic, it may take 50 years or more for plastics to degrade in nature (Müller, 1998).

CONCEPT OF PLASTIC POLLUTION

A material which is made from plastic can be easily shaped or deformed. Plastics are synthetic materials that are made of synthetic resins or organic polymers, which include nylon, PVC, and polyethylene. Plastics are categorized into two groups, those that go through a chemical change process in their constituents when subjected to heat (thermosetting polymers) and those that do not (thermoplastics). Examples of thermoplastics include polypropylene and polyethylene.

Polyethylene is the most common types of plastics as they are usually produced in large quantities but at very low cost. Most of the disposable items are packaged in these. Supermarkets and retail stores use them to package goods bought. Plastics mainly consist of petrochemicals which when burnt or melted, cause environmental pollution.

Almost 75% of plastic production demand comes from four major sectors: packaging, construction, automotive and electrical/electronics. Only 10% or less plastic is recycled; the remaining plastics are burnt or sent to landfills. Plastics are found everywhere from the deep water to the shorelines. Unsurprisingly, greater concentration/heap of plastic material is found near popular tourist destinations and densely populated areas.

The majority of plastic waste comes from land-based sources, including urban, sewer overflows, inadequate waste disposal, industrial activities, construction and illegal dumping.

1. Polyethylene Terephthalate (PET or PETE) – Used in soft drinks, juice, water, beer, mouthwash, peanut butter, salad dressing, detergent, and cleaner containers. It leaches Antimony Trioxide and (2ethylhexyl) Phthalate (DEHP).

2. High density Polyethylene (HDPE) – This is used in opaque milk, water, and juice containers, bleach, detergent, shampoo bottles, garbage bags, yogurt, margarine tubs, and cereal box liners. It is considered as a safer plastic. Research on risks associated with this type of plastic is ongoing.

3. Polyvinyl chloride (V or Vinyl or PVC) – This is used in toys, clear food and non-food packaging (e.g., cling wrap), squeeze bottles, shampoo bottles, cooking oil, peanut butter jars, detergent/window cleaner bottles, shower curtains, medical tubing, and numerous construction products (e.g., pipes, siding). PVC has been described as one of the most hazardous consumer products ever created.

4. Low density Polyethylene (LDPE) – It is used in grocery store, dry cleaning, bread and frozen food bags, plastic wraps, and squeezable bottles (honey, mustard). Research on risks associated with this type of plastic is ongoing.

5. Polypropylene (PP) – This is used in ketchup bottles, yogurt and margarine tubs, medicine and syrup bottles, straws, Rubbermaid and other opaque plastic containers, including baby bottles; considered as a safer form of plastic. Research on risks associated with this type of plastic is ongoing.

6. Polystyrene (PS) – It is used in Styrofoam containers, egg cartons, disposable cups and bowls, take-out food containers, plastic cutlery, and compact disc cases. Leaches styrene, an endocrine disruptor mimicking the female hormone estrogen, and thus has potential to cause reproductive and developmental issues. Long-term exposure by workers has shown brain and nervous system adverse effects. It also affects red blood cells, liver, kidneys, and stomach in animal studies. Also, present in second-hand cigarette smoke, off gassing of building materials, car exhaust, and possibly drinking water. Styrene migrates significantly from polystyrene containers into the container's contents when oily foods are heated in such containers.

7. Others – This is a catchall category that includes anything that does not come with in the other six mentioned categories. As such, one must be careful in interpreting this category because it includes polycarbonate – a dangerous plastic, it also includes the new, safer, biodegradable bio-based plastics made from renewable resources such as corn and potato starch and sugar cane.

Polycarbonate is used in plastic baby bottles, clear plastic sippy cups, sports water bottles, three and five gallon large water storage containers, metal food can liners, some juice and ketchup containers, compact discs, cell phones, and computers.



8. Polycarbonate leaches Bisphenol- Numerous studies have indicated a wide range of possible adverse effects from low-level exposure to Bisphenol A. First most hazardous one being causing chromosomal damage in female ovaries, decreased sperm production in males, early onset of puberty, various behavioral changes, altered immune function, and sex reversal in frogs.

9. DEHP (di(2-ethylhexyl)phthalate) – It is an endocrine disruptor that mimics the female hormone estrogen. It has been a strong reason of asthma and allergies in children. Also, it may cause certain types of cancer and has been linked to negative effects on liver, kidney, spleen, bone formation, and overall body weight. In Europe, DEHP has been banned since 1999 from use in plastic toys for children under the age of three.

