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REDUCING THE DANGERS OF PLASTIC POLLUTION TO HUMANS AND ANIMALS: BEST PRACTICES

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Abstract

The global increase in solid waste production, particularly in the form of plastic waste, has led to severe health hazards for both humans and animals. The main issue arises from the non-biodegradable nature of plastics, which can result in negative effects on the health of humans and livestock. Among the animal population, stray cattle are especially susceptible to the dangers of plastic pollution, as they may inadvertently consume plastic materials along with their feed or fodder. To minimize these hazards, it is essential for the general public and livestock owners to adopt responsible practices in their use and disposal of plastic materials.

Introduction

Reducing the Dangers of Plastic Pollution to Humans and Animals: Best Practices

Introduction: Plastic pollution has emerged as one of the most pressing environmental challenges of the 21st century, posing a significant threat to the well-being of humans, wildlife, and ecosystems worldwide. As the production and consumption of plastic materials continue to increase at an alarming rate, the accumulation of plastic waste in the environment has reached unprecedented levels, with millions of metric tons of plastic debris entering the world's oceans, rivers, and terrestrial ecosystems each year (Geyer, Jambeck, & Law, 2017). The pervasive presence of plastic waste in the environment has far-reaching consequences for human health and biodiversity, as microplastics and associated toxic chemicals can enter the food chain, accumulate in the tissues of organisms, and cause various adverse effects on the physiological and reproductive functions of humans and animals (Wright & Kelly, 2017). To mitigate the dangers of plastic pollution and safeguard the health and well-being of humans and wildlife, it is imperative to adopt a comprehensive and proactive approach that encompasses best practices in waste management, policy-making, public awareness, and scientific research. The growing body of evidence on the environmental and health risks of plastic pollution has prompted scientists, policymakers, and civil society organizations to call for urgent action to reduce the production and consumption of plastic materials, enhance the efficiency of waste management systems, and develop innovative solutions for the sustainable use and recycling of plastics (Lau, Shiran, Bailey, & Cook, 2016). A key component of this integrated approach is the implementation of best practices in waste management, which include the establishment of effective

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regulatory frameworks, the promotion of waste reduction and recycling initiatives, the improvement of waste collection and disposal infrastructure, and the engagement of stakeholders at all levels of society in waste management efforts (Yousuf, Ahammad, & Parsons, 2020). By adopting these best practices, countries and communities can significantly reduce the amount of plastic waste that enters the environment, thereby mitigating the risks of plastic pollution to humans and animals. One of the most important steps towards reducing the dangers of plastic pollution is the development and enforcement of robust policy measures that target the production, consumption, and disposal of plastic materials. In recent years, numerous countries have introduced policies aimed at reducing the use of single-use plastics, such as plastic bags, bottles, and straws, through bans, levies, and other regulatory instruments (Xanthos & Walker, 2017). These policies have shown promising results in reducing the consumption of single-use plastics, and their widespread adoption and implementation can significantly contribute to the reduction of plastic waste in the environment (Dauvergne, 2018). In addition to these targeted policies, comprehensive strategies that address the entire life cycle of plastic products and promote the transition to a circular economy are essential for achieving long-term reductions in plastic waste generation and pollution (European Commission, 2018). Public awareness and education play a critical role in reducing the dangers of plastic pollution, as they can influence individual behaviors, social norms, and consumer preferences, as well as stimulate the demand for sustainable products and services (Kleiman, 2020). Numerous campaigns and initiatives have been launched worldwide to raise public awareness of the environmental and health impacts of plastic pollution, and to encourage responsible consumption and waste management practices at the household and community levels (Schnurr et al., 2018). These efforts can be complemented by targeted educational programs that integrate the topic of plastic pollution into school curricula, promote the development of critical thinking and problem-solving skills, and foster a sense of environmental stewardship among students (Klein et al., 2019).

