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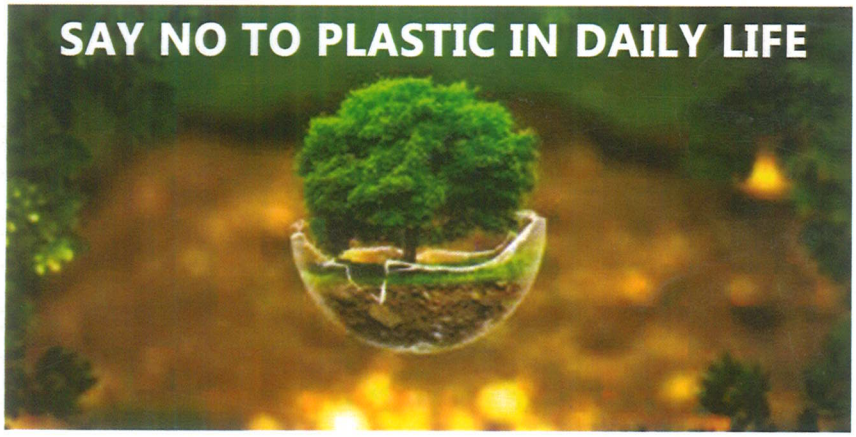

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PLASTIC OCEAN- A GLOBAL TRAGEDY FOR OUR OCEAN ECOSYSTEM

Dr.M.Maria Saroja,

Rev.Sr. Dr.L.Vasanthi Medona,

Abstract

Thousands of plastic factories are producing tons of plastic goods which are popularly used by the people because of their ease, cheapness and convenience. Due to non-biodegradable nature they cause hazardous negative impact on the environment. Disposal of them are major cause of environment pollution. The carcinogenic effect of plastic waste to human are birth defects, impaired immunity, endocrine disruption, development and reproductive effect. In addition to dumping of plastic material into marine, a large number of species are known to be harmed or killed which could jeopardize their survival. Marine animals are mostly affected through entanglement in and ingestion of plastic litter. Less conspicuous forms, such as plastic pellets and scrubber are also hazardous. This paper deals with the sources of plastic pollution, environmental impact and harmful effects of plastics in marine life.

Keywords: Endocrine, hazardous, anthropogenic.

Introduction

Plastics are a major source of global marine pollution. Ocean plastic pollution is an alarming issue due to its persistence, complexity, steady growth and the pervasive impacts it has on all aspects of ecosystems (Gregory, 2009).The problem requires holistic environmental remediation solutions at a global scale. Over the past 50 years, plastic as a material has evolved remarkably. Innovation in the plastic industry has led to new, low-cost, synthetic polymer resin formulations (i.e. plastics) that are versatile, durable and resistant to external shocks. Major end-applications of plastics include packaging, building and construction materials, automotive components, electrical and electronic equipment, agriculture, and medical equipment (Barnes, 2002).

Plastics are a range of synthetic or semi-synthetic polymerization products that can be molded into a permanent object having the property of plasticity. Plastic are found extensive industrial applications (Pandey,2015) .They have low specific gravities, ease of fabrication, resistance to low thermal and electrical conductivities. Many plastics can take range of colour to enable them useful for decorative purposes.

Dr.M.Maria Saroja, Associate Professor of Biological Science & Research Director, St.Ignatius College of Education, Palayamkottai.
Rev.Sr. Dr.L.Vasanthi Medona Assistant Professor of Mathematics, St.Ignatius College of Education , Palayamkottai.

Plastics in Daily Life

Plastics are widely used in making electrical instruments, telephones, paneling for walls, instrument boards, automobile parts, lamps, goggles, optical instruments, household appliances, etc. Plastic materials dumped into the earth prevent the production of nutrients in the soil. Because of this, the fertility of the soil is reduced and affects the agriculture sector. When its persistence in the environment can do great harm. It causes immune and enzyme disorders, hormonal disruption leading to endocrinal disorders and even infertility and is also considered as carcinogenic (cancer). Not only human health, it dangerously affects other animal life and alters the environment (air, water and soil) sustainability causing hazardous pollution. Plastic has become an optimal medium used in vast amounts of consumer products because it is lightweight, durable, inexpensive, and a good insulator. Unfortunately, within the last 30 years, scientists have realized that the useful attributes of plastics are what also make them detrimental to our environment. This is because it is difficult to eliminate plastic waste due to the fact that it does not biodegrade in nature, but only photo degrades into smaller pieces. The chemical bonds between the molecules that comprise plastic not only make them resilient, but also impervious to natural degradation (Shaw & Sahni, 2014). The percentage of plastics that make up the total municipal solid waste has risen 12 % over the last four decades (EPA, 2014). Almost one third of the plastic produced is used to manufacture single-use plastics (Gregory, 2009) such as coffee cup lids, stirrers, or straws.

Sources of Marine Plastic Pollution

About 80% of plastic pollution originates from land-based sources with the remainder coming from ocean-based sources. (Pandey, 2016).

- **Illegal Dumping and Inadequate Waste Management:** In the absence of effective landfills, fragments of plastic from open dumping grounds may be blown into streams, rivers or directly into the ocean.
- **Industrial Activity:** Inadequate disposal of products, or loss during production and transport may result in plastic waste being released into streams, rivers or the ocean.
- **Insufficiently Filtered Wastewater:** Wastewater treatment plants filter effluent, however very small plastic particles (micro plastics), such as cosmetic microbeads or fibres from clothing, cannot all be filtered out, making wastewater treatment plants a significant source of micro plastic pollution.
- **Coastal Littering:** Beach goers may leave litter behind, which can include cigarette butts, food and beverage packaging, and plastic beach toys.
- **Discharge of Storm Water:** During storms, runoff water can pick up municipal waste, waste from dumpsites, street litter or even landfill waste. This litter is then discharged into streams, rivers or directly into the ocean via the drainage network.

- **Combined Sewer Overflows (CSOs):** In the event of heavy rainfall, when combined sewer systems (carrying wastewater and storm water) are over capacity, mixed sewerage and storm water may be released untreated into nearby rivers or the ocean.
- **Natural Disasters:** Extreme events can result in almost any kind of waste being released into the ocean. Although uncommon, such events can cause substantial environmental impacts. In 2011 for instance, Japan's Tohoku tsunami produced a quantity of floating debris comparable to 3,200 years' worth of 'normal' debris input.
- **Fishing:** Boats may accidentally lose or deliberately dump fishing equipment (nets, lines and rope, etc) into the ocean.
- **Shipping:** Cargo ships may discharge litter into the ocean by accident.
- **Offshore Oil and Gas Platforms, Undersea Exploration**: Like with shipping, litter can accidentally be released into the ocean during any type of operation at sea.

Environmental Impacts of Marine Litter

Ocean plastic pollution places additional pressure on ocean ecosystems that are already severely strained by the impacts of human action. These existing stresses include acidification and warming due to carbon dioxide emissions, overfishing, and pollution by heavy metals and persistent organic pollutants. While the complete scale, extent and spatial distribution of the environmental impact of plastic is unknown, there is clear evidence from field- and laboratory-work that plastic debris threatens marine life and ecosystems in a variety of ways:

•**Ingestion:** The ingestion of plastic litter has been reported to date in over 250 marine species. The main impacts of ingestion include: physical damage or blockage of the intestinal tract, which can lead to infection, starvation and potentially death; reproductive and other health disorders due to the uptake of polychlorinated biphenyl (PCB) contaminated plastic fragments acting as a vehicle for PCBs into the marine food chain and energy effects resulting from carrying around the additional weight of ingested plastic (mainly in seabirds).

• **Entanglement and Ghost Fishing:** Entanglement in nets, ropes and other debris can be fatal to marine animals. Abandoned fishing gear can continue to 'ghost fish' for long periods of time while in the marine environment.

• **Transport of Non-Native and Invasive Species:** Floating litter can act as a vector for the transport of species, with slow travel rates providing time for species to adapt to the changing environmental conditions. The introduction of nonnative species through this transport mechanism can have detrimental effects on marine species diversity.

Environmental impacts of marine litter Ocean plastic pollution places additional pressure on ocean ecosystems that are already severely strained by the impacts of human

action. These existing stresses include acidification and warming due to carbon dioxide emissions, overfishing, and pollution by heavy metals and persistent organic pollutants.

Effects of Plastic on Ocean Life

Cheap and quick production, durability and usefulness in a number of applications make plastic a desired material for creating objects. But its durability is what makes plastic so dangerous to the environment. Wood is bio-degradable, it will ultimately return to the soil. Metals are not completely bio-degradable but they can be melted and then re-molded to form something new. But the chemical make-up of plastic makes it highly resistant to the degrading forces of nature. A plastic bag can remain for at least 10-15 years or even longer. To add to their harmfulness, they break into smaller and minute particles. Burning them releases noxious fumes. So when a plastic bottle is dumped into the ocean, it can sink to the bottom and remain on the ocean's floor for eons all together. That's just one plastic bottle or a bag, imagine a whole boatload of plastic debris falling to the ocean floor. And plastic products will sink, only if there is some weight or mass to them. Here's the real problem with plastic products; they float, especially plastic bags. (López &Martín, 2015).

A plastic bag floating on the surface of the ocean can fool a sea gull or albatross into thinking its food. On scooping the bag up, the bird could try to swallow it and end up choking. If it manages to ingest it, the bag will slowly poison the bird from within. Small, white pieces of plastic look like fish eggs or small fish. Such debris can be used to build nests and feed chicks. Another deadly plastic product is six-pack can ring. There are horrifying pictures of birds and fish getting entangled in these rings and slowly dying due to an inability to breathe. Such pack rings have sharp edges and can cut or wound an animal grievously. Plastic fishing nets have equally harmful consequences.

The Following are Some Statistics Showcasing the Different Harmful Effects of Plastic on Marine life:

Due to ingestion or entanglement in plastic debris, over 270 species, including turtles, fish, seabirds, and mammals, have experienced impaired movement, starvation, or death (Laist 1997; Wabnitz & Nichols, 2010).

- A study conducted by Dutch researchers on marine life in the North Sea reported that the local seagull population has ingested so much plastic, that an average of 30 plastic pieces could be found in one seagull's stomach.
- Albatrosses are other sea birds which are vulnerable to plastic pollution. According to some reports, albatross chicks die from being fed plastic by their parents, who have mistaken it for food.
- Plastic has been found in nearly every level of the oceanic food chain. From large predators like sharks and whales to turtles and jellyfish, no animal is safe from accidental ingestion. Even plankton, the tiniest of marine organisms have ingested plastic. In some areas of the ocean, like the Great Pacific garbage patch, plastic mass exceeds the local zoo-plankton population.

An estimated one hundred million metric tons of plastic are present in the Earth's oceans. If one plastic bag can bring down birds and fish, imagine the consequences of this number. The effects of plastic on marine life are so devastating, soon the planet's sea animals and birds will end up as nothing but statistics. Species will slowly become endangered and then extinct.

Conclusion

The Ocean Clean-up Array is another groundbreaking solution for cleaning up plastics circulating in the ocean gyres. Solid floating booms are attached to platforms that are anchored to the ocean floor. Recycling is the current solution to the overuse of plastics, but the final destination of a considerable amount of recyclable material is still being assessed. Solutions to ensure materials are recycled or disposed of properly need to be developed. Even with research, recycling, and new technologies, alternate packaging material should be utilized to reduce the dependence on plastic goods. Plastics do not disappear and will remain in our environments indefinitely affecting wildlife, until the pollution is reduced.

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ENVIRONMENTAL COMMITMENT OF TEACHERS TOWARDS FREE FUTURE

Dr. P.C. Nagasubramani
M. Thavasi

Abstract

Plastics have transformed everyday life: Usage and annual production is likely to exceed 300 million tones by 2010. It is evident that plastics bring many societal benefits and offer future technological and medical advances. However, concerns about technological and medical advances. However, concerns about usage and disposal are divers about include accumulation of waste in landfills and in natural habitats, physical problems for Wildlife resulting from ingestion or entanglement in Plastic, leaching of chemicals from plastic products and the potential for plastic to transfer chemicals to Wildlife and humans. Around 4 per cent of World Oil Production is used as a Feedstock to make plastics and a similar amount is used as energy in the process. Yet over a third of current production is used to make items of packaging, which are then rapidly discarded. There are solutions, including material reduction, design for end-of-life recyclability, increased recycling capacity, and development of bio-based feedstock. Such measures will be most effective through the combined actions of the public, industry, scientists and policymakers. There is some urgency, as the quantity of plastics produced in the first 10 years of the current century is likely to approach the quantity produced in the entire century that proceeded.

Introduction

Single- Use Plastics are a major Source of Pollution. We dispose of 50 billion Plastic bottles every year and cities are starting to ban Plastic bags because of the damage they've caused to the environment. As plastic degrades, a Process that can take 500-1000 Years, it breaks down into tiny particles that float through the ocean and endanger marine life. but they also emit toxins that contaminate fish, and eventually, humans.

Adults are taking action to fix the damage we've done and help leave behind a cleaner planet for the next adults are taking action to fix the damage we've done and help leave behind a cleaner planet for the next generation, but it's also important for Children to get involved in these efforts. By teaching them the importance of eliminating Plastic and selling out other options early on, it will help them adopt new, more eco- friendly habits that they'll carry into adulthood.

Dr. P.C. Nagasubramani
Associate Professor, Department of pedagogical Sciences, TNTEU Chennai.
M. Thavasi , Ph.d. Research Scholar
Department of pedagogical Sciences,TNTEU Chennai.

Teaching Children about Our Plastic Problem

It can be hard for young Children to Understand the magnitude of our Pollution Problem and Why they Should From Party favors to Cutlery and decorations, birthday Parties are a big Source Of Plastic Waste, Store aisles are filled With theme Party Options that are fun and Convenient to buy, but you can easily swap these items out for eco- friendly alternatives without Sacrificing the Party Favors and Colorful décor.

- Instead Of filling goodie bags with toys, Choose Plastic – Free party favors like sidewalk chalk, colored pencils, natural crayons, homemade play dough, or home made play dough or homemade Cookies and gummy bears.
- Trade the Plastic party favor bag for recycled paper bags that colorful drawing, Scraps of fabric or colored paper. Let Children decorate their own bags as a fun .activity, and then let them choose which party favors they like to take home.
- Skip the flimsy Plastic banners and make a customized banner out of Cloth or recycled paper instead.
- Latex and Mylar balloon (even those labeled as "biodegradable") harm wildlife when animals ingest the balloon pieces or become
- Latex and Mylar balloons (even those labeled as " biodegradable '') harm Wildlife When animals ingest the balloon pieces or become entangled in the colorful paper decorations or Utilize the natural elements of your backyard to create a fun and inviting space
- For Party ware use biodegradable drinking Straws in fun colors and compostable Cups, Plates, and Silverware.

  By working together, we can all help keep our Planet clean for generation to come.

Ways to Create change in your Community

1. **Learn, Share and join**

   The first step towards action is knowledge. Are you a member of a Community Group that is eager to learn more about how they can protect our Oceans and communities? Maybe your child's teacher is looking for way to teach kids about environmental protection? Our toolkit has power points and tips for giving a Presentation- you can

2. **Be heard in the media**

   If you want to make change in your Community, Start with local newspaper, blogs and magazines are a great venue for getting the word out. In the tool kit, we walk you through how to write a letter to the editor of your local newspaper and how to get it Published.

3. **Help create Plastic- free Supermarkets and restaurants**

Nowhere is the dominance of single-use Plastics and wasteful packaging more obvious than at the local supermarket. Make waves in Your Community by working to get a local supermarket to reduce their use of single-use plastics.

4. **Use restaurants to ditch single –use plastics**

The plastic straws and utensils at fast food places and cafes? Join the growing movement to get rid of throwaway Plastic Products.

5. **Lobby for local legislation**

All over the World towns, cities and villages are standing up for a plastic –free future by implementing local bans and laws restricting the use of throwaway Plastic. Be part of this movement by working with your local government to do the same.

6. **Organize a local cleanup and #Break free from Plastic brand audit**

Everyone loves a cleanup event. So why not of take it to the next leave? Get your community together to clean up a local beach, park, or riverbank –but don't stop there. Go through the single – use plastics collected and identify which companies produced them. Let's hold corporations responsible of their plastic waste!

7. **Start a community group!**

You don't have to go it alone. We have a lot of work to do, and we'll get a lot further- and have more fun-together. Get some friends and neighbors together for a plastic-free future!

Are you interested in joining the Project? Here's How to start.

Step One: Education. Learn in the classroom, conduct a peer education campaign, or bring in outside presenters. A brief summary of plastic pollution, myths and common misconceptions could be found here on this site. More in-depth information, including news stories and peer-reviewed articles, can be found at the Plastic Free Times website.

Understand exactly what items contribute to plastic pollution. Before you get to the plastic pollution. Before you get the student body involved, educate yourself on what are the greatest contributors. Many items in your backpack or in the classroom are made of disposable plastic; these items are the real problem, greatest contributors to plastic pollution. They include plastic straws, plastic bottles plastic utensils, plastic cups, plastic wrapping for your sandwiches and the list goes on.

Step Two: Collaboration: Get teams together, including peers, educators, and administrators? To really address the problem, you'll need peers to help spread the word, Teachers to provide help along the way, and campus administrators that

are willing to listen and ready to make policy changes. Share what you have learned. A great start is the one- sheet you can download.

Step Three: Investigation: Find out how much and what kind of disposable plastic your school uses in a Year, a month or a day. This is your school; plastic footprint. Understanding Your Campus's Plastic program is the key to change, because it will help focus your efforts on the biggest problems, and you may be surprised by what you find.

The plastic footprint accounts for items that are regularly thrown into the garbage or recycling bin, including plastic bottles and cups, polystyrene cups, containers and trays, plastic straws, plastic utensils, plastic baggies and food wrap, and other food packaging. Campus goes through can be hard, but you may be able to measure it

Step Four: Action: Take on the biggest contributors to you campus's plastic footprint, and set a goal for reeducation.

