TOXIC DUMPING IN OCEAN: A THREAT TO HUMAN LIFE

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Abstract: The exponential increase in the use of plastic in modern society and the inadequate management of the resulting waste has led to its accumulation in the marine environment. There is increasing evidence of numerous mechanisms by which marine plastic pollution is causing effects across successive levels of biological organization. This will unavoidably impact ecological communities and ecosystem functions. A remaining question to be answered is if the concentration of plastic in the ocean, today or in the future, will reach levels above a critical threshold leading to global effects in vital Earth-system processes, thus granting the consideration of marine plastic pollution as a key component of the planetary boundary threat associated with chemical pollutants. Possible answers to this question are explored by reviewing and evaluating existing knowledge of the effects of plastic pollution in marine ecosystems and the 'core planetary boundaries', biosphere integrity and climate change.

Keywords: Toxic Dumping, Ocean, Food chain, Plastic Toxin

1. INTRODUCTION

One of the main causes of the polluted marines is the wastes and toxins that get thrown into the ocean. Records show that 850 million meters cubed of liquid and solid wastes have been dumped into the ocean in the past 85 years. Not only does our population toss these solid wastes into the water, but the ocean also deals with the debris from natural disasters like floods, earthquakes, volcanoes, and fires. Since the late 1960s, impacts by humanity on the environment, particularly the degradation of air, water, and soil, have received widespread public attention and levels of funding to perform scientific studies. It is almost pointless that these scientific studies are being done, however, because the amount of wastes being put into the ocean is only increasing, which contradicts the purpose. The public is aware of the problem, but nobody is willing to stop it, mainly because they don't know what to do with the waste. What they also do not realize is that they are killing the marine world, one toxin at a time.

Human activities are capable of changing the normal functioning of Earth-system processes in ways that amplify risks to societies worldwide [1]. One of the most conspicuous anthropogenic activities is the manufacture, use and disposal of plastic. This synthetic material is so widespread throughout the environment that plastic is now considered as a geological marker of the Anthropocene, the emerging epoch in which human activities have a decisive influence on the state, dynamics and future of the Earth system [2].

Mass production of plastic took off rapidly since the 1950s, shaping the development of modern society [3], [4]. Global production of plastic resin increased from around 1.5 million tonnes in 1950 [5] to 322 million tonnes in 2015 [6]. Estimates are that during 2010, between 4.8 and 12.7 million tonnes of mismanaged land-based plastic waste entered the oceans [7]. The absolute amount is difficult to calculate, due to the many different sources and environmental transport pathways, but marine plastic pollution (MPP) is now ubiquitous in the marine environment. It has been documented to negatively affect organisms, ecosystems, human wellbeing, and socioeconomic sectors such as tourism, aquaculture and navigation [8], [9],. The recent rise in MPP studies reflects growing concern about its impacts. A first global assessment has been made of the sources, fates and effects of microplastic in the oceans highlighting the need for policy and societal action and identifying key research priorities to inform this action.

Recently, scientific attention has turned to plastics as a potential planetary boundary threat. The planetary boundaries framework defines precautionary boundaries for several anthropogenic perturbations, set at levels to avoid thresholds or shifts in Earth-system functioning that would generate rising risks for the world's societies. By identifying measurable control variables and setting boundaries, the framework demarcates a global 'safe operating space' for humanity.

2. SOURCES OF PLASTIC TOXINS ENTERING THE OCEANIC FOOD CHAIN

Much of the plastic in the ocean today comes directly from sources on land, often reaching the ocean as runoff that moves improperly discarded trash from land to river and finally, the ocean.

As far as plastic entering the ocean, about 20% of the trash comes from ships and platforms that are offshore. The rest sources from litter being blown into the sea, picked up by tides on the beach, or intentional garbage dumping. The worst part is these plastics don't biodegrade, so they break up into tiny pieces that are consumed by fish and sea mammals. Plastic is killing more than 100,000 sea turtles and birds a year from ingestion and entanglement. To learn more visit Project Green Bag.

Chemicals in plastics are released into the water as well as the atmosphere. Fish easily become contaminated from the chemicals in the water. This is a direct link of how plastic chemicals enter the food chain.

It is found that there is on average 8 million metric tons of plastic that enters the ocean from land every year, but that the actual amount could vary between 4.8 and 12.7 million metric tons. This is enough plastic to fill every foot of coastline in the world with five plastic grocery bags filled with plastic, and this occurs every year. While this is the most comprehensive study of marine plastics to date, it still does not factor in plastic debris dumped by ships or swept out to sea during natural disasters, like a tsunami or hurricane, suggesting the total amount of plastic entering the ocean could be even greater.

3. PLASTICS GETTING TO HUMANS IMPACTING HEALTH

Different plastics spread throughout the ocean. As Styrofoam breaks into smaller parts, polystyrene components in it sink lower in the ocean, so that the pollutant spreads throughout the sea column.