Finally, scientific research plays a crucial role in advancing our understanding of the sources, pathways, and impacts of plastic pollution, and in guiding the development of effective strategies and solutions for its prevention and mitigation. Researchers from various disciplines, including environmental science, toxicology, materials science, and social science, have contributed significantly to the knowledge base on plastic pollution and its implications for human and animal health (Seltenrich, 2015). By fostering interdisciplinary collaboration, promoting the exchange of knowledge and expertise, and supporting the development of innovative technologies and approaches, the scientific community can contribute to the identification and implementation of best practices for reducing the dangers of plastic pollution to humans and animals.

The growing threat of plastic pollution to the health and well-being of humans and wildlife calls for a concerted and proactive response that encompasses best practices in waste management, policy-making, public awareness, and scientific research. By integrating these elements into a comprehensive and adaptive approach, it is possible to mitigate the risks of plastic pollution and safeguard the health and well-being of current and future generations.

1. PET or PETE (polyethylene terephthalate)

This is used for water and soft drink bottles, mouthwash bottles, containers for condiments like nut butters and ketchup and TV dinner trays. PET is considered safe, but it can actually leach the toxic metal antimony, which is used during its manufacture.

2. HDPE (high-density polyethylene)

HDPE is used in butter tubs, milk jugs, juice, household cleaner and shampoo bottles, as well as cereal box liners and grocery bags. It is often considered a low-toxin plastic, but like almost all plastics, it has been found to release *estrogenic chemicals.*

3. PVC (polyvinyl chloride)

It is used in plastic cooking oil bottles, deli and meat wrappers, shrink wrap, sandwich baggies, and plastic "saran" wrap. It is also found in plastic toys, lunch boxes, table cloths and blister packs used to hold medications. It is commonly used to make jewelry and fauxleather purses, shoes and jackets. PVC contains numerous toxic chemicals including lead and phthalate, which could disrupt the endocrine systems of wildlife, causing testicular cancer, genital deformations, low sperm counts and infertility in a number of species, including polar bears, deer, whales, otters, and frogs, among others.

4..LDPE (low-density polyethylene)

This is low-toxin plastic and it is used in bread bags, produce bags, squeezable bottles as well as coated paper milk cartons and hot/cold beverage cups. It can leach estrogenic chemicals.

5. PP (polypropylene)

Polypropylene is used in straws, yogurt containers, and syrup, ketchup, and medicine bottles.

It is considered a low-toxin plastic that is tolerant of heat 6.PS (polystyrene)

This is used in egg cartons, disposable plates, cups and bowls, take-out containers, coffee cups, meat trays, packing materials, and more. When heated, polystyrene can release styrene, a suspected nerve toxin and carcinogen. Heating styrofoam or using it for hot foods and beverages makes it leach toxins even more.

HUMAN HEALTH

Plastic contains chemicals or additives to give it certain properties. There is a wide range of additives, but probably the most relevant to ecology and human health are the following: **Bisphenol A** is a monomer that is used to make the hard, clear plastic in polycarbonate food and beverage containers, CD cases and many other consumer products. It is an endocrine disruptor and acts like the female hormone oestrogen. It leaches in variable amounts and for different lengths of time, depending on the product and conditions, i.e. it is released more easily at higher temperatures and with changes in acidity. Early development appears to be particularly sensitive to its effects, with a growing body of evidence for associations with chronic disease, including cardiovascular disease and type 2 diabetes and with hormonal changes in adults Experiments on animals have revealed that Bisphenol A (BPA) causes various impacts on their reproductive systems, as well as increases in body weight and insulin resistance. A major concern is that these adverse effects relate to current disease trends in
human populations, such as increases in prostrate cancer, breast cancer, sperm count decreases, miscarriage, obesity and type 2 diabetes.