TYPES OF PLASTICS USED AND THEIR SAFETY LEVEL

There is a way to identify the type of plastic in many everyday products, especially food storage containers and packaging. Many, but not all, such plastic products have a number – the "resin identification code" – surrounded by a chasing arrows symbol and molded, formed or imprinted in or on the container, often on the bottom. Use of the word "resin" is synonymous with "polymer" or "plastic type."

A few things to keep in mind about these resin identification codes:

- Developed by plastics industry to facilitate recycling. This system of coding was developed in 1988 by the U.S.-based Society of the Plastics Industry to facilitate the recycling of post-consumer plastics. It is voluntary for plastic manufacturers, but has become relatively standard on certain plastic products sold globally.
- Codes do not guarantee recyclability. Although this coding system is designed to facilitate recycling, the presence of a code on a product does not mean it is recyclable. We provide below information on the estimated recycling rate of each plastic resin.
- Codes do not indicate toxicity or safety. The codes do not provide any information on the toxins contained in the identified plastics or whether or not they are safe - the code simply identifies the type of plastic resin. Plastic manufacturers are not required to disclose other chemicals that have been added to the plastic polymer. Most plastics have numerous synthetic, often petroleum-derived additives in them. We provide below information on what we perceive to be the toxicity and safety of each plastic type, based on our research, experience, and practice of the precautionary principle.
- Only six plastic types explicitly identified. Codes #1 to #6 each identify a specific plastic polymer commonly used in consumer goods all over the world. Code #7 is a general catch-all category which is essentially for every other type of plastic. We highlight a couple of the key common plastics that fall into this category.

The seven plastic resin identification codes are laid out below with added information describing characteristics of each plastic type, typical products it is found in, our perception of its toxicity and safety (including whether or not to avoid it), its estimated recycling rate and recycled products made from it, and suggestions for alternatives you can use to replace it in everyday life (including things available in our store)

MATERIALS & METHODS

The study will be done in different major cities of Bihar demarcated in three zonal areas named as- commercial zone, industrial zone and residential zone based on the activity profile of the city to get a clear cut idea of its effect and preventive measures we can take. All aspects of households such as: use of cloth and paper bags rather than plastic bags, safe recycling of plastic wastes and miscellaneous will be taken into consideration.

Various questionnaires and survey will be undertaken from various towns of Bihar to get a detailed view and solution. Secondary data regarding effect on environment, land, ocean, animals, and human's health will be taken into consideration.

These survey questions are.

Q1 Have you heard or read about the dangerous of plastic?

Q2 What are the sources of your information about the dangerous of plastic?

Q3 Are you used plastic bottle pack mineral water? where you disposed bottle?

Q4 you used this mineral water.after you dispose it off where does it go?

Q5. You buy vegetable /grocery product in poly bag. Shopkeeper tie handle of poly bag. What to you do with it?

Q6. Many Medicine are packed in plastic wrapper. What to do this wrapper?

Q7. How many plastic bag are consumed per week?

Q8. There are many alternatives for plastic bags such as cotton , linen and paper bag etc. do you know it?

Q9 After you have finished using the plastic what do you do with it?

Q10. After you dispose it off where it Go?

Results of survey

I am research scholar of Dept of Environmental Science, M.U Bodh Gaya. Conducting a research on plastic effect on environment and human health. I have a set of question which I would like you to answer and help me in my survey. The collected information will be kept confidential. In this survey involved male/ female age 60 and above, occupation, self employed, students, working professional, retired, others.

Have you heard or read about the dangerous of plastic?. 97 % say plastic is dangerous of our health and environment and 3% says I don't know plastic how to produce its naturally or manmade. What are the sources of your information about the dangerous of plastic? 47% say this information about school & college, 30% says by news paper, T.v etc, 20% say relative and friends and 3% I don't know. Next question Are you used plastic bottle pack mineral water? where you disposed bottle? 40% says bottle cap insert the bottle and throw any where because its no any re-use fill water in the bottle and again the sell. 38% say we crased bottle and through any where. 22% say we re-use in next time. Next question you used this mineral water. after you dispose it off where does it go? 90% say I don't know where its go 10% say collect in kabari wala and send recycle process. Next question You buy vegetable /grocery product in poly bag. Shopkeeper tie handle of poly bag. What to you do with it? 90% say tie is not open easily we tear polybag. 5% say this polybag tear open but some are dirty which are not use before wash its we throw outside home. 5% say we reuse. Next question related to Many Medicine are packed in plastic wrapper. What to do this wrapper? 100% say we thrown in out of home directly. Next question How many plastic bag are consumed per week? 85% say less then 20, 13% say 20 to 50, 2% say more then 50. I think that the socity has enough information about the dangerous of plastic bag. Next question There are many alternatives for plastic bags such as cotton , linen and paper bag etc. do you know it? 100% say yes we know that but no use alternatives bags because no any fixed of plan shopping. my any one family member calling in mobile phone and say some items brought in shop when you return in home. Next question After you have finished using the plastic what do you do with it? 80% say throw out of home and 20% shopkeeper say be burn because its fly any where. next question After you dispose it off where it go? 80% say I don't know 20% say collect in kabariwala he send in recycling.