Create a plan that includes the following areas:

- The problem. Explain the most common sources of plastic pollution at your school, including approximate quantities consumed per week,
- The path to education. Distribute outreach materials to the student body, and a plan to expand the use of alternatives;
- The solution. Define your reeducation targets, including a timeline, a strategy for getting the students

Conclusion

Discharge plastic into water bodies it might choke the fishes to death, which humans have been doing for a long time now, stray animals also eat food out of the plastic bags and sometimes they eat the plastic, which again can be harmful to their health. So, we need to stop the use of plastic and turn to more environment friendly materials for example jute. If we have many plastic bags in our home we can recycle them instead of throwing them away. This is a small thing at we can all do to protect our environment. Plastic-The new powerful enemy of the environment.

Yes, the above statement is true. Plastic is a polythene material which has become very popular lately. We use in our everyday lives. From carrying groceries from the market to carrying anything else, we use it-this is true for plastic bags. We even use other things made from plastic boxes, water bottles or even plastic utensils. But we don't notice one thing. We are harming the environment. Yes plastic is a non biodegradable and a toxic waste. If we discharge plastic into water bodies it might choke the fishes to death, which humans have been doing for a long period of time.

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HEALTHY OCEAN: PREVENTING PLASTIC POLLUTION

G. Daniel Sathya Singh

Abstract

Plastic pollution is a global problem that is growing exponentially due to both an increase in consumerism and an increase in the number of plastics used to manufacture the things we use on a daily basis. The demand for plastic has increased dramatically over the last few years. According to Plastic Ocean, 300 million tons of plastic is produced globally every year. Half of that plastic is used for disposable items that will only be used once. As a result, more than 8 million tons of discarded plastic ends up in our oceans every single year. Once it is there it doesn't readily go away. This paper provides actions required preventing plastic pollution to make healthy Ocean.

Key words: Disposable, Plastic pollution

Introduction

Plastic is a word that originally meant 'pliable and easily shaped'. Now it has become a name for a category of materials called polymers. The word polymer means 'of many parts', and polymers are long chains of molecules. Polymers abound in nature. Cellulose, the material that makes up the cell walls of plants, is a very common natural polymer. But the term 'plastic' is used for human-made, synthetic polymers. Synthetic polymers are made up of long chains of atoms, arranged in repeating units, often much longer than those found in nature.

Plastics products are not bio-degradable. But under stress, say heat or sunlight, they keep disintegrating over time into smaller and smaller particle. Thrown away, single-use plastics items begin to break down into smaller particles, becoming tinier over time, becoming micro plastics (less than 5mm) and even more miniscule. Whatever the size, the chemical ingredients used to make the items remain in these particles. These ingredients are toxic. Thus, micro plastics become carriers of the chemicals. They can roll, fly, float...litter streets, block storm drains... make their way, via rivers, to the ocean...go anywhere. And take the toxic chemicals with them. Moreover, micro plastics are known to act as sponges, attracting and absorbing persistent organic pollutants. Species living there are affected.

Actions Required Preventing Plastic Pollution to Make Healthy Ocean:

Propagandaor Preach the Evil of Usage of Plastics

Stay informed on issues related to plastic pollution and help make others aware of the problem. Tell friends and family about how they can be part of the solution, or host a viewing party for one of the many plastic pollution focused documentaries, like Bag It, Addicted to Plastic, Plasticized, or Garbage Island.

G. Daniel Sathya Singh
Assistant Professor in Computer Science,
PSN College of Education, Tirunelveli

Support Plastic Ban Policies

Many municipalities around the world have enacted bans on single use plastic bags, takeout containers, and bottles. You can support the adoption of such policies in your community.

Avoid the Products Containing Microbeads

Tiny plastic particles, called "microbeads," have become a growing source of ocean plastic pollution in recent years. Microbeads are found in some face scrubs, toothpastes, and body washes, and they readily enter our oceans and waterways through our sewer systems, and affect hundreds of marine species. Avoid products containing plastic microbeads by looking for "polythelene" and "polypropylene" on the ingredient labels of your cosmetic products.

Avoid Use of Single-Use Plastics

Wherever you live, the easiest and most direct way that you can get started is by reducing your own use of single-use plastics. Single-use plastics include plastic bags, water bottles, straws, cups, utensils, dry cleaning bags, take-out containers, and any other plastic items that are used once and then discarded. The best way to do this is by a) refusing any single-use plastics that you do not need (e.g. straws, plastic bags, takeout utensils, takeout containers), and b) purchasing, and carrying with you, reusable versions of those products, including reusable grocery bags, produce bags, bottles, utensils, coffee cups, and dry cleaning garment bags. And when you refuse single-use plastic items, there is an evident need of reducing our usage of plastic. It means changing our everyday behaviors and not using plastic when there is a better alternative to it.

Proper Recycling is Essential

This should go without saying, but when you use single-use (and other) plastics that can be recycled, always be sure to recycle them. At present, just 9% of plastic is recycled worldwide. Recycling helps keep plastics out of the ocean and reduces the amount of "new" plastic in circulation. Plastic recycling consists of collecting plastic waste and reprocessing it into new products, to reduce the amount of plastic in the waste stream.

Organize a Beach or River Cleanup

Help remove plastics from the ocean and prevent them from getting there in the first place by participating in, or organizing a cleanup of your local beach or waterway. This is one of the most direct and rewarding ways to fight ocean plastic pollution. You can simply go to the beach or waterway and collect plastic waste on your own or with friends or family, or you can join a local organization's cleanup or an international event like the International Coastal Cleanup.

Support All Organizations Addressing Plastic Pollution

There are many non-profit organizations working to reduce and eliminate ocean plastic pollution in a variety of different ways, including Oceanic Society, Plastic Pollution Coalition, 5 Gyres, Algalita, Plastic Soup Foundation, and others. These

organizations rely on donations from people to continue their important work. Even small donations can make a big difference.

Personal Responsibility

We all also need to take personal responsibility and significantly limit our use of plastic. It is the vital one which makes the global environment a plastic free environment and changes the environment better for all organisms to live and grow.

These are ideas only scratches the surface for ways you can help address the growing problem of plastic pollution in the oceans. The important thing is that we all do something, no matter how small.

Refuse Plastics

- **Plastic is Forever:** Every bit of plastic that has ever been created still exists, including the small amount that has been incinerated and has become toxic particulate matter. Plastic is a material that the Earth cannot digest.
- **Plastic Poisons our Food Chain:** Plastic creates toxic pollution at every stage of its existence: manufacture, use, and disposal. In the environment, plastic breaks down into small particles that attract toxic chemicals. These particles are ingested by wildlife on land and in the ocean, contaminating the food chain.
- **Plastic Affects Human Health:** Harmful chemicals leached by plastics are present in the bloodstream and tissues of almost every one of us, including newborns.
- **Disposable Plastics are the Main Source of Plastic Pollution:** Consumption of disposable plastics—bags, bottles, straws, utensils, polystyrene cups, film, food packaging and more—has spiraled out of control. These items are used for seconds, hours or days, but their remains last forever.

Conclusion

Pollution from solid waste, in particular from plastics, has emerged as one of the greatest global challenges, threatening the well-being of our environments, ecosystems and species. If not managed well, plastic has negative effects on human health, marine biodiversity, ecosystems and ecosystem services, including fisheries, maritime transport, recreation and tourism as well as local societies and economies. In conclusion, the ocean pollution is a global problem in the world that suffered many organisms. It is important to think seriously to solve all plastic pollution in the ocean because it is a place to keep marine species survives, as they also consider one of the important sources for humanity. If ocean polluted and or contaminated, it will directly cause an adverse impact on human health and marine organisms as well as cause habitat destruction for marine organisms. Hence we must take actions require avoiding plastic pollution to make ocean healthy and make the environment better for living.

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ROLE OF TEACHER IN PLASTIC FREE SOCIETY

Dr.N. Theresita Shanthi
M. Krishnavenidhivya

Abstract

Plastic in the environment is regarded to be more an aesthetic nuisance than a hazard, since the material is biologically quite static. The ubiquitous presence of plastic in our daily lives might make this seem like an impossible task. It is inexpensive, easy to manufacture, and ideal for many innovative technologies. While plastic alternatives can be costly, the long-term health and environmental benefits of going plastic-free far be more important than the initial economic costs. The Teacher's responsibility also plays an important role to make the society plastic free. Hence this paper focuses on overview of plastic free, need to go plastic free, teacher's reinforcement and steps for involving students in plastic free society.

Key words: Hazard, Aesthetic, Innovative, Plastic free, Manufacture

Introduction

Plastic is cheap, it gets discarded easily, and its diligence in the environment can do great harm. Plastic in the environment is regarded to be more an aesthetic nuisance than a hazard, since the material is biologically quite static. It is one of the new chemical materials which pose environmental problem. It reduces soil fertility by forming the part of compost for years. It can reduce the growth of plants and trees by blocking the assimilation of minerals, water and other nutrients. It can cause landslides. It is the teacher's responsibility to make the society plastic free. Students, who are so energetic and dedicated to anything they, feel drawn towards. Teacher can make the students do phenomenal work in making environment plastic free a successful campaign. Teacher can also instruct students to avoid using plastic bags for bringing their materials. Teacher should encourage every student to use re-usable containers for lunches and to use recycle boxes and plastics, not only to students but also to parents so that they can learn from them.

Meaning of Plastic Free

Plastic has become an almost-unavoidable part of modern everyday life. It is inexpensive, easy to manufacture, and ideal for many innovative technologies. Pledging to transition away from not reusable plastics is pledging to end the utilization of single-use items meant for a landfill. It can start with an elevated education about the effects of plastic production and consumption, and a removal of basic products like plastic bottles and bags, plastic film, and other unnecessary product packaging.

Dr.N. Theresita Shanthi
Assistant Professor of Physical Science, St.Ignatius College of Education
M. Krishnavenidhivya
M.Ed Scholar, St.Ignatius College of Education

While plastic alternatives can be costly, the long-term health and environmental benefits of going plastic-free far be more important than the initial economic costs.

Need to go Plastic Free

- **Massive carbon footprint:**

Single-use not reusable plastics have a huge carbon footprint. Whether it made from petroleum or plants, plastic manufacturing is not well-organized due to the scale of production.

- **Effects of human health:**

Both the production and disposal of single-use plastics frequently release enormous amounts of dioxins, a highly toxic side-effect linked to increased cancer rates and other human health effects.

- **Plastic lasts forever:**

Plastic can never be broken down by natural processes; every particle of plastic that has ever been created motionless exists in a form toxic to all terrestrial and marine life.

- **Difficulty in disposal:**

Plastics can be difficult to dispose of. Not all areas have the infrastructure to reuse single-use plastics; thus, many eco-friendly plastics take up valuable landfill space. When not able to be reused or land filled, they are frequently sent to incinerators, releasing environmental toxins into the atmosphere.

- **Plastic poisons our food chain:**

It is increasingly found in the ocean and nerve of marine life, extending to affect the health of human populations who pertain on fish and other marine life for food sources.

- **Save money:**

Going plastic-free can save our money. Depending on reusable items enable us to avoid stable purchasing of disposable items.

- **Disposal culture:**

Single-use plastic items are responsible for a wasteful, throw-away culture. Our society is far too valuable to be thrown away.

Teacher's Reinforcement for Plastic Free

Teacher makes the change worth it for students. Teacher can reward campus inhabitants for participating in plastic-free initiatives, warning students for disobedience can also be effective. Teacher should keep in mind that deterrents have the possible to frustrate campus residents, and may result in repulse against plastic-free initiatives so use them wisely and sparingly.

Steps for Involving Students in Plastic Free

Teacher can make students to involve in plastic free initiatives through project. There are five steps to organize a project. They are:

- **Form a team:**

The first step is to get a small team together. The most successful projects are a collaborative effort. Teacher will need a team of about 3-4 people, and also buy-in from the college principal. Assign different roles to each person, including visiting each class, designing a workshop, internal communications in the school, linking with the wider community.

- **Visit classrooms and get involved the whole college:**

To make sure it is fully participatory teacher need to visit each classroom and let everyone knows what you are planning and encourage the students to ask questions and make suggestions. Tell them about the three asks: support reusable water bottles, say no to plastic lunch boxes and plastic straws. Teacher makes the student to use the available posters in the resources section to communicate what everyone can do to help the college achieve the three asks. At each classroom visit teacher ask everyone to commit to the three asks and put some posters up in the classroom.

- **Communicate with the wider college community**

This project will only be a success if it has support from the wider college community, particularly parents and guardians, as they will be involved, in reducing plastic lunch boxes, and in supporting the children as they read the message in the larger community. Communicate through any mediums that the college usually uses, for example the website, Whatsapp and Facebook groups. In these communications teacher could include the three asks.

- **Conduct a Workshop**

Teacher can prepare and deliver a workshop to create an interactive experience for the students. In the resources section teacher will find a useful guide to prepare the workshop, which includes worksheets activities and group discussion.

- **Become Plastic Free Ambassadors in the community:**

Once college is up and running on its path to becoming a Plastic Free college, it is time to become ambassadors in the community. There are lots of ways to do this, some ideas are:

- Link up with local tidy towns group to get them to spread the message and maybe organize a joint clean up in local area.
- Link with other colleges to encourage them to get involved too.
- Replicate the actions in local sports clubs that students are involved with.

Conclusion

Students have a positive experience with plastic-free initiatives. The teacher's goal is not to burden individuals by making it difficult to follow these initiatives. Reducing plastic use is important, and the teacher's goal is for students to realize that being plastic-free is possible, easy, inexpensive and can be done without missing out on anything.

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WASTE REDUCTION CLASS IN SCHOOLS

Dr.P.C.Naga Subramani
J.Jerlin Femi

Abstract

Waste reduction class in schools generate interest in the topic of solid waste as an environmental issue. This class focus on reducing, reusing, and recycling material waste at a school with the overall goal reduce waste at the school. A successful waste reduction class includes a focus on preventing waste, understanding where waste ends up, and exploring how waste issues impact the land, air, water, and other living things in the local environment.

Introduction

Students involved in waste reduction class explore topics of how humans interact with the world around them including the use of natural resources, impacts on the land, water, air, and other living things in a local environment. Students think about their actions and learn to make their own choices. Students begin to develop a sense of wonder about the world around them and will understand the importance of caring for the Earth.

Classes can target overall waste generated at the school, a specific material, increasing reuse of office supplies, and much more. Waste reduction can also take place behind the scenes as faculty and staffs engages in sustainable practices such as duplex printing, digital communications, sustainable purchasing of office supplies and materials, and engaging in conversation with the school's waste hauler.

Benefits

Schools engaged in successful waste reduction programs see benefits both financially, academically, and environmentally.

- **Educationally**

Students develop civic responsibility, communication and team-building skills, improve critical thinking & problem solving skills, and cultivate inquiry and analysis skills that are keys to solving any real-world problem. Students learn to value the natural world and understand how humans and the environment interact.

- **Environmental**

Taking steps to reduce school waste can have a huge impact on the environment. The school can save energy, reduce greenhouse gas emissions, and decrease the amount of material in landfills by implementing waste reduction projects.

Dr.P.C.Naga Subramani, Associate professor,
Department of Pedagogical Sciences, Tamil Nadu Teachers Education University , Chennai.
J.Jerlin Femi,Ph.D. scholar,
Department of Pedagogical Sciences, Tamil Nadu Teachers Education, University, Chennai.

Reducing waste can have positive impacts on local soil and air quality. Students become champions of the environment.

- **Financially**

Starting a new program may have some costs, but waste reduction programs can decrease disposal costs. By increasing recycling rates, schools may be able to cut costs by reducing how often trash is picked up. In addition to cutting waste disposal costs, several programs exist which actually allow schools to bring in additional revenue by selling recyclables.

Beyond Recycling - Reduce, Reuse, Recycle

Students are taught at young ages to practice the "three R's" in order to care for the environment. It's a big challenge to task students with saving the planet, but it is important to challenge students to understand that their action impacts the health of the environment. Learning to reduce, reuse, and recycle, is a good start because it easy a manageable task for learners of any age to achieve, and the topic is universal.

Here is an example of a school who has taken on a project to reduce the amount of paper sent to the landfill:

Reduce

- Teachers, staff, and students begin to reduce use through duplex printing
- Teachers and students only print what is absolutely necessary
- Teachers begin to assign work that does not need to be written
- Teachers use a smart board or chalkboard to deliver written instructions
- Students submit assignments digitally rather than in print

Reuse

- Students collect paper scraps and turn them into note-pads.
- Students and staff create a paper supply exchange for notebooks and other paper products a person no longer uses.
- The student art clubs turn old homework into paper mache materials, recycled beads, and more.

Recycle

- Students and staff collect and recycle old homework
- Students host a paper recycling competition to determine see grade level can collect the most paper.
- The school hosts a recycled paper drive for the community and weighs the final amount collected.
- The school starts purchasing paper made from recycled paper.

Teachers teach us

If you are looking to investigate solid waste issues in your school and take action to reduce, reuse, and recycle resources from the waste stream then this guide is for you! The purpose of this guide is to assist educators seeking to launch or expand a waste reduction program in their school. Students exposed to this knowledge pick up key strategies to reducing waste in their schools, homes, and communities. Included in this resource guide are steps to take when starting projects and keys to success. These elements include a problem-solving framework for addressing the issue, tips on integrating waste reduction into curriculum, kick-start activities to launch your class, and case study examples of successful waste reduction class from around the area. Additionally, this guide is a part of a larger toolkit to enable educators to implement waste reduction projects in their school and classrooms. This toolkit includes posters, fliers, bookmarks, and bin labels that may be downloaded and used in the school or classroom. Educators are free to modify, reproduce, and recreate these materials to fit their needs as long as it is for educational purposes. By empowering youth with the appropriate knowledge and resources students can work to achieve waste reduction goals. As young learners, students form the knowledge-base and values that are carried into their adult lives. These values and judgments impact student's relationship to the environment. For this reason it is imperative that students are exposed to environmental education. Every school and school district is distinct so what works best at one location may not always be the way that works for all schools. Keep in mind that every waste reduction program is unique, takes time, and is beneficial to the classroom, the school, your community, and the environment.

Conclusion

Teachers at MRH Middle integrate the waste system as a part of their teaching from a systems thinking approach. Teachers use the school building as a learning tool as many initiatives focus on conservation and waste reduction. Students are tasked as leaders in sustainability initiatives at the school. From the beginning of the program, much of the movement towards waste reduction has been student led. A student sustainability club was formed as a means of getting interested students engaged in furthering new initiatives at the school. Currently students have taken on the task of expanding the composting program to include cafeteria waste. When the expanded compost program first launched, students and faculty realized that there was a greater need to inform students and staff about proper composting procedures, conduct periodic checks of the system to ensure that the compost does not become contaminated, and to engage as the key supervisors of sorting materials in the cafeteria.