Phthalates (diesters of 1,2 – benzenedicarboxylic acid) are a group of industrial chemicals used as plasticisers, which make plastics, such as PVC, more flexible or resilient. Highmolecular weight phthalates (e.g. di(2-ethylhexyl) phthalate, DEHP) are primarily used as plasticisers, but the low-molecular weight phthalates (e.g. diethyl phthalate, DEP) are used as solvents in personal-care products. This means the sources of phthalates in the environment are numerous. Certain phthalates have been shown to function as endocrine disruptors, and to have anti-androgenic activity. Experimental evidence of negative impacts on reproductive systems of animals and these resemble human reproductive disorders, especially testicular dysgenesis syndrome have been shown, indicating a possible link between phthalate exposure and human disease.

Dioxin emissions: The most dangerous emissions could be caused by burning plastics containing organochlorine-based substances like PVC. When such plastics are burned, harmful quantities of a group of highly toxic chemical called: Dioxins are emitted. Dioxins are carcinogenic and a hormone disruptor and persistent and they accumulate in body-fat and thus. Dioxins also settle on crops and in our waterways where they eventually wind up in the food, accumulate in the bodies and are passed on to generations with foetuses of pregnant mother.

The burning of polystyrene polymers - such as foam cups, meat trays, egg containers - releases styrene. Styrene gas can readily be absorbed through the skin and lungs. At high levels styrene vapor can damage the eyes and mucous membranes. Long term exposure to styrene can affect the central nervous system, causing headaches, fatigue, weakness, and depression.

MEASURES FOR MINIMIZING THE PLASTIC HAZARDS

1. Since plastic is found widely in processed food packaging, the most one can do is to reduce plastic toxins in one's life by changing the diet to include primarily fresh, whole, *unpackaged* foods from the farmer's market or food co-op. Buying in bulk or joining a buying club can make this very affordable.
2. Avoiding canned foods and beverages, including canned baby formulas and using BPA-free cans,reusable produce bags to hold and reusable grocery bags to carry all items during shopping and reusable glass or stainless steel water bottles to carry water
3. Avoiding disposable plastic or polystyrene dishes and utensils, Using super cheap mismatched ceramic dishes and stainless steel cutlery are recommended
4. Replacing the plastic kitchenware with items made from stainless steel, glass, ceramic, materials
5. Bringing one's own containers to the restaurant for both carryout and leftovers.
6. Storing shampoo, lotions, liquid soaps, and cosmetics in glass, ceramic or stainless steel containers. Because the toxins in plastic can cause health problems, it is important to avoid containers that leach chemicals like BPA, phthalates, lead and antimony into the food, water and the environment.
7. Using cloth diapers, Choosing glass bottles with real rubber nipples, wood or cloth teethers, etc. and replacing child's plastic lunchbox with a cloth or stainless steel one
8. Choosing wood, cloth, steel and paper-based toys for the children over plastic, whenever possible.
9. For minimizing hazards in livestock, the vegetable waste \kitchen waste should not be disposed off in the plastic bags as the animals are forced to consume the plastic bags along with the vegetable waste.
10. Rearing of the livestock in urban and semi-urban areas near to market places, roadsides are is to be discouraged as they attempt to eat foul and vegetable waste thrown in plastic bags.
11. Dietary impaction is usually encountered in animal fed in straw and poor quality hay with limited water access needs to be addressed and proper balanced ration is to be provided to the animals to reduce\avoid the incidence.
12. Pollution of the grazing lands with plastic bags, hair, hoof, wool, is to be avoided and awareness level among the livestock keepers is to be increased.
13. Farmers \livestock owners should be cautioned against unsupervised grazing of animals as there in danger of accidental ingestion of polythene bags.
14. Providing covered disposal bins for polythene materials separately in municipality areas to avoid ingestion by the animals
15. Popularising the slogan " Not using plastic carry bags when one can carry things in hand" can be another way to avoid the incidence of the problem.

However, in order to follow all the measures to minimize the plastic hazards, one should be having the sincere aptitude towards the protection of the environment and ecosystem.

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