Total solid Waste in some cities of Bihar

PATNA- Total solid waste produce 800 tonnes per day. Dumping waste site in ramachak- bairiya village on the patna gaya road.

GAYA- Total solid waste produce 250 tonnes per day. Dumping waste site is chandauti, nailly

MUZAFFARPUR- Total solid waste produce 170 tonnes per day. Dumping yard situated 12 km away from the city in the village rautiniya.

Recycling

Plastic recycling is the process of recovering scrap or waste plastic and reprocessing the material into useful products. Since the vast majority of plastic is non-biodegradable, recycling is a part of global efforts to reduce plastic in the waste stream, especially the approximately eight million tonnes of waste plastic that enter the Earth's ocean every year. This helps to reduce the high rates of plastic pollution.

Compared to other materials like glass and metal, recycling of plastic is expensive and complex. This is due to the high molecular weight of the large polymer chains that build the plastic material. Heating plastic doesn't dissolve the polymer chains and hence a tedious and complex process is essential. Different types of plastic cannot be mixed together because they phase separate. Such a resulting melting product cannot be recycled to make another plastic product. While making plastic products many fillers like dyes and other additives are used. These fillers cannot be separated from the plastic using inexpensive techniques.

ADVANTAGES OF RECYCLING

- 1. Recycling minimizes pollution-** All forms of pollution in the modern world emanate from industrial waste. Recycling of these industrial wastes such as plastics, cans, and chemicals go a long way towards considerably cutting back on levels of pollution because these waste products are reused rather than just being thrown away recklessly.
- 2. Protects the environment-**The great benefit of recycling waste material is that it plays a big part in protecting Mother Nature in the most balanced way. While many trees are felled every day, recycled paper manufactured from specific trees is continually utilized to reduce deforestation. This classical example demonstrates that other natural resources can be recycled and made useful this way to conserve the environment.
- 3. Recycling minimizes global warming-** It is perfectly true that recycling minimizes global warming and its grave impacts. During waste disposal, huge amounts of waste are combusted that lead to emission of vast greenhouse gases such as carbon dioxide, sulfur, and nitrogen, which contribute to climate change and global warming. Recycling process involves minimal combustion and waste is transformed into reusable materials with zero or minimal harmful impact on the environment. The whole process of processing and manufacturing products from waste materials emits few greenhouse gases because the very waste recycling industries burn little fossil fuels.
- 4. Conserves natural resources-** If the process of recycling used and old materials was not there, it means new products will be manufactured by extraction of fresh raw materials underneath the earth through the process of mining and extraction. Recycling is a surefire way of conserving existing raw materials and protecting them for future use. Taking steps to conserve natural resources like minerals, water and wood ensures sustainable and optimal use.
- 5. Recycling cuts down amount of waste in landfill sites-** Recycling old and used materials into reusable products enormously reduces the possibility of choking of landfill sites. This is beneficial because it helps minimize land and water pollution since landfills contribute mightily to environmental degradation.
- 6. Recycling ensures sustainable use of resources-** Recycling guarantees that existing resources will be used sensibly and sustainably. The recycling process alleviates the possibility of discriminate use of raw materials when they are obtainable in huge supply. Governments these days have stepped in to encourage recycling from lower levels, for instance, schools, small-sized organizations and also at global levels. This means that manufacturing industries can leave existing natural resources for exploitation by our children in the future without affecting current production.
- 7. Reduces energy consumption -** A lot of energy is used to process raw materials in the course of manufacture. Recycling plays a big role in reducing energy consumption, which is vital for large-scale production, for instance, mining and refining. Recycling also renders the whole process of production less expensive, which is a great victory for manufacturers.

Conclusion

Today India and world facing a problem with the plastic pollution. Control the plastic pollution Effective policy requires effective monitoring and the current state of plastic waste monitoring needs harmonization, which is being put into place by various guidelines on plastic debris in general. To raise public awareness, the regional and national different levels of educational curriculums must include the waste management systems. There is also a need for better education and awareness around plastic waste. Total respondents support to the dangerous of plastic in environment and human health. Some people agreed that society has enough information about the dangerous of plastic. The plastic bag ban would help to improve environmental condition of Bihar. From above Information we can say that people are positive towards the effects, they wish to plastic ban our state.

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