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PRECAUTION AND PROSPECTS OF PLASTIC WASTE MANAGEMENT

Rev.Sr.Dr.Nirmala Devi
Dr. R. Indra Mary Ezhilselvi
M. Vincy

Abstract

Plastic waste is defined as the gathering of the different types of plastic material on land, as well as in water bodies like rivers, oceans, canals, lakes, etc. Plastic is used on a large scale all around the world. Plastic materials are classified into thermoplastics and thermosetting polymers. Plastic waste that is thrown into the trash for long period can leave many poisonous effects for the environment. Plastic which is disposed of can be recycled and used in many different ways such as for tote bags, wallets, or pouches. There are biodegradable plastic bags available, which can help to a considerable extent. Hence this paper focuses on overview of plastic waste management, issues and challenges, precautions and prospects and 4 A's of plastic waste management.

Keywords: Thermoplastics, thermosetting, polymers, biodegradable

Introduction

Plastic is synthetic material made from wide range of polymers that can be moulded into shape when soft and set into a rigid or slightly elastic form. The word 'plastic' comes from Greek word plastikos, which means able to shape or mould. Shaping plastics by using heat is a basic part of its manufacturing process. It is divided into two groups based on thermal processing behavior Thermoplastics and thermo sets. Thermoplastics can be heated and reshaped. Thermoses cannot be reformed, remolded or reshaped. Plastics are very useful material but the indiscriminate use and reckless disposal of plastics causes challenges and not plastics by themselves.

Plastic Waste Management

Plastic waste is produced when plastic has gathered in an area and has started to negatively influence the natural environment and create problems for plants, wildlife and even human beings. Plastic waste management means the scientific reduction, re-use, recovery, recycling, composting or disposal of plastic waste. Plastic waste management involves collection, storage, transportation, reduction, reuse, recovery, recycling and disposal in an environmentally safe manner.

Rev.Sr.Dr.Nirmala Devi, Principal,
St.Ignatius College of Education, Palayamkottai
Dr. R. Indra Mary Ezhilselvi, Assistant Professor of Psychology,
St. Ignatius College of Education, Palayamkottai.
M. Vincy, M.Ed Scholar,St.Ignatius College of Education, Palayamkottai

Plastics are very useful material with applications in domestic and industrial sectors.Let us look at how plastics have become a problem.

Widespread Use of Plastics

The use of plastics in today's life is widespread. They have found a place in everyday things like toothbrushes, water bottles and storage containers in households, to pipes, tubes and fittings in the electrical, electronically and plumbing industry and packaging consumer products including food products. Their durability and strength make them ideal for packaging and transporting all kinds of consumer and industrial products.

Disposable, One Time Use Plastic Items

Disposable cups, plates, spoons, drinking straws, and other items are made of plastics or plastics fused with other materials. Weddings, parties and other community events are also major consumers of this kind of plastics. Disposable plastics has a major role in the medical field, for instance, disposable syringes, surgical instruments, blood and saline bags, gloves, surgical gowns etc.

Sanitary and Cosmetic Products

Disposable menstrual products and diapers get mixed with municipal solid waste. These products contain cotton and rayon but also a significant amount of plastics or polymers. These plastics cannot be recycled or reused. Cosmetic products also use a lot of disposable plastics –containers for cosmetics and even micro plastics in the form of micro beads in face cleansers, body washes etc. These needs to be disposed of in the hazardous waste bin.

Lack of Waste Segregation at Source

Segregation of waste at source is not commonly being practised – food and wet waste (whichcan be composted) is mixed with dry waste like plastics and paper (which can be recycled butcannot be composted). The practice of segregation has to become a habit.

Plastics Waste Mixed with Municipal Solid Waste

When plastic waste is mixed with municipal solid waste, it reduces the efficiency of municipal waste management. When waste is segregated and collected, the wet/food/organic part of it is composted; items like paper, plastics, metal, glass, etc. are sent for recycling.

Precautions and Prospects

Avoid buying plastic packaged items: Buy food in glass jars rather than plastic ones, and detergents in boxes rather than bottles. It is to tell that, not only reducing the plastic use, instead sending a powerful message to the makers of those products of plastic packaging.

Use cloth shopping bags: Plastic bags are dangerous to wildlife. We should keep reusable bags to avoid plastic bags. While going to the market, grocery store or mall keep reusable bags.

Skip bottled water. Carry a reusable canteen: Plastic bottles are one of the top five most common types of litter found on beaches. Avoid the possible hazards of plastic toxins leaching into your beverage.

Wealth from Waste : Think of new uses for old items rather than discarding them or buying new ones.

Bring a reusable mug when you order coffee: Stow it on your desk, in your purse, car or bag so you have it on hand when you order or refill your drink.

Wear clothing made from natural (not synthetic) materials: Wearing and washing clothes causes fibers to flake off, and polyester clothing is made of plastic. Tiny particles of microplastic found in oceans around the world have been traced to such synthetic fabrics.

Avoid disposable tableware, or use the compostable kind: Try using washable and reusable cups, plates or utensils. When using compostable tableware, be aware they will not biodegrade in a landfill and must be disposed of in appropriate composting conditions.

Don't just discard electronics: Aim to repair or upgrade your devices instead of buying new ones. Sell gadgets and computer parts, or find a facility where you can turn them in for recycling.

Four A's of Plastic Waste Management

Plastic waste could be controlled through these four A's:

- **Awareness**

  Great journey starts with the first step. Any measure taken starts with the change in mind set and attitude created by the awareness within.

- **Avoidance**

  Once we come to know the ill effects it must be avoided immediately. Avoid using single use plastic and throwing it away in the eco-stream.

- **Alternate**

  We are used up with the usage of plastics right from the toothpaste we hold to the plastic mouse of our personal computers. It is wise and advisable to find a suitable and also could replace plastic usage. Necessity is the mother of all inventions. Now its high time to invent an alternative.

- **Action**

  Awareness created kindles our thoughts and make us act is relevant ways. But the resultant will be fruitful it our thoughts are put into action. Earlier and immediate action is needed to prevent the calamity.

Through these four A's the younger generation could join hands together to realize the possible modes of plastic waste management. If you are in the habit of dumping the waste is a **"PIT"** – keep this PIT in mind.

P – Prevent: Prevent yourself from being in a comfort zone and from producing pollutants.

I – Intelligence: Use intelligently whatever we havewith clean thought process of what to use, how to use? When and why?

T – Tackle: Personally or socially we must hold up the responsibility to plan and execute better approaches to plastic waste management. Widen our horizons and realize that we are accountable for everything we take out and lay in, in the wonderful creation of nature.

Conclusion

Undeniably a culture of behavioural changes, now in its infancy, need to further blossom and be implemented/prompted at all levels: individual, associative, governmental, legislative, industrial, technological, educational, philosophical, national, and international. It simply starts with individual choices. That is the enormous task, yet the enormous power as well because it resides within each and every one of us. Being educated on the situation and aware of the consequences ultimately leads us toward better choices in term of consumption and waste management of plastic at an individual level. The path to successful resolution of the crisis clearly appears, as we are the problem and the solution. Behind each and every piece of littered plastic debris there is a human face. At a critical decision point, someone, somewhere, mishandled it, either thoughtlessly or deliberately. The obvious and simple solution is ' US'. Take the responsibility and make the change.

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GOING PLASTIC-FREE

V.Anto Donald Edgaar

Abstract

Plastic is one of the most versatile and relatively cheap materials invented by mankind. Today, the world is living in a "plastic age" to the extent that life without plastic seems unimaginable. It is estimated that nearly half of all plastic ever manufactured has been manufactured since 2000. The world production of plastics has increased exponentially from 2.3 million tons in 1950 to 335 million tons in 2016 and is expected to triple by 2050 while consuming 20 percent of the global annual crude oil. Many plastic products are designed for single use without planning for the potential after-use pathways. Plastic waste represents a single-use throw away culture. It is estimated that 40 percent of plastics produced in the world is for packaging, used just once and then discarded. In good old days, we used banana leaves to pack our food. Now we use plastic sheets which are non bio-degradable. The throw-away culture is suffocating Mother Earth. If we don't change the way we produce and use plastics, there will be more plastic than fish in our oceans by 2050. It is a proven fact that plastic waste is adversely impacting ecosystems and human beings.

Key words: Plastic, Single-use plastic, Biodegradable

Introduction

All campuses are different: what works at one school may require more attention; more push, or may not work at all, for yours. We highlight this by providing case studies of plastic-free initiatives with a variety of outcomes: from the passing of bans that have essentially fallen into students' laps, to initiatives that resulted in unintended consumption of other plastic items.

Reasons to go Plastic-Free

Single-use disposable plastics have a massive carbon footprint. Whether made from petroleum or plants, plastic manufacturing is not efficient due to the scale of production. Both the production and disposal of single-use plastics often emit massive amounts of dioxins, a highly toxic byproduct linked to increased cancer rates and other human health effects. Plastic lasts forever: Plastic can never be broken down by natural processes; every particle of plastic that has ever been created still exists in a form toxic to all terrestrial and marine life. Plastics can be challenging to dispose of. Not all localities have the infrastructure to recycle single-use plastics; thus, many recyclable plastics take up valuable landfill space. When not able to be recycled or land filled, they are often sent to incinerators, emitting environmental toxins into the atmosphere.

V.Anto Donald Edgaar, Assistant Professor, VET College of Education

Myths about Plastic Bag Bans and Going Plastic-Free

Reusable bags spread bacteria: Some studies out there try to make the case that reusable bags encourage the spread of infectious disease through harboring bacteria like E. Coli. The reality is that bacteria are found on everything, including single-use plastic bags. If your reusable bag is dirty, give it a wash or wipe it down.

Reusable bags are toxic: Any synthetically made product has the potential to contain unsafe amounts of heavy metals or other toxic compounds. Eco-friendly intentioned products are no exception to this. Likewise, reusable bags are no more likely to be toxic than their disposable counterparts. Navigating this is part of being an informed consumer!

Banning plastic bags means people will just use disposable paper bags instead:

That is certainly a logical assumption, but paper bags can be the lesser of two evils. They are more easily recyclable AND have the ability to be composted. Oftentimes, bag bans will put charge a small fee onto other disposable bags, so that consumers are still encouraged to bring reusable.

Charging for single-use bags is just a scam for stores to make money:

Fees applied to single-use bags are used to fund an establishment's procurement of more durable bags to comply with the law. The consumer was never getting single-use bags for free in the first place; the cost of procuring them is often tacked onto the prices of products that the establishment sells.

Campus & Community Infrastructure: Start big and learn the status of the area surrounding your University in regard to any kind of plastic ban or legislation. This knowledge is a powerful tool in moving your campus to take steps. Once you know, you can act.

Plastic-Free Events!: Coordinate plastic-free purchasing by communicating with the caterer or food service provider that there should be no single-use plastic packaging for the food Buy in bulk or opt for food and materials that are packaged in paper, as long as you have the ability to compost or recycle the material. Serve beverages fountain-style or out of out of pitchers. Provide reusable cutlery and serving utensils.

Pre-Planning: Bring Your Own Everything! We'll provide delicious food, but you'll need to bring your own reusable cup/thermos, plate/bowl, utensils, handkerchief etc. That's right, we walk the talk. Set up clear signage for refillable water stations, water fountains, and waste bins. Use fun displays to advertise the event as plastic-free.

Alternatives to Single-Use Plastics

- **Education as an Alternative:** Transitioning your campus to becoming free of single-use disposable plastics requires tangible and trackable goals. Keep in mind that many of your successes might take qualitative forms, and may be hard to measure. You can still EDUCATE the student body on the dangers of plastics,

and their ability to make a direct positive impact by choosing to live their personal lives without them.

- **Refusing Single-Use Items** :Dining areas and eateries are prime locations for complementary single-use items making them a primary source for generating waste on campus. Working with these areas can be a huge stride in your plastic-free efforts. Rather than offering napkins, straws, plastic bags, coffee sleeves.
- **Encouraging Reusable Items:**Whether or not your campus is able to implement a ban on single-use plastics, It is important to highlight existing infrastructure that assists campus residents in living plastic-free. Post maps and signs around dorms highlighting existing water fountains for students to refill reusable drink containers at no cost.

Alternatives to Specific Materials: Your campus will likely have pre-established criteria for product purchasing, facilitated through the Procurement Department. These criteria might require our campus to purchase products from companies that are committed to reducing greenhouse gas emissions or utilize a certain percentage of postconsumer recycled content A list of alternatives for specific single-use plastic items might come in handy.

Partnerships for Publicity;Student Activities office: Can help you put events on campus wide calendars and make sure nothing conflicts.

Academic Departments: Professors can say a few words at the beginning of classes to help recruit volunteer s and group members as well as spread the word.

Student Government: Always a good support for proposed policy change or bans, they can spread the word with a public statement to your campus.

Sustainability Department: Can assist with campus wide emails, funding for printing and advice on strategy.

Intramural/Recreation Department: Can encourage and sponsor sporting events to be plastic-free.

Internship and/or Volunteer Office: Another avenue through which to spread the message and gather people power.

Residential Life/Housing: Can distribute information through RA's who in turn teach their residents.

Campaigning: There are a ton of resources both on and beyond campus that you can utilize to spread the word for your project or campaign. Collaborate with your advisor, or equivalent project "champion" (as we mentioned in the Introduction), about how to reach out to local, regional, national, and international groups who are implementing plastic-free initiatives on a larger scale.

Take Advantage of Outside Resources

Students are obviously a massive component of a college or university campus, so utilize that strength in numbers! Petitions are a fun and exciting way to get student

support, as they require you to interact with a variety of audience's in-person! You want students to sign up for campaign updates and become ambassadors of the campaign.

Making Plastic-Free a Positive Experience

It's really important that the students of your campus leave having had a positive experience with plastic-free initiatives. The goal is not to burden individuals by making it difficult to follow these initiatives. Reducing plastic use is important, and the goal is for students to realize that being plastic-free is possible, easy, affordable, and can be done without missing out on anything.

Orienting New Students

Anxious, nervous and eager - new students are impressionable. During orientation and the first weeks of the term, new students will be bestowed with too much information to retain. Administration, academic departments, sports teams, and school clubs will all try to fill heads with their own information. You and your sustainability group or department must do its best to make sure that amongst all of this influence, your initiatives are noticed and understood. Be a presence on campus from the very moment student's step on site.

Conclusion:

The process of making the plastic free nation is in our hand. We the teachers must educate the future to protect our nation. Let us take the steps towards a plastic free nation.

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ENVIRONMENTAL COMMITMENTS OF TEACHERS TOWARDS PLASTIC FREE FUTURE

Ygnamoorthy

Abstract

Environmental issues have become a subject of due importance because of increasing interaction between population and its environment. The problem of plastic pollution has become a learning platform, teachers can empower students to be change agents in their communities. The overuse of plastics in today's society has become major environmental issue for human life. Plastics are typically organic polymers of high molecular mass, but they often contain other substances. They are usually synthetic, most commonly derived from petrochemicals, but many are partially natural. The rise in pollution in an alarming rate has given birth to various health problems influencing the economic growth of a country. The root cause of this problem is the low level of awareness among students towards environment. Thus, the subject about a teacher's attitude towards environmental awareness becomes important to promote environmental education at all educational levels-primary, secondary, senior secondary.

Key words: Polyethylene terephthalate **(PET),** Polypropylene **(PP),** Polystyrene **(PS)**

Introduction

"Destruction is a man's will, Nevertheless Prevention is also a man's will, and it's a man's choice to choose between Destruction and Prevention". — **Babu Rajan**

Environmental degradation poses a major threat to the existence of humanity today both in rural and urban settlements. The biggest impact of the scientific and industrial revolution in recent past year can be seen in the rise of new factors disturbing the balanced relation between man and its environment in an alarming rate. The degradation of the world's environment constitutes a very real and important concern for today's society. There are currently a number of increasingly significant environmental concerns and threats to the future of society. Since the industrial revolution in the 1800s, plastic pollution is becoming a global reality Environment as also civilization are threatened by environmental pollution. There are different types of pollution in the world and one of them is plastic pollution. Plastic pollution increases in geometric rate and now it is a big challenge for civilization. In this situation, awareness towards plastic pollution is an important issue. If students have some awareness then the part of the problem may be reduced. If we do not aware the students in right time then in future the plastic totally engulf the human civilization and then we have no way to escape from the problem. If future generations are aware about plastic pollution then the problem somehow will reduce in future. It is in this light that teachers can create awareness on various environmental issues.

Ygnamoorthy, Ph.D., Research Scholar, Tamilnadu Open University, Chennai

Types

Polyethylene terephthalate (PET or PETE) – Used in soft drink, juice, water, beer, mouthwash, peanut butter, salad dressing, detergent, and cleaner containers.

High-density polyethylene (HDPE) – Used in opaque milk, water, and juice containers, bleach, detergent and shampoo bottles, garbage bags, yogurt and margarine tubs, and cereal box liners.

Polyvinyl chloride (PVC) – Used in toys, clear food and non-food packaging (e.g., cling wrap), some squeeze bottles, shampoo bottles, cooking oil and peanut butter jars, detergent and 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.

Low-density polyethylene (LDPE) – Used in grocery store, dry cleaning, bread and frozen food bags, most plastic wraps, and squeezable bottles.

Polypropylene (PP) – Used in ketchup bottles, yogurt and margarine tubs, medicine and syrup bottles, straws, and Rubbermaid and other opaque plastic containers, including baby bottles.

Polystyrene (PS) – Used in Styrofoam containers, egg cartons, disposable cups and bowls, take-out food containers, plastic cutlery, and compact disc cases. Also present in secondhand 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.