In fact, not only do the toxins in plastic affect the ocean, but acting like sponges, they soak up other toxins from outside sources before entering the ocean. As these chemicals are ingested by animals in the ocean, this is not good for humans. We as humans ingest contaminated fish and mammals.

There are different types of ways that plastic is dangerous for humans. Direct toxicity from plastics comes from lead, cadmium, and mercury. These toxins have also been found in many fish in the ocean, which is very dangerous for humans. Diethylhexyl phthalate (DEHP) contained in some plastics, is a toxic carcinogen. Other toxins in plastics are directly linked to cancers, birth defects, immune system problems, and childhood developmental issues.

Other types of toxic plastics are BPA or health-bisphenol-A, along with phthalates (mentioned above). Both of these are of great concern to human health. BPA is used in many things including plastic bottles and food packaging materials. Over time the polymer chains of BPA break down, and can enter the human body in many ways from drinking contaminated water to eating a fish that is exposed to the broken down toxins. Specifically, BPA is a known chemical that interferes with human hormonal function.

4. MICROBEADS AND CHEMICAL WASTE DUMPING

Microbeads are tiny pieces of plastic, often microscopic in size, that are added to a range of products, including rinse-off cosmetics, personal care and cleaning products. They are often included for their exfoliant or abrasive properties. These tiny plastic pieces can end up in rivers; lakes and an ocean by being washed down sink or drain after use. Microbeads are so small they cannot be filtered out during normal sewage treatment works.

Once in the water, microbeads have the potential to cause harm in the environment and to human health due to their composition, ability to attract toxins and to transfer up the food chain. Microbeads persist in the environment as they do not readily biodegrade and are almost impossible to remove from the environment due to their size. The best way to reduce their impact is to prevent them from entering the environment.

Chemical waste is any type of waste that is composed of noxious, potentially hazardous chemicals. Harmful chemicals and solvents that are the by-products of large scale laboratories and manufacturing plants serve as the most common examples of industrial chemical waste. However, certain household refrigerants, batteries and cleaning products qualify as chemical waste, too. Depending on the potency of certain chemicals and solvents, as well as the potential safety hazards they present, they may fall under the category of hazardous waste. Because of the safety hazards associated with this type of waste, most chemical waste must be disposed of in a special manner. For industrial forms of chemical waste, the disposal process typically involves sealing the waste in securely sealed chemical-resistant drums or barrels, then transporting the

safely stored waste to a special landfill. For household forms of chemical waste, many municipal landfills feature areas specifically designated for this type of waste. Like many forms of hazardous waste, chemical waste tends to be toxic, flammable, corrosive or reactive-or some combination thereof-so it's important to take the proper safety precautions when disposing of it.

5. PREVENTION OF CONTAMINATION

There are efforts to protect the oceans from plastic pollutants along with human health, but they are mostly grassroots organizations. As far as protecting yourself from contamination, it is probably best not to have a diet that consists mainly of fish, since most is probably contaminated. However, one of the most effective things we could all do as members of this fragile ecosystem is to be responsible for our trash. When we have the opportunity, we should try to avoid buying products packaged in plastic. We should always recycle plastic when we do use it. At the store, request a paper bag instead of plastic, or bring your own. Use a reusable water bottle, and of course don't litter.

6. RECOMMENDATION

It is recommended that there should be proper waste management system and waste should be treated before entering in to river. Educational and awareness programs should be organized to control the pollution. The Environment Ministers from all the country, territory and federal governments agreed to work towards a voluntary agreement from industry to phase out microbeads in personal care, cosmetic and cleaning products by 1 July 2018.

7. CONCLUSION

Humans to be irresponsible about cleaning up after ourselves is about to get us in trouble. We risk losing many species in the ocean as well as negatively affecting ourselves. The average person produces half a pound of plastic waste every day. No wonder the oceans are filling up with waste!

Marine plastic pollution is irreversible and globally ubiquitous, and thus meets two of the three proposed essential conditions for a chemical pollution planetary boundary. Evidence is growing about the ecological consequences of plastic pollution, but it remains an open question whether MPP also meets the third condition and has disrupted Earth system processes.

The proposed threat conditions and scenarios that define requirements for a chemical pollutant to be a planetary boundary candidate have needed to be adapted for MPP, where the solid-phase properties of plastic introduce additional complexity to chemical pathways and ecological impacts. The conditions are open to different interpretations, particularly regarding time and spatial scales. Trophic webs, ecosystem shifts, and the carbon cycle are complex cross-scale phenomena. Thus, whilst it is already evident that plastic is a planetary problem, there is high uncertainty and even ignorance about its disruptive Earth-system effects. Current literature lacks a broad, holistic view of how sub-systems link to each other and to the Earth-system processes that determine Earth’s self-regulating capacity.

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