Plastic Pollution: A Threat to Eco System

Every time empty plastic bottles, plastic beads gets thrown away or washed down a sink, the toxic pollutants have more of a chance to enter the environment and do harm. Trash dumps and landfills are unfortunate major problems, as they allow pollutants to enter the ground and affect wildlife and groundwater for years to come. As plastic is less expensive, it is one of the most widely available and overused item in the world today when disposed, it does not decompose easily and pollutes the land or air nearby when burned in the open air. The problem of plastics pollution in the oceans in several ways. The nets used for certain large-scale trolling operations are usually made of plastic. This not only kills and harms local wildlife, but also ensures that pollutants enter the water and fish of the area. Burning plastic is incredibly toxic, and can lead to harmful atmospheric conditions and deadly illness. Plastic micro particles from cosmetics and microfibers from synthetic clothes are washed into the sewage system. While many pass through treatment plants and end up in the sea, other particles are caught up in sewage used to fertilize farmers' fields. After it dries out, it may get picked up by the wind and blown about. Therefore, if it is in a landfill, it will never stop releasing toxins in that area. Even recycling does not cut down on plastic, as it essentially uses the existing plastic, albeit in a new form. The process of recycling plastic can also lead to plastic irritants being released in a number of ways.

Fatal Effects of Plastic Pollution on Human Healthy

The word "plastics" generally applies to the synthetic products of chemistry. Alexander Parkes created the first man-made plastic and publicly demonstrated it at the 1862 Great International Exhibition in London. The material, called parkesine, was an organic material derived from cellulose that, once heated, could be molded and retained its shape when cooled.

The quality of the air we breathe, the water we drink or bath on, and the earth in which we grow our food has an immense effect on our health. Endocrine disruptors are ubiquitous in our environment and have deep impact on our health. Endocrine distruptor chemicals (EDC's) are added to plastic products to make them softer and easier to handle. These EDCs are common in our environment and, when absorbed by human beings and wildlife, mimic the action of hormones and have been linked to reproductive problems in animals and human beings are known to affect fat cells. The major chemicals that go into the making of plastic are highly toxic and pose serious threat to living beings of all species on earth. Some of the constituents of plastic such as benzene are known to cause cancer. Recycling of plastic is associated with skin and respiratory problems, resulting from exposure to and inhalation of toxic fumes, especially hydrocarbons.

The Road Ahead: Current and Future Aims of Teachers in Creating Environment Awareness:

Teachers are the most pivotal part in the classroom. They are the one who can provide link in delivering environmental knowledge and create among the students the awareness of problems associated with environment. The following classroom practices need to improve awareness about environmental concerns, develop understanding of ecological principles, arouse concern for environmental problems, stimulate commitment for environmental protection.

- Need for use of more innovative and proper methods and techniques is heightened by the fact that what is being learnt goes much beyond the learning of traditional subjects.
- Teachers have to clarify values and ensure participation and actions on the part of the learners.
- Teachers use more active teaching approaches including trips, projects, community service and academic excursions.
- This will expose students to the reality of environment and environmental problems hence enhancing holistic learning

Role of Students in banning plastics

- Students will gain a greater understanding of the need to carefully use all resources in ways that are not wasteful and damaging to the environment —both now and in the future.

- Students will gain a greater understanding of the threats facing a variety of organisms, including endangered species, and the need to reduce plastic pollution and aluminum waste.
- Students will understand that they can personally play an important role in reducing plastic pollution and increasing recycling rates for a healthier environment.
- Students will gain a greater understanding of the different types of plastics, and which can and cannot be recycled.
- Students will learn more about different states of matter and how plastic and aluminum can be changed into different states and reformed during the recycling process.
- Students will learn that aluminum beverage cans and certain plastics are excellent examples of closed-loop recycling and learn how recycling cans can save energy and reduce greenhouse gas emissions.
- Students will understand that recycling involves a firsthand commitment to making the environment healthier.

Conclusion

Most solutions to the problem of plastic pollution, therefore, focus on preventing improper disposal or even on limiting the use of certain plastic items in the first place. Fines for littering have proved difficult to enforce, but various fees or outright bans on foamed food containers and plastic shopping bags are now common, as are deposits redeemed by taking beverage bottles to recycling centers. Plastic pollution is indeed a stark reality that requires prompt cooperative action before it gets too late to save our planet. The world did not become cluttered with plastic pollution overnight, so it will take a bit more time and effort to get rid of it completely. The actions taken to reduce the impact of the plastic pollution on the environment does not need to be grand or sweeping, just an honest effort every day will definitely make a great contribution to the subject? Teachers can play an important role in making the program of environmental education successful.

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TECHNIQUES USED IN PLASTIC WASTAGE DISPOSAL

Dr. E.C.Punitha

A.Umadevi

Abstract

Plastics have been used widely in both water and food packaging due to their natural properties such as inertness and low bulk densities, which make them suitable mover materials and little risk to contaminants. Plastic bottles and sachets have become prevalent all over the country, particularly, urban areas. The packaging revolt has not been backed by proper plastic waste management policy, which has left a lot of cities in India littered with plastic wastes, hence, creating horrible visual troubles and other community health problems. Growing environmental awareness and reduction in available landfill capacity have prompted plastic recycling programmes in most developed countries. Currently, however only between 5 to 25% of plastic waste is being recycled. The paper discusses prospects of plastic waste management schemes. It is concluded that the existing rate of environmental worsening is likely to continue unless long term remedial measures are adopted for plastic wastes management in the country.

Keywords: Inertness, environmental awareness, prospects

Introduction

In the year 2000, one of the millennium development goals (MDGs), which Ghana appended to was the promotion of environmental protection and sustainability; is still grappling with the proper disposal and management of its Municipal solid Waste (MSW), especially plastic waste. Currently, the common waste disposal methods employed are land filling, incineration and haphazard littering in the cities, municipalities and the countryside. These disposal methods have a negative impact on human health and the environment; consequently, rivers, gutters and roadsides are choked and filled with waste plastics.

Methods of Waste Disposal

1. Composting and Vermicomposting

This method is useful for the disposal of biodegradable waste. The part of the garbage which can rot in nature to form harmless substances is called biodegradable (plants and animal waste). Different biodegradable waste can be dumped in a pit. Here, it can be allowed to decompose after which the garbage will convert into useful manure. This is known as composting. The process of decomposition may take around 2 to 3 months. To make the process fast, red worms may be used for composting. This method is called vermicomposting. Vermicomposting is the high-quality manure.

Dr. E.C.Punitha, Dean & Associate Professor of English,
St.Ignatius College of Education, Palayamkottai
A.Umadevi , M.Phil Scholar, St.Ignatius College of Education, Palayamkottai

2. Land filling

A low-lying open area out of the city where garbage is collected and dumped is known as a landfill. The garbage is loaded into the truck and dumped in the landfill. When that area is fully covered with the garbage, it is covered with layers of soil. Now it can be converted into a park or a playground.

3. Incineration

This method is mainly used to dispose of the medical waste. In this method, garbage is burnt at a high temperature in a special furnace called *Incinerator*. This reduces large amounts of garbage into a small amount of ash which can be disposed of in the landfill site.

4. **Biodegradable Plastics**

Biodegradable plastics are plastics that decompose by the action of living organisms. Biodegradable plastics have the potential to solve a number of waste-management issues, especially for disposable packaging that cannot be easily separated from organic waste. However, biodegradable plastics are not without controversy. Even though biodegradable plastics can be completely metabolize by organisms into carbon dioxide and water, there are allegations that Oxo-Biodegradable plastics may release metals into the environment.

Refuse, Reduce and Reuse

Refusing to use single use plastics such as plastic cups, fruit juice straws, plastic bottles, Multi layered milk pouches etc and instead using multi use glassware or metal ware et cetera. However, refusing to use plastic would not make an impact unless the majority of population believes in this.

Some daily habits that can reduce waste

Avoid using disposable plastic plates, spoons, glass, cups and napkins. Instead use your own plates and spoon which can be used again and again.Avoid buys items which comes with a lot of packaging. This excess plastic packaging ends up as waste that can't be recycled.Buy products which offer long term durability so that you don't end up buying more and increase landfill load. Reduce the use of plastic in your life and instead use bio degradable material instead. Start by carrying cloth or jute bag when visiting grocery store instead of using plastic bags.Plastic waste disposal is not a responsibility for a few but a responsibility that we all have to share.There are already technologies which can do reverse engineering and produce oil from plastic without any pollution or harmful residues i.e. Pyrolysis, so that it can be used again instead of ending up in land filling sites and oceans.

Tips to Use less Plastic

- Stop using plastic straws, even in restaurants. If a straw is a must, purchase a reusable stainless steel or glass straw

- Use a reusable produce bag. A single plastic bag can take 1,000 years to degrade. Purchase or make your own reusable produce bag and be sure to wash them often!
- Give up gum. Gum is made of a synthetic rubber, aka plastic.
- Buy boxes instead of bottles. Often, products like laundry detergent come in cardboard which is more easily recycled than plastic.
- Purchase food, like cereal, pasta, and rice from bulk bins and fill a reusable bag or container. You save money and unnecessary packaging.
- Reuse containers for storing leftovers or shopping in bulk.
- Use a reusable bottle or mug for your beverages, even when ordering from a to-go shop
- Bring your own container for take-out or your restaurant doggy-bag since many restaurants use Styrofoam.
- Use matches instead of disposable plastic lighters or invest in a refillable metal lighter.
- Avoid buying frozen foods because their packaging is mostly plastic. Even those that appear to be cardboard are coated in a thin layer of plastic. Plus you'll be eating fewer processed foods!
- Don't use plastic ware at home and be sure to request restaurants do not pack them in your take-out box.
- Ask your local grocer to take your plastic containers (for berries, tomatoes, etc.) back. If you shop at a farmers market they can refill it for you.
- The EPA estimates that 7.6 billion pounds of disposable diapers are discarded in the US each year. Use cloth diapers to reduce your baby's carbon footprint and save money.
- Make fresh squeezed juice or eat fruit instead of buying juice in plastic bottles. It's healthier and better for the environment.
- Make your own cleaning products that will be less toxic and eliminate the need for multiple plastic bottles of cleaner.

Conclusion

This study clearly indicates that the Integrated Plastic Waste Management (IPWM) best suits the waste management system for developing countries. The results of this study are especially important for countries whose low financial circumstances and low technological level dictate their waste management practices. The environmental presence of plastic waste as litter is an attitudinal problem in the "Use phase" and would be best solved by an aggressive campaign or sensitization as to the effects of such practices. The effects of plastic materials during the life cycle is not confined to just the

disposal phase and the use phase; the production stag as well as the plastic product design stages also have roles to play. At the present time bio-degradable plastics are being researched, tested and produced.

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MEANS AND WAY TO SOLVE ACCUMULATION OF PLASTIC TRASH

Dr.A.Faritha Begam
A.Thiruselvi

Abstract

Plastics have become a vital asset for humanity. Though extensive research and new technologies have led to invent of newer and safer plastics, but drawbacks and challenges of plastics have never been resolved and impact is on the rise. Some of the major compounds (vinyl chloride, dioxins, and plasticizers) are causative factors of hormone-disruption, reproductive dysfunction, breast growth and testicular cancers. The harmful effects are also pronounced in newborns via mothers during pregnancy or young children exposed directly. Recycling is one of the most convenient and easiest ways. Smarter sorting, energy efficient ways, developing smarter plastics and research to develop certain fungi and bacteria that hasten degradation of conventional plastics are some of the present era needs. Source reduction (Reduce and Reuse) can occur by altering the design, manufacture or reduced use of plastic products. Biodegradable plastics are similar to conventional plastics, with the additional quality of being able to naturally decompose and break into natural and safe byproducts. Bioplastics, nature derived plastics, are derived from biological sources such as sugar cane, cellulose etc. and these either degrade in open air or are made to compost using fungi, bacteria or enzymes. To conclude, it is not the plastics to blame, but it is the misuse of plastics. The present time need is to look for biodegradable measures and effective policies and their implementation.

Keywords: Plastics; Impact; Prevention

Introduction

Plastic is a kind of material that is commonly known and used in everyday life in many forms. It becomes an important part of every one's life. To define plastics at molecular level, it is a kind of organic polymer, which has molecules containing long carbon chains as their backbones with repeating units created through a process of polymerization. The structure of these repeating units and types of atoms play the main role in determining the characteristics of the plastic.

These long carbon chains are well packed together by entanglements and Van der Waals forces forming a strong, usually ductile solid material [2]. Also, additives are usually added when manufacturing of commercial plastics is carried on, in order to improve the strength, durability or grant the plastic specific characteristics. Many of the controversies associated with plastics are associated with the additives [3].

Dr.A.Faritha Begam Controller of Examinations &
Associate Professor of Education, St.Ignatius College of Education, Palayamkottai
A.Thiruselvi, M.Phil Scholar, St.Ignatius College of Education,Palayamkottai

Plastics have become a vital asset for humanity, often providing functionality that cannot be easily or economically replaced by other materials. Plastic products have brought benefits to society in terms of economic activity, jobs and quality of life. Most plastics are robust and last for hundreds of years. They have replaced metals in the components of most manufactured goods, including for such products as computers, car parts and refrigerators, and in so doing have often made the products cheaper, lighter, safer, stronger. Plastics have taken over from paper, glass and cardboard in packaging, usually reducing cost and also providing better care of the items.

Ways to solve accumulation of plastic trash

Reduce Your Use of Single-Use Plastics

Wherever you live, the easiest and most direct way that you can get started is by reducing your own use of single-use plastics. Single-use plastics include plastic bags, water bottles, straws, cups, utensils, dry cleaning bags, take-out containers, and any other plastic items that are used once and then discarded.

The best way to do this is by a) refusing any single-use plastics that you do not need (e.g. straws, plastic bags, takeout utensils, takeout containers, purchasing, and carrying with you, reusable versions of those products, including reusable grocery bags, produce bags, bottles, utensils, coffee cups, and dry cleaning garment bags. And when you refuse single-use plastic items, help businesses by letting them know that you would like them to offer alternatives.

Avoid Products Containing Micro beads

Tiny plastic particles, called "micro beads," have become a growing source of ocean plastic pollution in recent years. Micro beads are found in some face scrubs, toothpastes, and body washes, and they readily enter our oceans and waterways through our sewer systems, and affect hundreds of marine species. Avoid products containing plastic micro beads by looking for "polyethylene" and "polypropylene" on the ingredient labels of your cosmetic products (find a list of products containing micro beads here).

We must reduce our plastic dependency

We use an incredible quantity of single-use plastic items, such as straws, plastic bags, packaging, plastic cups, plates and cutlery. We must put an end to it. An increasing number of countries have now imposed a ban on disposable plastics and plastic bags, or established concrete targets for reducing plastic consumption and waste. This effort must be scaled up, so that global plastic consumption goes down. You can do your part by refusing to use these products.

Increased producer responsibility

Over the past 50 years, world plastic production has doubled, and leading plastic manufacturers are planning to increase production by almost a third over the next five years. In 1974, the average per capita plastic consumption was 2kg. Today, this has increased to 43kg! This is taking the world in the wrong direction. Instead, alternatives to non-degradable plastics must be developed, and the industries responsible for the major

plastic wastes must be targeted with specific industry agreements and producer liability arrangements, with requirements for handling, collection and reuse of waste and broken plastic equipment.

Increased mapping, surveillance and research

There is still much we do not know about the plastic problem. Researchers estimate that more than 70 percent of the plastic ends up on the sea floor. Over time, it breaks down into tiny particles, but we do not know what happens to this material or how to get rid of it. The efforts to map and monitor, as well as conduct research on the negative effects, must be strengthened. An important initiative in this direction is REV, the world's largest research and expedition vessel, which aims to solve the biggest challenges around the ocean, including a dedicated effort on plastic.

Recycle

It seems obvious, but we're not doing a great job of it. For example, less than 14 percent of plastic packaging is recycled. Confused about what can and can't go in the bin? Check out the number on the bottom of the container. Most beverage and liquid cleaner bottles will be #1 (PET), which is commonly accepted by most curbside recycling companies. Containers marked #2 (HDPE; typically slightly heavier-duty bottles for milk, juice, and laundry detergent) and #5 (PP; plastic cutlery, yogurt and margarine tubs, ketchup bottles) are also recyclable in some areas. For the specifics on your area, check out Earth911.org's recycling directory.

Pack a lunch the right way

If your lunchbox is full of disposable plastic containers and sandwich bags, it's time to make a change. Instead of packing snacks and sandwiches in bags, put them in reusable containers you have at home, or try lunch accessories like reusable snack bags. You can also opt for fresh fruit instead of single-serving fruit cups, and buy items like yogurt and pudding in bulk and simply put a portion in a reusable dish for lunch.

Use cloth diapers

According to the EPA, 7.6 billion pounds of disposable diapers are discarded in the U.S. each year. Plus, it takes about 80,000 pounds of plastic and more than 200,000 trees a year to manufacture disposable diapers for American babies alone. By simply switching to cloth diapers, you'll not only reduce your baby's carbon footprint, you'll also save money.

Conclusion

Plastic takes up large part of society, from plastics used for furniture, electronics, to small households needs like containers and grocery bags. Since plastic first became available to consumers, it became widely used, due to the advantages it provides, such as lightweight, durability and its ability to mold into any products with chemicals and additives. However, there are also a number of disadvantages that plastic poses, including health problems starting from manufacturing to consumption and negative environmental impacts created by accumulation of plastic wastes. Today, the

management of plastic wastes has become one of the most challenging problems in our society. It seems even serious if we think about the future generation that has to deal with continuously growing amount of plastic wastes accumulated in the environment. In the course of this project, we did an extensive amount of research on plastics and their types, their impacts on the environment, economy, and many other factors. Based on all of the information we gathered and comparisons we have made, we determined that there is no one best alternative to the plastics problem we have, but different solutions should be combined for the best result

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A STUDY ON FUTURE OF PLASTIC FREE LIFE

Dr. R. Indra Mary Ezhilselvi
D. Meera Devi

Abstract

Plastics have transformed everyday life; usage is increasing and annual production is likely to exceed 300 million tons by 2010. Plastic is one of the most commonly used and convenient materials in most societies around the world. The use of plastic is increasingly controversial, however, due to its negative impacts on the environment, biodiversity and human health. Tamil Nadu government initiatives to reduce, recycle and reuse in their production and usages. In this paper, the researcher investigates the current plastic reduction practices in industries and to provide practical strategy suggestions for the improvement of sustainability performance and related business sectors.

Keywords: Plastic, plastic free life, plastic recycling, pollution, health effects.

Introduction

Plastic, a highly useful and convenient material and it is also one of the world's greatest environmental problems. Its usage is heavy in all the fields like industry, society, etc. Most advances of human society over the past century have been facilitated by the use of plastics. Plastics are composed of a network of molecular monomers bound together to form macromolecules of infinite use in human society. Today, there are more than 20 different major types of plastics in use worldwide.

Plastic production began back in the 1840's and to this day, every piece of plastic produced still remains on the earth. This is because plastic does not biodegrade. Now, any of the millions of plastic products thrown out lay way into the future either inland fills or in our precious oceans. Due to UV radiation and the mechanical forces of the wind and waves, plastics break down and fragment. Pieces deteriorate into micro plastics increasing their surface area and the possibility of chemical transport. Micro plastics act as little sponges with their surface area containing concentrations of harmful pollutants. These minute pieces are mistaken for algae and krill, consumed by small fish, then bigger fish, then bigger mammals: Even humans. This is a comprehensive guide on how to eliminate plastic from your daily lives. While it is not easy, since plastic is everywhere, it's a cause worth fighting for. These are the solutions have heard everywhere, but that is because they are easy to do and make a huge difference.

Dr. R. Indra Mary Ezhilselvi,
Assistant Professor of Psychology, St. Ignatius College of Education
D. Meera Devi,
M. Phil., Scholar,St. Ignatius College of Education

Plastics and the Future

Looking ahead, we do not appear to be approaching the end of the 'plastic age' described by Yarsley and Couzens in the 1940s, and there is much that plastics can contribute to society.

Andrady & Neal (2009) consider that the speed of technological change is increasing exponentially such that life in 2030 will be unrecognizable compared with life today; plastics will play a significant role in this change. Plastic materials have the potential to bring scientific and medical advances, to alleviate suffering and help reduce mankind's environmental footprint on the planet (Andrady & Neal 2009).

Plastic Free Kitchen

It is impossible to go to any supermarket and ignore the vast amounts of fresh produce wrapped in plastic.

- Go to farmer's markets. Not only is it supporting local businesses, the prices tend to be lower and you have fresher choices.
- Make your own produce bags or buy reusable ones.
- Choose bulk stores if you have the opportunity.
- If you do not, pick the pastas packaged in paper and canned food over plastic packaging.

Plastic Free Clothing:

When washed, many synthetic materials release microfibers which do not get caught by the washing machine and instead end up. In the ocean. This can be up to 4,500 fibers per gram of clothing per wash!

- Buy clothes made out of 100% natural fibers including: cotton, linen, wool, silk, cashmere, jute or hemp.
- Wash the synthetic clothing you own less frequently, on colder settings with liquid laundry soap.

Plastic Free Bathroom:

We are using many subtle plastic items around sink, in shower and in the drawers.

- Switch to bars of soap or make your own liquid soap!
- Choose shampoo and conditioner bars to eliminate packaging. Or go No poo!
- Get a bamboo, biodegradable toothbrush.
- Consider getting recycled toilet paper without plastic packaging.

Plastic Free Life:

- A lot of plastic is hidden: in juice cartons, coffee cups and most lids.

- Be on the lookout for natural alternatives: i.e. Natural compostable or flush able cat litter.
- Keep Tupper ware on hand to avoid single use containers.

Plastic and Climate

We may have thought that the only problem caused by plastic pollution is the negative effect that litter has on the environment. Plastic is a petroleum product. It is created from petroleum just like refined gasoline. The EPA estimates that production of plastic products account for an estimated 8% of global oil production. The drilling of oil and processing into plastic releases harmful gas emissions into the environment including carbon monoxide, hydrogen sulfide, ozone, benzene, and methane (a greenhouse gas that causes a greater warming effect than carbon dioxide) according to the Plastic Pollution Coalition. The EPA estimated that five ounces of carbon dioxide are emitted for every ounce of Polyethylene Terephthalate produced.

Plastic Pollution in the Ocean

Decades of poor waste management policies that saw and continue to see plastic waste being dumped directly into the ocean have led to an international pollution crisis that threatens each of the world's oceans. In the globe, there are five massive patches of marine plastic? These huge concentrations of plastic debris cover large swaths of the ocean; the one between California and Hawaii is the size of the state of Texas. Sea creatures eat or get ensnared in plastic debris and can be killed or maimed. Plastic that is consumed by marine organisms, as well as the toxins they absorb from the water, accumulate up the food chain making seafood potentially dangerous for humans as well.

Plastic Pollution and our Health

Plastic pollution is not only damaging the health of our planet. After decades of producing trillions of oil-based plastic items, the discovered negative consequences to human health are startling. Many plastics contain phthalates (DEHP) and the chemical biphenyl-A (BPA), now recognized as a hazard to public health and the human body. Both chemicals are potentially harmful to human hormones and reproductive systems. When heated in the Microwave, as reported by Fox News, these chemicals can leach out into the food they contain. In fact, many correlations have been shown between levels of some of these chemicals and an increased risk of the following health problems such as Chromosomal and reproductive system abnormalities, Impaired brain and neurological functions, Cancer ,Cardiovascular system damage, Adult-onset diabetes, Early puberty, Obesity and Resistance to chemotherapy

General information about plastics that can be recycled

Deciding which items to recycle is not always easy and intuitive. It requires looking at the product and making a decision based on the instructions given by the waste management department that serves your community. Recycling rules vary from place to place. Before recycling it is important to understand your local recycling

programs, what can and can't be recycled, how you should sort your recyclables, and which plastics to leave out and throw in the trash.

Remove

We have made every effort to reduce the amount of plastic pollution we allow to flow into the environment. Unfortunately, the fact of the matter is that there is already an immense amount of plastic pollution dirtying our waterways and harming the planet's organisms. At this point, we as humans have to accept the fact that we need to do more than stop producing plastic pollution; we need to reverse the impact we have already made. We need to work to clean up the world's oceans and to find a way to deal with all the plastic we collect.

Our fifth and final step in this toolkit is to remove existing plastic. This process presents exciting opportunities. Plastic/litter clean-ups are great community events that let you meet the people who live around you while cleaning up your local community at the same time. New technologies are being invented as we speak to collect the plastics in the world's oceans. New products are being created to take advantage plastics collected from the environment and recycled.

Conclusion

This paper attempts to explore the concept of plastic free and their consequences. Plastic free life in future is always good for our younger generations. Also, it is good for our environmental activities. So we promise to avoid plastic and find it alternatives to plastic. In this paper, investigator elaborated detailed about consequence of plastic and also advantages of plastic free life.

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SINGLE USE PLASTICS AND ITS EFFECT ON HUMAN HEALTH

S. SermaThangam
Dr. H. Deepa

Abstract

Plastic has changed our everyday life. We are involved with plastic made products in various ways. Plastic plays an important part in our life. Plastics are used widely everywhere in our life. Plastic makes our life easier and better. They are composed of a network of molecular monomers bound together to form macromolecules of infinite use in human society. Day by day peoples are becoming more and more dependent on the use of plastics because of the characteristics of plastic such as inert, durability, flexibility and versatility and so on. Because of the chemical additives used during plastic production, plastics have potentially harmful effects on human health. Plastics in the environment pose significant hazards to wildlife both on land and in the ocean. High concentrations of plastic materials, particularly plastic bags, have been found blocking the breathing passages and stomachs of hundreds of different species. There is emerging evidence that the toxic chemicals added during the manufacturing process transfer from the ingested plastic into the animals' tissues, eventually entering the food chain for humans as well. This paper exposes something about the single use plastics and its effect on human health.

Key words: Environment, Additives, Macro molecules

Single-use plastics

Single-use plastics, or disposable plastics, are used only once before they are thrown away or recycled. These items are used for their strength and resilience, and because they prevent cross-contamination of sampling. As with medical applications, many substitute materials do not provide the protection or stability that single-use plastics do. Single-use plastics are often used to package food and water. The most common single-use plastics found in the environment are, in order of magnitude, cigarette butts, plastic drinking bottles, plastic bottle caps, food wrappers, plastic grocery bags, plastic lids, straws and stirrers, other types of plastic bags, and foam take-away containers. These are the waste products of a throwaway culture that treats plastic as a disposable material rather than a valuable resource to be harnessed.

Additives used in plastics

Additives used in plastics can have different health effects for people. Numerous additives are used depending on the kind of plastic, the primary use of the product where the plastic is used or even the brand! For instance, the group of chemicals called "plasticizers" is one family of additives used to provide PVC with flexibility.

S. SermaThangam,Assistant Professor, St. John's College of Education
Dr. H. Deepa,Assistant Professor,
DD&CE, Manonmaniam Sundaranar University,

Plasticizers are in fact numerous substances and the kind of plasticizer added in the manufacturing process depends on where the PVC is used and what it is needed for, for example in children's toys or in fake leather car seats. The three most commonly cited plastic additives that have been linked to such diseases are:

- **BPA or Bisphenol A**, often used in food and beverages containers, such as water bottles. The EU has taken steps to ban the use of BPA in baby bottles and some EU member states have taken restrictions further.
- **Plasticisers or Phthalates**, primarily used in PVC to make it flexible, these additives can be used in children's toys, flooring, clothes and a myriad of other everyday items.
- **Flame retardants**, used in electric and electronic equipment, upholstery and other items to provide fire safety benefits. Some of these substances have been banned by the UN due to the detrimental effects they had to the environment and human health.

Examples of single-use plastic include:

- plastic forks and knives
- plastic coffee cup lids
- Styrofoam and plastic take out containers
- cigarette butts
- plastic bottle caps
- plastic grocery bags
- straws and stirrers
- foam take-away containers
- plastic shopping bags
- plastic water bottles
- plastic straws
- plastic drinking bottles
- food wrappers
- plastic lids
- other types of plastic bags

The billions upon billions of items of plastic waste choking our oceans, lakes, and rivers and piling up on land is more than unsightly and harmful to plants and wildlife. Plastic pollution is very real and single-use plastics are small but have a large impact.

Effect of Plastics

Single-use plastics may represent the epitome of today's throwaway culture. Just nine per cent of the world's nine billion tonnes of plastic has been recycled. Most of our plastic ends up in landfills, our oceans and waterways, and the environment. Plastics do not biodegrade. Instead they slowly break down into smaller pieces of plastic called micro plastics.

The effects plastic has on the Earth as well as on humans. It can take up to thousands of years for plastic bags and Styrofoam containers to decompose. In the meantime, it contaminates our soil and water. The toxic chemicals used to manufacture plastic get transferred to animal tissue, eventually entering the human food chain. Plastic products are toxic if ingested and can damage nervous systems, lungs and reproductive

organs. For many animal species, plastic waste is simply a nightmare. Plastic items like bags and straws choke wildlife and block animals' stomachs. Turtles and dolphins, for example, often mistake plastic bags for food.

Plastic Toxicity for Human Body

Plastics can be made of a selection of many different chemicals to improve its properties, to prevent degradation in the environment when exposed to light, humidity, temperature or microorganisms, to make it more or less flexible, to lessen flammability or to color it. Many of these substances are not bound to the chemical chain of the plastic, which means that they can migrate under different circumstances as small as a change in temperature or light. Toxic ingredients can evaporate into the air and be breathed in. They can readily absorb into the skin. And they can leach into food or drink and then be ingested.

Breathing near plastic trash being burned, opening a new plastic item that releases a strong odour, applying body lotion, drinking hot coffee from a plastic cup, reusing a water bottle, eating food micro waved in a plastic container, or that has been frozen in a plastic container or even food that has simply been stored in a while... any of these common practices allow chemicals from plastic to migrate easily into the body. Exposure to them is linked to cancers, birth defects, impaired immunity, endocrine disruption and other ailments. Plastic comes in many forms but there is general consensus that while a useful material, there are serious concerns about harmful effects of plastic on human health.

Effects of Plastic on Human Health

Plastic items contain toxic chemicals such as styrene and benzene. Both are considered carcinogenic and can lead to additional health complications, including adverse effects on the nervous, respiratory and reproductive systems, and possibly on the kidneys and liver. The toxins in Plastic containers can transfer to food and drinks, and this risk seems to be accentuated when people reheat the food while still in the container. In low-income regions, domestic waste - including plastics - is often burnt for heating and/or cooking purposes, exposing largely women and children to prolonged toxic emissions. Illegal disposal practices of plastics often take the form of open burning, accentuating the release of toxic gases that include furans and dioxins. Littering of plastic bags and Plastic containers can lead to perceived 'welfare losses' associated for instance to the visual disamenity of a park being contaminated with litter. This increases the indirect social costs of plastic pollution. In developing countries with inadequate solid waste management regulations, plastic bag litter can aggravate pandemics. By blocking sewage systems and providing breeding grounds for mosquitoes and other pests, plastic bags can raise the risk of transmission of vector-borne diseases such as malaria. Plastic waste and micro plastics, if ingested by fish or other marine life, can enter our food chain. Micro plastics have already been found in common table salt and in both tap and bottled water.

Indeed, exposure to toxic chemicals coming out of plastic can cause cancers, birth defects, impaired immunity and other health problems. Humans can be exposed to these chemicals through the nose, mouth, or skin. Although the level of exposure varies depending on age and geography, most humans experience simultaneous exposure to many of these chemicals. Average levels of daily exposure are below the levels deemed to be unsafe, but more research needs to be done on the effects of low dose exposure on humans. A lot is unknown on how severely humans are physically affected by these chemicals. Some of the chemicals used in plastic production can cause dermatitis upon contact with human skin.

Conclusion

It is difficult to dispose plastic products. It is dangerous when plastic waste goes to the landfills and even more dangerous when it goes into the water bodies. Unlike, wood and paper we cannot even dispose it off by burning it. This is because burning plastic produces harmful gases that are dangerous for the environment and life on earth. Plastic thus causes air, water and land pollution. No matter, how hard we try we cannot do away with the plastic products completely. However, we can certainly restrict our plastic usage. A number of plastic products such as plastic bags, containers, glasses, bottles, etc can easily be replaced by eco-friendly alternatives such as cloth/ paper bags, steel utensils and so on. This is the only way to save our environment and to save our future generations.

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PLASTICS IN MARINE

S.Davasuba

Abstract

Our Earth is the most beautiful planet in our solar system. As far as we know, Earth is the only planet that has life. Before 500 A.D. man had a good relationship with Mother Earth. But since humans developed cities and industries, the modern lifestyle has changed. Man has been using and misusing natural resources up to the limit. Now we are tearing up remote corners of the planet. Our environment is totally polluted, As a result of human activities, we, the human race along not facing the consequences but also the other living creatures. A huge whale with a plastic bucket stuck in its mouth, new-born dolphin calves being exposed to pollutants through their mother's contaminated milk, and seabirds unsuspectingly feeding their chicks piece of plastic - these scenes from the BBC Blue Planet II documentary series were heart-breaking, and just a snapshot of the problems plastic pollution is causing in the oceans. In this article let us discuss about the impact of plastics on the ocean.

Key words: Environment, Pollution

Introduction

Our Earth is the most beautiful planet in our solar system. As far as we know, Earth is the only planet that has life. Before 500 A.D. man had a good relationship with Mother Earth. But since humans developed cities and industries, the modern lifestyle has changed. Man has been using and misusing natural resources up to the limit. Now we are tearing up remote corners of the planet. Our environment is totally polluted, As a result of human activities, we, the human race along not facing the consequences but also the other living creatures. A huge whale with a plastic bucket stuck in its mouth, new-born dolphin calves being exposed to pollutants through their mother's contaminated milk, and seabirds unsuspectingly feeding their chicks piece of plastic - these scenes from the BBC Blue Planet II documentary series were heart-breaking, and just a snapshot of the problems plastic pollution is causing in the oceans. In this article let us discuss about the impact of plastics on the ocean.

Plastics in Our Life

"No-one in their daily life within a period of 10 minutes isn't touching something that is made of plastic," said Professor Andrew Holmes, an emeritus professor at the University of Melbourne and a polymer chemist who has developed special plastics for flat screen TVs and solar cells.

S.Davasuba,
Assistant Professor of Mathematics,
V.O.C College of Education, Thoothukudi

It's used in everything from the keyboard or pen you are using, to your glasses or contact lenses, the Teflon on your frying pan, and the banknotes in your wallet. It's in your clothes, phone, car, mattress, and TV screen. But for all the benefits plastic has given us, disposing of products particularly those designed to be used only once, such as packaging has become a major environmental issue. "The ocean is full of waste because humans have disposed of it carelessly," said Professor Holmes.

Dirty Dozen

The Center for Marine Conservation has been coordinating coastal cleanups since 1986. (The first nationwide cleanup took place in 1988, just four months before the MARPOL treaty took effect. Canada and Mexico joined in on the act in 1989.) The CMC also divides their data into debris found, listing the "dirty dozen"--twelve items found most frequently:1)cigarette butts 2) paper pieces 3) plastic pieces 4) Styrofoam 5) glass pieces 6) plastic food bags 7) plastic caps and lids 8) metal beverage cans 9) plastic straws 10) glass beverage bottles 11) plastic beverage bottles 12) Styrofoam cups.

How Much Plastics Dumped in a Year

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. A 2015 study assessing plastic waste management, from 2010 data, 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.

Another group of scientists analyzed plastic debris information from around the world and found that over a quarter of the plastic waste that goes into the ocean every year likely comes from the runoff of just ten rivers. These ten rivers, eight of which are in Asia and two in Africa, are located adjacent to large cities where hundreds of millions of people live. Most of the global population lives near coastal areas, but even those who live far from the sea contribute to ocean pollution when their waste gets into rivers that dump into the ocean.

How Long Does Plastic Last in the Ocean

The Marine Conservancy has published that the estimated decomposition rates of most plastic debris found on coasts are:

1) Foamed plastic cups: 50 years 2) Plastic beverage holder: 400 years

3) Disposable diapers: 450 year 4) Plastic bottle: 450

5) Fishing line: 600 years.

Impact of Plastics on Marine Animals

Fish, marine mammals and seabirds are being injured and killed by plastic pollution, and it's believed that 700 species could go extinct because of it. Current estimates suggest that at least 267 species worldwide have been affected, including 84% of sea turtle species, 44% of all seabird species and 43% of all marine mammal species – but there are probably many more. Deaths are chiefly caused by ingestion of plastics, starvation, suffocation, infection, drowning and entanglement. Its estimated that one in three marine mammals have been found caught up in some type of marine litter - lost fishing gear, nets and plastic bags for example - and that over 90% of seabirds have pieces of plastic in their stomachs. Seabirds who feed from the surface of the ocean are especially likely to ingest plastics that float, and then feed this to their chicks. One study found that 98% of chicks sampled contained plastics, and that the quantity of plastic being ingested was increasing over time.

And even the deepest sea creatures can't escape plastic pollution; samples taken by scientists at the Scottish Association for Marine Science off the Western Isles found that 48% of creatures had plastic in them, at a depth of 2,000 m. It was mostly polyethylene and polyesters from shopping bags and clothing - which makes it was into water via washing machine waste water - as well as micro plastics, small pieces of plastic that have degraded from larger pieces and the small plastic beads found in cleaning products.

Ways to Protect the Marine from Plastics

Reduce Your Use of Single-Use Plastics, Recycle Properly, Participate In (or Organize) a Beach or River Cleanup ,Support Bans ,Avoid Products Containing Micro beads ,Spread the Word, Support Organizations Addressing Plastic Pollution.

Conclusion

Our youth and young students take a growing interest in the problem of plastic, and we want to further engage this group through useful plans so that we can become a pioneer country when it comes to sustainable use of plastic. Engaging young people is a very important part of the solution to plastic in our sea environment. Driven by our wish for a clean environment, we are able to develop solutions and ideas that stem plastic pollution.

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EXOTOXOLOGICAL EFFECTS OF MICRO PLASTICS ON BIOTA: A CONTEMPORARY CHALLENGE IN OCEAN GOVERNANCE

E.Michael Jeya Priya

Abstract

Micro plastics are non-biodegradable bits of plastic which create havoc in our environment and ecosystem. These tiny bits of plastic can come from a variety of sources including cosmetics, clothing and industrial processes. These materials enter the food chain and ecosystem and misbalance the entire structure. Chemical toxins such as DDT and BPA from factory effluents and other sources stick to the micro plastics floating around in the ocean and enter the digestive system when they are consumed. These toxins can cause cancer, liver failure and kidney failure. This paper highlights the exotoxological effects of micro plastics on biota and its contemporary challenge in the ocean.

Key words: Micro plastics, Exotoxological, Contemporary

Introduction

Plastic is the most prevalent type of marine debris found in our ocean and Great Lakes. Plastic debris can come in all shapes and sizes, but those that are less than five millimeters in length (or about the size of a sesame seed) are called "micro plastics." Micro beads are tiny pieces of polyethylene plastic added to health and beauty products, such as some cleansers and toothpastes. Micro plastics come from a variety of sources, including from larger plastic debris that degrades into smaller and smaller pieces (Browne et al., 2011). These tiny particles easily pass through water filtration systems and end up in the ocean and Great Lakes, posing a potential threat to aquatic life. Micro plastic particles highest abundance of micro plastics was recorded on beaches adjacent to river mouth in India. Polyethylene and polypropylene were the most abundant micro plastics in the beaches. Micro plastics were found in 10.1% of the 79 fishes representing 5 species. Fragments were the dominant micro plastic available both in beaches and fish gut (Karthik et al., 2018). Polyethylene, polypropylene and polystyrene were the main types of micro plastics present in Indian beach. Micro beads are not a recent problem. According to the United Nations Environment Programme, plastic micro beads first appeared in personal care products about fifty years ago. The ubiquitous presence of micro plastics in the environment has drawn the attention of Eco toxicologists on its safety and toxicity (Sheavly &Register,2007). Micro plastics are of great concern because they can concentrate persistent organic pollutants (POPs) such as PCBs and dichlorodiphenyltrichloroethane (DDT, an insecticide), which can concentrate further as they move up the food chain, a process known as biomagnifications.

E.Michael Jeya Priya,
Assistant Professor of Biological Science, St.Ignatius College of Education

Sources of micro plastics in the environment include disintegration of larger plastic items (secondary micro plastics), personal care products like liquid soap, exfoliating scrubbers, and cleaning supplies etc. Indiscriminate usage of plastics and its poor waste disposal management pose serious concern on ecosystem quality at global level. The present review focused on the exotoxological impact of micro plastics on biota

Exotoxological Effect of Micro Plastic

Micro plastics include monomers of high-and low-density polyethylene (HD/LD-PE), polyethylene terephthalate (PET), polypropylene (PP), polystyrene (PS), and polyvinyl chloride (PVC) (European Commission 2013). Existing scientific evidence shows that micro plastics exposure triggers a wide variety of toxic insult from feeding disruption to reproductive Performance, physical ingestion, disturbances in energy metabolism, changes in liver physiology, synergistic and/ or antagonistic action of other hydrophobic organic contaminants etc. from lower to higher trophics. Thus, micro plastic accumulation and its associated adverse effects make it mandatory to go in for risk assessment and legislative action the environmental impact of micro plastics is due to two main reasons: (1) Their small size facilitates internalization by biota and, thus, resultant accumulation in the food chain and (2) They can absorb pollutants on their surfaces (Barnes et al., 2009). The micro plastic ingestion and subsequent chemical release in the organism through the process of 'absorption', while sometimes the ingested plastic results in the increased 'excretion' of organic pollutants.

Occurrence of Micro Plastics in Aqueous Ecosystem and Biota

- **Marine Environment**

Considering the 'hotspots' of micro plastics, oceans worldwide is acting as sink for plastic debris but the recent research indicates its presence on every in-land system. Its presence has been shown on beaches, in surface waters, throughout the water column, and within the biota FTIR spectra reveal that most of the plastic particles were made of polyethylene and polypropylene polymers. There is no limitation for micro plastics detection in the biota under natural conditions. It has been universally thought that the proportion of micro plastics particles increases with increased production and usage at global scale. This clearly shows that the level of micro plastics pollution could be closely correlated to specific human activities than the global plastic production and its utilization.

- **Fresh Water Environment**

Micro plastics may enter the freshwater environment through disintegration of plastic particles in water column, leaching of plastic particles from land to water basin and from direct effluent discharge (household and industrial operations) from waste water treatment plants etc. (Campbell et al. 2017). It has been noted that micro plastics occurred at higher concentrations in the vicinity of most populated and tourism spot near to fresh water ecosystems.

Table :1. Showing the occurrence and abundance of plastic litters in Indian marine is shown in Table 1.

Area	Location	Average abundance of micro plastics (MP)	Detection methods	Reference
Caranzalem Beach	Goa India	50–300/m2 along high water mark; 3–5 mm broad and 1–4 mm long	Not indicated	Nigam 1982.
Alang-Sosiya ship breaking yard	Mumbai, India	81 items /kg sediment	Chemical analysis by FT-IR spectroscopy and morphology using SEM	Reddy et al. 2006
Recreational beaches in Mumbai(Aksa,Versova, Juhu, Dadar)	Mumbai, India	7.49 g and 68.83 items/sq.m; 1–20 mm size particles with 41.85% of 1–5 mm size	As per Martin and Sobral, 2011	Jayasiri et al. 2013
Goa beaches (Keri, Vagator, Calangute, Colva, Mobor and Galigibag)	Goa, India	Total of 3000 pellets	FTIR coupled with attenuated total reflectance (ATR) for polymer composition	Veerasingham et al. 2016a
Marina beach Chennai	India	Mean mass of 25 mg (1200 pellets) with size ranging from 2 to 5 mm	FTIR coupled with attenuated total reflectance (ATR) for polymer composition	Veerasingham et al. 2016b

Ecological Risks Posed by Micro Plastics on Biota

Ecological impacts of micro plastics on marine ecosystem can be well studied in invertebrates. Over 250 marine species are believed to be contaminated by plastic ingestion (Laist, 1997). At the plankton level, micro plastics disrupt algal feeding (Cole et al., 2013). The increased food intake in oyster is noted after polystyrene micro plastics (2 and 6 μm size) exposure (Barnes et al., 2009) suggesting compensatory adjustment of energy intake in response to micro plastics exposure based on dynamic energy budget modeling. Micro plastics disrupt the filtering mechanism and induce an inflammatory response in sessile organisms such as mussels (Moos et al., 2012). Trophic level transfer of micro plastics-induced adverse effects on the marine food web has received considerable attention (Farrell and Nelson 2013; Setala et al.,2014). Evidence for micro plastics impact on freshwater biota is limited both interms of studies and species exposed.

Issues for Contemporary Ocean Governance

Marine pollution has long been recognised as a threat and a catalyst for ongoing developments in ocean governance. One major means to address and combat these threats has been through the work of international bodies such as the International Maritime Organization (IMO).(Laist,1997)

International Maritime Organization

The IMO, responsible for the administration of the International Convention for the Prevention of Pollution from Ships 1973/78 (MARPOL), the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter 1972 and its 1996 Protocol (London Convention/Protocol), have also recognised the problem of plastic pollution and marine litter.

Ship-sourced disposal of plastics is prohibited under the MARPOL convention for vessels flagged to parties to this convention in both exclusive economic zones and waters beyond national jurisdiction. The enforcement of MARPOL provisions needs strong monitoring, control and surveillance systems to ensure effective compliance, a key role for the flag state of vessels, from the smallest fishing vessel to large supertankers.

Declaration on Environment and Development in 1992

Declaration on Environment and Development in 1992, and the more recent commitments made in 2015 by world leaders in adopting the 2030 Agenda for Sustainable Development which, inter alia, includes 17 Sustainable Development Goals (SDGs).

United Nations Law of the Sea Convention.

An international agreement to address marine plastics could be pursued in a similar manner, but necessarily in a more integrated and broad-based approach than that attempted in the late 1960s. It could be modelled on the successful Montreal Protocol addressing ozone-depleting substances that saw replacement of chlorofluorocarbons and an increasing public awareness of the problem. A key starting point is to build on

commitments made at Nairobi, reaffirming the principles contained in the Rio.United Nations Conference to Support the Implementations of SDG 14, also known as the Oceans Conference, held in New York in June 2017.

Oceans Conference

Oceans Conference was the creation of Communities of Ocean Action, with marine pollution identified in SDG. The clear focus of such work.

United Nations Environment Assembly

United Nations Environment Assembly was a forum for governments, non-governmental organisations and civil society groups to present innovative solutions to tackle marine pollution through voluntary commitments by members of Communities of Action.

Joint Group of Experts on the Scientific Aspects of Marine Environmental Protection (GESAMP).

Ongoing scientific work must continue in order to understand the scale and scope of the problem. However, adopting a precautionary approach would mean that this uncertainty should not be used to limit immediate efforts to reduce impacts and to mitigate their effects. Linking business and industry to such issues could be facilitated by the work of the World Ocean Council as a global industry alliance committed to Corporate Ocean Responsibility (www.oceancouncil.org).

Conclusion

Despite the difficult task of avoiding plastic consumption and reducing the pollution, it is time to involve industrial manufacturing, shipping and harbour stakeholders to make a step forward in preventing the micro plastics entering into the marine environment from land and/or ocean based sources. Finally, it is suggested that government can play an active role in addressing the issue of plastic waste by introducing legislation to control the sources of plastic debris and the use of plastic additives. In addition, plastic industries can find the possibility of shouldering the responsibility for the end of-life of their products by introducing plastic recycling or upgrading programmes. Reduce; reuse and recycle are the current solutions to the overuse of plastics. Solutions to ensure materials are recycled or disposed of properly need to be developed. There should be awareness of the threats posed by micro plastics to marine ecosystems and human health to prevent plastic littering.

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WAYS AND METHODS OF PLASTIC WASTE DISPOSAL FOR MAKING PLASTIC FREE FUTURE

Mrs. S. Anitha Ruth
Mrs. M. Jasline Pravina
Mrs. R. Jeyasheeli

Abstract

Economic development and people's changing patterns of consumption and production have led to a drastic increase in plastic wastes all over the world. Plastic waste disposal harms the environment and poses threat to human health. Hence, there is great desire to reduce the plastic wastes. To reduce plastic wastes, education is of utmost importance as education can change people's knowledge, attitude, and behaviors toward plastic waste management. In the Educational system, we can be used of three important teaching strategies (direct teaching, hands-on teaching, and simulation game-based teaching) on change in knowledge, attitude, and behavior in students toward plastic waste management. This paper reveals that the ways to reduce plastic ways to make plastic free future through using various substitute of plastic products in our daily life.

Key words: Plastic, Waste management

Introduction

Plastic is the general common term for wide range of synthetic or semi synthetic organic amorphous solid materials derived from oil and natural gas. The word 'Plastic' is derived from the Greek word 'Plastikos' meaning fit for moulding & 'Plastos' meaning moulded.

Methods of Plastic Waste Disposal (and possible complications)

Landfilling: To be frank, all plastics can be disposed in landfills. However, landfilling is considered highly wasteful as it requires a vast amount of space and the chemical constituents and energy contained in plastic is lost (wasted) in this disposal route. In 2008, 29.2 million tons of plastic was disposed in landfills in the United States. In countries where landfills are poorly managed, plastic wastes can be easily blown into waterways or carried out to sea by flood water. In addition, when plastics decompose in landfills, they may leak pollutants (phthalates and bisphenol A) into the soil and surrounding environment.

Incineration: Plastics are derived from petroleum or natural gas, giving them a stored energy value higher than any other material commonly found in the waste stream.

Mrs. S. Anitha Ruth
Ph.D. Scholar, St. Mary's College, Thoothukudi
Mrs. M. Jasline Pravina
Assistant. Professor of Biological Science,
St. John's College of Education, Palayamkottai
Mrs. R. Jeyasheeli
Assistant. Professor of Education, St. John's College of Education, Palayamkottai

Incineration returns some of the energy from plastic production. In fact, one pound of plastic can generate as much energy as Wyoming coal and almost as much energy as fuel oil much energy as fuel oil. However, plastic incineration tends to cause negative environment and health effects as hazardous substances may be released into the atmosphere in the process. For example, PVC and halogenated additives are mixed into plastic waste and their incineration leads to release of dioxins and polychlorinated-biphenyls into the environment.

Recycling: Many plastics can be recycled and the materials recovered can be given a second-life. However, this method is not fully utilized, due to difficulties with the collection and sorting of plastic waste. Many developing (and even some developed countries) have poor waste management facilities which often result in plastics (and other waste) being recklessly disposed into rivers and water bodies. Even though recycling is the most effective way to deal with plastic waste, its effectiveness is highly depended on public awareness, economic viability, and the implementation of public infrastructures to make recycling more efficient (recycling bins, specialized waste collecting trucks).

Biodegradable Plastics: Biodegradable plastics are plastics that decompose by the action of living organisms. Biodegradable plastics have the potential to solve a number of waste-management issues, especially for disposable packaging that cannot be easily separated from organic waste. However, biodegradable plastics are not without controversy. Even though biodegradable plastics can be completely metabolize by organisms into carbon dioxide and water, there are allegations that Oxo-Biodegradable plastics may release metals into the environment.

Ways to reduce plastic waste: Plastic is found in virtually everything these days. Your food and hygiene products are packaged in it. Your car, phone and computer are made from it. And you might even chew on it daily in the form of gum. While most plastics are touted as recyclable, the reality is that they're "down cycled."

- A plastic milk carton can never be recycled into another carton — it can be made into a lower-quality item like plastic lumber, which can't be recycled. Of the 33 million tons of plastic waste generated in the U.S. each year, only 7 percent is recycled. This plastic waste ends up in landfills, beaches, rivers and oceans and contributes to such devastating problems as the Great Pacific Ocean Garbage Patch, a swirling vortex of garbage the size of a continent where plastic outnumbers plankton. Plus, most plastic is made from oil. Luckily, there are simple steps we can take that will dramatically decrease the amount of plastic waste you generate.

- **Just say no to straws**

One of the easiest ways to keep plastic out of the landfill is to refuse plastic straws. Simply inform our waiter or waitress that we don't need one, and make sure to specify this when ordering at a drive-thru. Can't fathom giving up the convenience of

straws? Purchase a reusable stainless steel or glass drinking straw. Restaurants are less likely to bring you a plastic one if they see that you've brought your own.

- **Use reusable produce bags**

About 1 million plastic bags are used every minute, and a single plastic bag can take 1,000 years to degrade. If you're already bringing reusable bags to the grocery store, you're on the right track, but if you're still using plastic produce bags, it's time to make a change. Purchase some reusable produce bags and help keep even more plastic out of the landfill. However, avoid those bags made from nylon or polyester because they're also made from plastic. Opt for cotton ones instead.

- **Give up gum**

Gum was originally made from tree sap called chicle, a natural rubber, but when scientists created synthetic rubber, polyethylene and polyvinyl acetate began to replace the natural rubber in most gum. Not only are you chewing on plastic, but you may also be chewing on toxic plastic — polyvinyl acetate is manufactured using vinyl acetate, a chemical shown to cause tumors in lab rats. While it is possible to recycle your gum, it may be best to skip it — and its plastic packaging — altogether.

- **Buy boxes, not bottles**

Buy laundry detergent and dish soap in boxes instead of plastic bottles. Cardboard can be more easily recycled and made into more products than plastic.

- **Buy from bulk bins**

Many stores, such as Whole Foods, sell bulk food like rice, pasta, beans, nuts, cereal and granola and opting to fill a reusable bag or container with these items will save both money and unnecessary packaging. Stores have various methods for deducting the container weight so simply check with customer service before filling your container. Also, many cotton bags have their weights printed on their tags so they can simply be deducted at the checkout.

- **Reuse glass containers**

You can buy a variety of prepared foods in glass jars instead of plastic ones, including spaghetti sauce, peanut butter, salsa and applesauce, just to name a few. Instead of throwing these away or recycling them, reuse the jars to store food or take them with you when you're buying bulk foods. If you have plastic containers leftover from yogurt, butter or other food, don't throw them out. Simply wash them and use them to store food.

- **Use reusable bottles and cups**

Bottled water produces 1.5 million tons of plastic waste per year, and these bottles require 47 millions gallons of oil to produce, according to Food & Water Watch. By simply refilling a reusable bottle, you'll prevent some of these plastic bottles from ending up in landfills and oceans — but don't stop there. Bring a reusable cup to

coffee shops and ask the barista to fill it up, and keep a mug at your desk instead of using plastic, paper or Styrofoam cups. The average American office worker uses about 500 disposable cups a year so you'll be preventing a lot of unnecessary waste.

- **Bring your own container**

Whether you're picking up takeout or bringing home your restaurant leftovers, be prepared with your own reusable containers. When you place your order, ask if you can get the food placed in your own container. Most restaurants will have no problem with it.

- **Use matches**

If you need to light a candle, build a campfire or start a fire for any other reason, opt for matches over disposable plastic lighters. These cheap plastic devices sit in landfills for years and have even been found in dead birds' stomachs. If you can't bear to part with your lighter, pick up a refillable metal one to help cut down on waste.

- **Skip the frozen foods section**

Frozen foods offer both convenience and plenty of plastic packaging — even those eco-friendly packaged items made from cardboard are actually coated in a thin layer of plastic. While giving up frozen food can be difficult, there are benefits besides the obvious environmental ones: You'll be eating fewer processed foods and avoiding the chemicals in their plastic packaging.

- **Don't use plastic ware**

Say goodbye to disposable chopsticks, knives, spoons, forks and even sporks. If you often forget to pack silverware in your lunch or if you know your favorite restaurant only has plastic ware, start keeping a set of utensils. It's sure to reduce your carbon forkprint.

- **Return reusable containers**

If you buy berries or cherry tomatoes at the farmers market, simply bring the plastic containers to the market when you need a refill. You can even ask your local grocer to take the containers back and reuse them.

- **Use cloth diapers**

According to the EPA, 7.6 billion pounds of disposable diapers are discarded in the U.S. each year. Plus, it takes about 80,000 pounds of plastic and more than 200,000 trees a year to manufacture disposable diapers for American babies alone. By simply switching to cloth diapers, you'll not only reduce your baby's carbon footprint, you'll also save money.

- **Don't buy juice**

Instead of buying juice in plastic bottles, make your own fresh-squeezed juice or simply eat fresh fruit. Not only does this cut down on plastic waste, but it's also better

for you because you'll be getting more vitamins and antioxidants and less high fructose corn syrup.

- **Clean green**

There's no need for multiple plastic bottles of tile cleaner, toilet cleaner and window cleaner if you have a few basics on hand like baking soda and vinegar. So free up some space, save some cash, and avoid those toxic chemicals by making your own cleaning products.

- **Pack a lunch the right way**

If your lunchbox is full of disposable plastic containers and sandwich bags, it's time to make a change. Instead of packing snacks and sandwiches in bags, put them in reusable containers you have at home, or try lunch accessories like reusable snack bags. You can also opt for fresh fruit instead of single-serving fruit cups, and buy items like yogurt and pudding in bulk and simply put a portion in a reusable dish for lunch.

Conclusion

This crucial process of waste disposal can help reduce costs and environmental concerns all over the world. Plastic is a very important recyclable because it can negatively affect the environment and living beings in many ways. Recycling and responsible waste management can help beautify the world.

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PLASTIC FREE PLANET – A VISION FOR FUTURE

A.Vinothini Sylvia

Abstract

Plastic waste is ubiquitous and poses a warning to the environment and human survival. Plastic is chocking our planet. The UN slogan "Beat plastic pollution" must be translated into action if we are to keep the planet a safe place for our future generations. This paper suggests a few ways to replace plastics we use in our day-to-day life with eco-friendly materials. A survey was conducted among the prospective teachers regarding their usage of plastics based on which a few measures that has to be adopted for creating a plastic free planet was also suggested.

Introduction

Plastic is chocking our planet. Single use plastic and disposable electronics are trashing our planet. The devastating images of beaches covered with plastic waste, turtles and other marine life killed by ingesting bags, bottles, and other debris pose a serious threat to us. The statistics about micro plastics getting into the food we eat and the water we drink is worrisome. Plastic waste is ubiquitous and poses a warning to the environment and human survival. The world is addicted to plastic. It was once sold to consumers as the product of the future. But decades later the reality is that the earth is being choked on it. According to the US Environmental Protection Agency, only 9 percent of plastic is making its way into the recycling stream. We find heaps of discarded plastic straws, stirrers, wrappings, bags and bottles in every nook and corner of the landscape. Plastics pile up in landfills, clogs the oceans, and contaminate food chains thereby affecting the entire planet.

Need for Plastic free Planet

As plastic is less expensive, it is one of the most widely available and overused item in the world today. When disposed, it does not decompose easily and pollutes the land or air nearby when burned in the open air. How many plastic bags have you thrown away in your lifetime? Hundreds? Thousands? Multiply that by the population of Earth and you understand the size of the issue we're tackling. We produce close to 300 million tons of plastic waste each year, and it is estimated that 8 million tons of it ends up in the sea. Some collects together to form "trash islands.

The UN slogan "Beat plastic pollution" must be translated into action if we are to keep the planet a safe place for our future generations. The end of its journey leads to a lifetime in landfills, or as litter on land or in bodies of water.

A.Vinothini Sylvia,
Assistant Professor of Education,
Annammal College of Education for Women, Thoothukudi

It is predicted, given the current rate of pollution, there could be more plastic than fish in the world's oceans by the year 2050. This underlines the need to intensify a mass campaign to create awareness among people about the ill-effects of unchecked plastic use and persuade them to give up the habit of using plastic manufactured in the name of 'convenience'. Without going into a very tedious science lecture, here is a simple fact about plastic – it doesn't decompose naturally that's an obvious fact. And yet, with islands of plastic waste swelling up around us, we still hold on to every plastic element we find. Although plastic as we know it was introduced less than 100 years ago it has quickly become a staple in our everyday lives – from light switches to cars to computers, plastics are unavoidable. Unfortunately, this explosion in plastic products has been devastating for our environment. Synthetic plastics are not biodegradable, which means that once they're manufactured they're going to be with us in our landfills and oceans for hundreds if not thousands of years. There is also a whole laundry list of toxic chemicals that leak into our air, water, and soil from the manufacturing and disposal of plastics. Recycling can help alleviate some of these problems, but the best way to protect the earth from plastics is to replace them with more eco-friendly materials. Here are a few alternatives to plastic items which can be used to minimize plastic pollution.

Alternatives to Plastic Items in Everyday Life

Bamboo Toothbrushes: Tooth brush is the very first thing made of plastic we use as we start our day. This essential item, when tossed into the trash take around 400 years to decompose. It is better to switch to bamboo tooth brushes that can decompose naturally.

Stainless Steel/Glass Water Bottles: Instead of buying an umpteen number of plastic bottles, it is better to invest in a good water bottles made of glass or stainless steel that limits the use of plastic ones. With prolonged use of plastic bottles toxic chemicals that seep into the drinking water and can enter the food chain.

Eco-friendly Coffee Tumblers: Instead of having for several small plastic cups of coffee we can opt for durable tumblers which is more eco-friendly than those little cups that will wind up in a big pile of garbage.

Cloth Pads or Menstrual Cups: When it comes to the conventional sanitary napkin, it's got more plastic in it than anything else. On an average, a woman uses 11,000 disposable menstrual products lifetime. Tus due to sanitary napkins a staggering amount of plastic waste is dispelled into the environment across the world. Reusable cloth pads and menstrual cups can serve as great alternatives to conventional menstrual hygiene products. Not only do they create no waste, but also they are reusable and durable.

Cloth Diapers: A countless number of disposable diapers are clogging landfills and contributing to garbage piles at an alarming rate. Cloth diapers are reusable and better for the baby's skin due to the lack of chemicals.

Reusable Shopping Bags: The plastic ban that has been imposed in almost every state of India has set back the usage of plastic bags. But people still use and dispose of plastic covers mainly used for grocery shopping and throwing out the trash. A reusable bag can

be kept handy while going to the supermarket and one can also use bags made from vegetable waste which are completely bio-degradable.

Compostable Garbage Bags: The one reason we prefer to use our plastic covers as garbage bags is because it assures no leakage of food waste and can hold quite a lot of stuff in. But there are reasonably priced compostable garbage bags available in the market which have the above qualities and help the environment. One can use these to line the trash can and to dispose of food and other wastes instead of any regular plastic bag.

Eco-Friendly Cutlery: As an alternate to the plastic disposable cutlery we can use wooden spoons and forks, leaf or bamboo plates and cups, and even edible cutlery. It is better than throwing out an infinite number of plastic cutleries that will probably end up sticking around for a couple of centuries.

Reusable Straws: Main things we toss into the trash in extremely high numbers are plastic straws. If straws are a must, we can use stainless steel straws that are washable and reusable.

Plastic Free Homes: From jars to store food to water bottles, kitchen equipment and even simple items like cups, tiffin boxes and trays most modern Indian homes are filled with plastic. These can be replaced by ecofriendly materials which can fulfil the same purpose as that done by plastics.

Survey on the Usage of Plastic Bags among Prospective Teachers

A sample of 30 prospective teachers was chosen randomly and a survey was conducted among them to find out their attitude towards the usage of plastic bags. The results are as follows:

Item	don't think that a ban is necessary	think it`s a great solution	doesn't bother
Attitude towards the ban on plastic carrier bags imposed by the Government	26%	60%	14%

From the above table it is clear that 26% of prospective teachers consider that the ban on the usage of plastic bags imposed by the government is not necessary but instead the government can insist the companies to produce biodegradable bags. 60% of prospective teachers think the ban imposed to be a great solution for cutting down the use of plastics. 14% of prospective teachers doesn't bother about the imposed ban on the plastic carrier bags.

Item	For Shopping	As bin liners	For Storing	Throw away
Reusing the plastic bags	12%	44%	18%	26%

From the above table it is clear that 12% of prospective teachers reuse the plastic bags for shopping, 44% of them use it as bin liners, 18% of them use it for storing and 26% of them throw it away.

Item	Don't reuse	Once	2 to 5 times	More than 5 times
Number of times a plastic bag is reused	26%	20%	54%	0

From the above table it is clear that 26% of prospective teachers do not reuse the plastic bags, 20% of them reuse it only once, 54% of them use it 2 to 5 times and no one reuse plastic bags more than 5 times.

Implications from the Survey

The results of the survey indicate that many prospective teachers doesn't bother about the ban imposed on the use of plastic bags. This indifferent attitude among prospective teachers is pathetic. Hence many programmes should be organized to enhance the social responsibility among prospective teachers. Programmes based on the devastating effects of plastics on our environment should be organized in teacher education institutions to create awareness on the harmful effects of plastic pollution and the alternatives to replace plastics among the prospective teachers who are the future teachers whom can influence the upcoming generation. The results also show that more of plastic bags are used as bin liners. Hence government should take measures to produce bio-degradable garbage bags at cheaper rate which can be conveniently accessed by all people irrespective of their socio-economic status. It is also seen that nearly 26% of prospective teachers do not reuse the plastic bags and just throw them away. Hence awareness regarding the kinds of plastics that can reused and those that should be recycled should be generated among the prospective teachers.

Conclusion

We and the generations before us inherited a beautiful planet but what we are giving our children and grandchildren is a toxic waste-choked environment. Giving up plastic is not the easiest thing to do. Making the transition to eco-friendly products won't happen in a second. Don't rush to replace All the existing items in our homes cannot be replaced at once but remember that when we buy new products we should switch from plastics to handmade, sustainable items. The Tamil Nadu Government did the right thing in banning single-use plastic products. A plastic-free planet is a goal worth pursuing for our and posterity's sake.

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SINGLE-USE PLASTIC AND ITS EFFECT ON HUMAN HEALTH

Muthulakshmi.S

Abstract:

Plastic bags are killing our planet. It is expected that the world will consume 5 trillion plastic bags this year. Plastic bags are not biodegradable. They clog waterways, spoil the landscape, and end up inlands fill. Where they may take 1,000 years or more to break down into ever smaller particles that continue to pollute the soil and water. Plastic bags also pose a serious danger to birds and marine mammals that often mistake them for food. Thousands die each year after swallowing or choking on discarded plastic bags. Finally, producing plastic bags requires millions of gallons of petroleum that could be used for transportation or heating.

Key words: Plastics, Bio-degradable

Introduction

Plastic pollution is currently one of the biggest environmental concerns. It may seem like large amounts of plastic waste are inevitable in the world we live in, but you can help with the plastic pollution issue by being aware of its dangers and taking steps to reduce waste. The amount of garbage in the world increases as the population grows and disposable plastic products, like water bottles and soda cans, accumulate over time. Plastic pollution occurs when enough plastic has gathered in an area that it affects the natural environment and harm plants, animals, or humans. Plastic has toxic pollutants that damage the environment and cause land, water, and air pollution. It can take hundreds or even thousands of years for plastic to break down, so the damage to the environment is long-lasting.

What is single use plastic and why is it a problem?

Single use plastics or disposable plastics, are used only once before they are thrown away or recycled. These items are things like plastic bags straws, coffee stirrers, soda and water bottles and most food packaging. We produce roughly 300 million tons of plastic each year and half of it is disposable. Worldwide only 10-13%of plastic items are recycled. The nature of petroleum based disposable plastic makes it difficult to recycle and they have to add new virgin materials and chemicals to it to do so. Additionally they are a limited number of items that recycled plastic can be used.

Petroleum based plastic is not biodegradable and usually goes in to a landfill where it is buried or it gets in to the water and it's way into the ocean. Although will not biodegrade (decompose into natural substance like soil,) it will degrade(break down into tiny particles after many years. in the process of breaking down, it releases toxic chemicals (additives that were used to shape and harden the plastic) which make their way into our food and water supply.

Muthulakshmi.S
Assistant Professor of Education,
TDTA DS Daniel Rajammal College of Education, Ilanji, Tenkasi

These toxic chemicals are now being found in our bloodstream and the latest research has found them to disrupt the endocrine system which can cause cancer, infertility, birth defects, impaired immunity and many other ailments. We produce hundreds of millions of tons of plastic every year, most of which cannot be recycled. It's obvious that we need to use less plastic, move towards environmentally sustainable products and services and come up with technology that recycles plastic more efficiently.

As Per Analysis

- 100% people heard or read about the dangerous of plastic bags.
- 69% people re-use plastic bag.
- 100% people know alternative for plastic bag.
- But while shopping 59% people use alternative.
- Still 68% people think to need more awareness.
- 91% people trying to reduce consumption and 100% people would like to support to reduce plastic bag use.
- If Government will take any action then 60% people will support & 40% will try to support

Effects on Human Health:

The problem with this ready migration is that (BPA) Bisphenol A. A powerful endocrine disruptor) which means that it disrupts the human endocrine system from working properly.

The endocrine system regulates a number of vital body functions including:

- metabolism
- digestion
- general mood
- sexual function
- tissue development and function
- heart rate
- temperature
- ability to sleep well
- fertility and reproduction

Generally the endocrine system works by removing necessary materials from the blood .The most common endocrine disease in the United States in diabetes. This occurs when there is a problem with in the endocrine system such as the pancreas not making enough of the hormone insulin or the body does not use it as it should so then the sugar in the blood becomes too high. A disrupting chemical like BPA can mimic a hormone or block a receptor or do any number of things to disrupt the proper functioning of any of the endocrine glands.

- Osteoporosis
- Hypo and hypertension
- Cushing's syndrome
- Obesity
- Thyroid cancer
- Addison's disease
- Low testosterone

Alternatives to Plastic Bags

- An Easy Alternative – Canvas Bags
- Eco-Friendly Bags, Made Out Of Natural Starches And Vegetable Wastes:
- Trendy And In Vogue – Denim Bags
- A Step Closer To Plastic-Free World: Aarohana EcoSocial Developments company started by two IT professionals in Pune is providing trendy alternatives to plastic bags. What's great is that the duo is up cycling the old plastic bags and converting it into new stylish fashionable bags. Today, around 200,000 typical small grocery plastic bags have been up cycled by the duo. Choose this alternative product in place of your conventional plastic bag and prevent adding to the growing pile of plastics.
- Plain And Simple – Jute Bags.

CONCLUSION:

It is recommended that this material should be avoided as far as possible unless the material is transparent and there is a note on the bottle says: "BPA free bottles."Ask your school to stop using single-use plastic items in the cafeteria. Talk to your local politicians about what they can do to reduce the single-use plastic footprint of your community. Educate your friends and family about marine plastic pollution. Download the education pack and use it with your students. Work with the school administration to see how your school can reduce its plastic footprint. Participate in a beach clean-up together with your students.

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THE POLLUTION OF THE MARINE ENVIRONMENT BY PLASTIC DEBRIS

D.N.Anita

Abstract

The deleterious effects of plastic debris on the marine environment were reviewed by bringing together most of the literature published so far on the topic. A large number of marine species is known to be harmful and killed by plastic debris, which could jeopardize their survival, especially since many are already are endangered by other forms of anthropogenic activities. Marine animals are mostly affected through entanglement in and ingestion of plastic litter. Other less known threats include the use of plastic debris by "invader" species and the absorption of poly chlorinated biphenyls from ingested plastics. Less conspicuous forms, such as plastic pellets and "scrubbers" are also hazardous. To address the problem of plastic debris in the ocean is a difficult task, and a variety of approaches are urgently required. Some of the ways to mitigate the problem are discussed.

Key words: Plastic debris, Pollution, Marine, Environment

Introduction

Human activities are responsible for a major decline of the world's biological diversity, and the problem is so critical that combined human impacts could have accelerated present extinction rates to 1000-10000 times the natural rate. In the oceans ,the threat to marine life comes in various forms ,such as overexploitation and harvesting, dumping of waste, pollution, alien species, land reclamation, dredging and global climate change.

Plastic debris

Plastic are synthetic organic polymers, and though they have only existed for just over a century. The versatility of these materials has led to a great increase in their use over the past three decades, and they have rapidly moved into all aspects of everyday life. Plastics are light weight, strong durable and cheap, characteristics that make them suitable for the manufacture of a very wide range of products. These same properties happen to be the reasons why plastics are serious hazard to the environment. Since they are also buoyant, an increasing load of load of plastic debris is being dispersed over long distances, and when they finally settle in sediments they may persist for centuries.

The threat of plastics to the marine environment has been ignored for a long time, and its seriousness has been recently recognized for instance, then a member of the council of the British Plastics Federation and a fellow of the Plastic Institute, stated that, 'plastics litter is a small proportion of all litter and causes no harm to the environment except as an eyesore.

D.N.Anita
Junior Lecture in Science, Sarah Tucker Teacher Training, Palayamkottai

"His comments not only illustrates how the deleterious environmental effects of plastics were entirely overlooked, but also that, apparently, even the plastics industry failed to predict the great boom in t he production and use of plastics of the past 30 years. In the marine environment, the perceived abundance of marine life and the vastness of the oceans have to lead to the dismissal of the proliferation of plastic debris as a potential hazard.

The Threats from Plastics Pollution to Marine Biota

There is still relatively little information on the impact of plastics pollution on the ocean's ecosystems. The threats to marine life are primarily mechanical due to ingestion of plastic debris and entanglement in packaging bands, synthetic ropes and lines, or drift nets. Since the use of plastics continues to increase, so does the amount of plastics polluting the marine environment. The list of affected species indicates that marine debris are affecting a significant number of species. It affects at least 267 species worldwide, including86% of all sea turtle species, 44% of all seabird species, and 43% of all marine mammal species. There is also potential danger to marine ecosystems from the accumulation of plastic debris on the sea floor. The accumulation of such debris can inhibit the gas exchange between the overlying waters and the pore waters of the sediments, and the resulting hypoxia or anoxia in the benthos can interfere with the normal ecosystem functioning, and alter the make-up of life on the sea floor.

Ingestion of Plastics

A study done on 1033 birds collected off the coast of North Carolina in the USA found that individuals from 55% of the species recorded had plastic particles in their guts (Moser and Lee, 1992). The authors obtained evidence that some seabirds select specific plastic shapes and colors, mistaking them for potential prey items. Shaw and Day (1994) came to the same conclusions, as they studied the presence of floating plastic particles of different forms, colors and sizes in the North Pacific, finding that many are significantly under-represented. Carpenter et al. (1972) examined various species of fish with plastic debris in their guts and found that only white plastic spherules had been ingested, indicating that they feed selectively. Other harmful effects from the ingestion of plastics include blockage of gastric enzyme secretion, diminished feeding stimulus, lowered steroid hormone levels, delayed ovulation and reproductive failure. Even Antarctic and sub-Antarctic seabirds are subjected to this hazard (Slipet al., 1990). A whiteface storm-petrel (Pelagodroma marina) found dead at the isolated Chatham Islands (New Zealand) at abreedingsite, had no food in its stomach while its gizzard was packed with plastic pellets (Bourne and Imber,1982).The harm from ingestion of plastics is neverthelessnot restricted to seabirds. Polythene bags drifting inocean currents look much like the prey items targeted by turtles (Mattlin and Cawthorn, 1986; Gramentz, 1988;Bugoni et al., 2001).

Plastics Ingestion and Polychlorinated Biphenyls

Over the past 20 years polychlorinated biphenyls(PCBs) have increasingly polluted marine food webs. Though their adverse effects may not always be apparent,

PCBs lead to reproductive disorders or death, they increased risk of diseases and alter hormone levels. These chemicals have a detrimental effect on marine organisms even at very low levels and plastic pellets could be a route for PCBs into marine food chains. Bjorndal et al. (1994) worked with sea turtles and came to a similar conclusion, that the absorption of toxins as sub lethal effects of debris ingestion has an unknown, but potentially great negative effect on their demography. Plastic debris can be a source of other contaminants besides PCBs.

Plastic "Scrubbers"

Small fragments of plastic derived from hand cleaners, cosmetic preparations and air blast cleaning media. The environmental impact of these particles, as well as similar sized flakes from degradation of larger plastic litter, has not been properly established yet. In New Zealand and Canada, polyethylene and polystyrene scrubber grains respectively were identified in the cleansing preparations available in those markets, sometimes in substantial quantities Once discarded they enter into foul water or reticulate sanitary systems, and though some may be trapped during sewage treatment, most will be discharged into marine waters; and as they float, they concentrate on surface waters and are dispersed by currents (Gregory, 1996). There are many possible impacts of these persistent particles on the environment (Zitko and Hanlon, 1991). For instance, heavy metals or other contaminants could be transferred to filter feeding organisms and other invertebrates, ultimately reaching higher trophic levels.

Other Issues and Ways to Prevent Marine Pollution

Education is also a very powerful tool to address the issue, especially if it is discussed in schools. Youngsters not only can change habits with relative ease, but also be able to take their awareness into their families and the wider community, working as catalysts for change. Since land-based sources provide major inputs of plastic debris into the oceans, if a community becomes aware of the problem, and obviously willing to act upon it, it can actually make a significant difference. The power of education should not be underestimated, and it can be more effective than strict laws, such as the Suffolk County Plastics Law that banned some retail food packaging and was unsuccessful in reducing beach and roadside litter. "no effort to conserve biological diversity is realistic outside the economics and public policies that drive the modern world' 'There are also more complicated aspects of the problem of plastic pollution. It is unlikely that such nations would take any steps to reduce the use of plastics or their disposal into the oceans, if that would compromise any short-term economic gain.

Conclusion

Ultimately, all sectors of the community should take their individual steps. Thinking globally and acting locally is a fundamental attitude to reduce such an environmental threat. A combination of legislation and the enhancement of ecological consciousness through education is likely to be the best way to solve such environmental problems. The general public and the scientific community have also the responsibility of ensuring that governments and businesses change their attitudes towards the problem.

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BEAT PLASTIC POLLUTION

Vennila Santha Ruby
Suhasini.K

Abstract

Studies suggest that trillions of micro plastic particles are floating on the surface of the global oceans and that the total amount of plastic waste entering the ocean will increase by an order of magnitude by 2025. As such, this ever-increasing problem demands immediate mitigation and reduction. Diverse solutions have been proposed, ranging from source reduction to ocean-based cleanup. These solutions are most effective when guided by scientific evidence. They conclude that it will be most cost-effective and ecologically beneficial if clean-up efforts focus on the flux of micro plastics from the coasts rather than in the center of the oceans where plastic accumulates in so called 'garbage patches'. If followed, this example may become one of a series of examples where science has informed a solution to the complex problem of plastic pollution. Ocean is mainly being polluted by plastics in which the sea-living animals mainly die because of the hazardous pollutants caused by pollution.

Key words: Magnitude, Mitigation, Micro plastics, Pollutants.

Introduction

"With every drop of water you drink,
every breath you take,
you're connected to the sea". **-Sylvia Earle**

Plastic pollution is one of the greatest threats to ocean health World Wide. With sky rocketing plastic production low level of recycling and poor waste management, between 4 and 12 million metric tons of plastic enter the ocean each year, 80%of marine plastic pollution originates from land- based resources.

Shocking Facts about Plastics in our Ocean:

The ocean are massive pulsing, vibrant bodies of water that serve humanity in countless ways from providing food to enable commercial to simply being beautiful. But these powerful expenses of sea are not invincible. Each year, human activity erodes marine life in some way. Over fishing is driving many fish populations to the brink of extinction. Carbon waters, making it hard for small sea animals to reproduce ,rising global temperatures are cooking coral reefs alive. Each year,13million tons of plastic end up in the oceans. A study revealed that 20 rivers carry two-thirds of plastic waste to the oceans. The Ganga's contribution to this is one of the highest. Researchers exploring the Artic have found very high levels of micro plastics trapped in the ice. Last year , a plastic spoon was found in the remains of the whole shark off Rameshwaram. Experts explained that whale sharks are filter feeders and like to swallow everything floating.

Vennila Santha Ruby,
Assistant Professor of English, St.Ignatius College of Education, Palayamkottai
Suhasini.K
Assistant Professor of History, St.Ignatius College of Education, Palayamkottai

In the Asia- pacific region a total of 11.1 billion plastic items were found trapped on the coral reefs. Billions of bits of plastic waste are entangled in corals and sickening reefs from Thailand to Australia's Great Barrier Reef. The trash is another pressure as corals, already suffering from over-fishing, rising temperature caused by climate change and other pollution. The waste plastic items including shopping bags, fishing nets, evers diapers and tea bags are ensnared on reefs, the scientists wrote in the journal science. A 2011 study found that fish in North Pacific ocean ingested between 12000 and 24000 tons of plastic every year. That moves up the food chain while upsetting nature processes. We know that fish and even zoo plankton -some of the smallest creatures on the earth are eating more and plastic every year. And while we wouldn't choose to eat plastic soaked in hazardous chemicals, there's a real danger that we are eating fish and sea food contaminated by their plastic meals. Sea animals choke on plastic debris, sea turtle eats polythene mistaking it for jelly fish.

But often we mistake plastic bags for their natural prey. This plastic debris can kill the sea turtle by obstructing the oesophagus ,baby sea turtles are particularly vulnerable according to 2018 study by Australian scientist so too are whales ;large amount of plastics have been found in the stomach of branched whales. In June 2018, more than 80 plastic bags were found inside a dying pilot whale that washed upon the shores of Thailand. In March 2019 a dead curvier's beaked whale washed up in the Philippines with 88lbs of plastic in its stomach. Plastic once in the ocean are known to absorb a range of hazardous chemicals. Overtime, toxins accumulate onto floating and drifting fragmented plastic debris and are eventually ingested by marine life. We don't know whether these pollutants are being passes in the food chain to us humans, but its likely that they are increasing risk to human health.

We need an investigation into the toxic risks of plastics in our seafood and we need to keep plastics out of our oceans for the safety of our fish, normal life and ultimately ocean own lives.

Actions for Creating Awareness

So, what can we do about ocean plastic pollution? Everyone can do something to reduce the amount of plastic that enters ocean. Everyone can do something to reduce the amount of plastic that enters the ocean. Here are seven ways we can make a difference

1. **Reduce our use of Single use Plastics**

Single use plastics include plastic bags water bottles, straws, cups dry cleaning bags take out containers and any other plastic items that are used once and then discarded.

2. **Recycle Properly**

At present just 9%of plastic is recycled worldwide. Recycling helps keep plastics out of the ocean and reduces the amount of "new" plastics in circulation.

3. **Participate in a Beach or River Cleanup**

This is one of the most direct and rewarding way to fight ocean plastic pollution, we can simply go to the beach or waterway and collect plastic waste on our own or with friends or family, or we can join a local organization's cleanup or an international event like the International coastal cleanup.

4. Support Bans:

Many municipalities around the world have enacted bans on single use plastic bags takeout containers and bottles. We can support the adoption of such policies in our community.

5. Avoid Products Containing Micro beads:

Tiny plastic particles, called "micro beads" have become a growing source of ocean plastic pollution in recent years. Micro beads are in some face scrubs, toothpastes and body washes and they readily enter our oceans and waterways through our sewer systems and affects hundreds of marine species. So avoid products containing plastic micro beads by looking for "polyethylene" on the ingredient labels of our cosmetic products.

6. Spread The World:

Stay informed on issues related to plastic pollution and help make others aware of the problem.

7. **Support Organizations Addressing Plastic Pollution:**

There are many non-profit organizations working to reduce and eliminate ocean plastic pollution in a variety of different ways including oceanic society. Plastic soup foundations and others. These organizations rely on donations from people like us to continue their important work. Even small donations can make a big difference.

Steps Undertaken by Government

In 2017, the Kerala government began a programme called Suchitwa Sagaram to prevent dumping of nets and to bring back plastic litre as well. Until June this year, 28tonnes of plastics was recovered and used for surfacing roads. Unfortunately few such programmes exist in India.

An ambitious resolution piloted by India to phase out single use plastics by 2025 was watered down at the United Nation Environment Assembly that concluded in NCUROBI. At the world Environment Day summit on June 5,2018 here union Environment Minister HarshVardhan had pledged to eliminated single -use plastics from India 2022.

Conclusion

These ideas only scratch the surface for ways we can help address the growing problem of plastic pollution in the oceans. The important thing is that we all do something , no matter how small. So let us all signup to join the blue habit community of

people worldwide committed to joyful daily actions that improve ocean health. As a responsible citizen remember the 5 R' principle are Reduce, Reuse, Recycle, Recover and Refuse. Develop habits which are environment friendly.

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ZERO PLASTIC WASTE IN OUR ENVIRONMENT

D.Grace Rejilabai

Abstract

Plastics have involved in every instance of our life. They are organic polymers. However, they are not biodegradable, they exist in the environment and releases toxic fumes during combustion or pollute water and soil this confirms the need of recycling. Plastic is a non- biodegradable organic polymer, which is very commonly used in materials, large amounts of discarded plastics accumulating in oceans as Garbage islands and in land as landfills or blocking streams and waterways. Leaching of waste plastics from land filling and fumes released during incineration resulting major health impacts to living things as well as polluting the air, water, and soil, burning PVC releases cancer causing dioxins and PCB. Plastic items are a critical part of modern society and they are used in almost every aspect of our lives. One of the values of plastics for packaging and manufacturing articles is the strength and durability of the material, however, after use this durability means that the plastics remain after use and continue to accumulate in the environment indefinitely. This means that as we use more and more plastic, we will also discard an ever growing amount of plastic that will last for centuries.

Key words: Biodegradable, Land filling

Introduction

The word "plastic" comes from the Greek word Plasticos, which means to be able to be shaped or molded by heat. Plastics are macromolecules composed of various elements such as carbon, hydrogen, chlorine and sulphur. Plastics typically have high molecular weight, meaning each molecule can have thousands of atoms bound together. Plastics also called polymers, are produced by the conversion of natural products or by the synthesis from primary chemicals generally coming from oil, natural gas, or coal. Rapid population growth, urbanization and industrial growth have led to severe problem of waste generation in urban centres. Report says that per capita per day production will increase to 0.7 kg in 2050.

D.Grace Rejilabai,
Assistant Professor of Physical Science,
St.Ignatius College of Education,Palayamkottai

Types of plastic

There are several plastic types and associated with each code number.

Plastic Code Number	Types
#1 PETEorPET	**recyclable**
#2 HDPE	**recyclable**
#3 PVC	**recyclable**
#4LDPE	**recyclable**
#5 PP	**not recyclable**
#6 PS	**not recyclable**
#7 - Other plastics like nylon and styrene	**not recyclable**

Generally, there are two kinds of commercial plastics, thermoplastic (reheated, melted, and molded into different shapes) and thermosetting plastics which degrade and turn into other substances if reheated after molding. Today, there are many different types of plastics manufactured in the plastic industry. The table below summarizes names of all commonly used plastics and their applications.

Polymer type	**Examples**	**Use of recycled plastics**
Polyethylene Terephthalate	Fizzy drink and water bottles. Salad trays.	Multi-layer detergent bottles, soft drink bottles and packaging
High Density Polyethylene	Milk bottles, bleach, cleaners and most shampoo bottles.	Detergent bottles irrigation pipes and buckets
Polyvinyl Chloride	Pipes, fittings, window and door frames (rigid PVC). Thermal insulation (PVC foam) and automotive parts.	Floor materials and covering materials
Low Density Polyethylene	Carrier bags, bin liners and packaging films.	Packaging, sheets for nursery and film for industry
Polypropylene	Margarine tubs, microwaveable meal trays, also produced as fibres and filaments for carpets, wall coverings and vehicle upholstery.	Buckets and worm factories
Polystyrene	Yoghurt pots, foam hamburger boxes and egg cartons, plastic cutlery, protective packaging for electronic goods and toys. Insulating material in the building and construction industry.	Office accessories and CD boxes

Plastic waste management

Plastic Recycling

Among the existing solutions recycling is one of the most convenient and easiest ways. Recycling techniques deals with the tones of plastic waste that is choking earth. Plastic recycling is the process of recovering different types of plastic material in order to reprocess them into varied other products, unlike their original form. An item made out of plastic is recycled into a different product, which usually cannot be recycled again.

Stages in Plastic Recycling

Before any plastic waste is recycled, it needs to go through five different stages so that it can be further used for making various types of products.

- **Sorting:** It is necessary that every plastic item is separated according to its make and type so that it can be processed accordingly in the shredding machine.
- **Washing:** Once the sorting has been done, the plastic waste needs to be washed properly to remove impurities such as labels and adhesives. This enhances the quality of the finished product.
- **Shredding:** After washing, the plastic waste is loaded into different conveyer belts that run the waste through the different shredders. These shredders tear up the plastic into small pellets, preparing them for recycling into other products.
- **Identification and Classification of Plastic:** After shredding, a proper testing of the plastic pellets is conducted in order to ascertain their quality and class.
- **Extruding:** This involves melting the shredded plastic so that it can be extruded into pellets, which are then used for making different types of plastic products.

Recycling of plastics through environmentally sound manner

Plastics recycling technologies generally divided into four general types:Primary, Secondary, Tertiary, and Quaternary.

- **Primary recycling:** It involves processing of a waste into a product with characteristics similar to those of a original product. Multi-layered and mixed plastic waste cannot be recycled using this process.
- **Secondary recycling:** It involves processing of waste/ scrap plastics into materials that have characteristics different from those of original products.
- **Tertiary recycling:** This is chemical method of recycling. It involves the production of basic chemicals and fuels from plastic waste using pyrolysis of hydrolysis as process. This method is suitable for all kinds of plastic waste for which first two methods of recycling are not suitable.
- **Quaternary recycling:** This method retrieves the energy content of waste/ scrap plastics by burning /incineration. The problem of this method is emission of harmful chemicals like dioxans and furans . This process is not using in India.

Plastic waste to energy:

Incineration: The most effective way to reduce the volume of solid waste is to burn it in a properly designed and operating condition, the process called as incineration. In this process, the hydrocarbon compounds of the combustible residue combine chemically with the molecular oxygen to generates carbon- di-oxide and water, and as a residue generates oxides of metals and minerals.

Land filling of waste plastics : It is the means of disposing waste under the soil cover. Since plastics are mostly act as inert materials, therefore landfill methods are an effective method for the disposal of waste plastics.

Conversion of plastic waste into liquid fuel The entire process is undertaken in closed reactor vessel followed by condensation, if required. Waste plastics while heating up to 2700 to 3000c convert into liquid vapor state, which is collected in condensation chamber in the form of liquid fuel. The tarry liquid waste is topped down from the heating reactor vessel. The organic gas is generated which can be used in dual fuel diesel generator set for generation of electricity.

Reduced use of plastics Plastic pollution can be reduced by using less plastics products and switching to alternatives. Now focus on another important part of eco-friendly living: reduce your use of plastic. Source reduction (Reduce and Reuse) can occur by altering the design, manufacture, or use of plastic products and materials.

Chemical decomposing: Chemical decomposing is a very effective solution to plastic pollution. There are mainly two ways to decompose conventional plastics. Decomposing plastics by microorganisms is one of them and another way to decompose plastics is by combustion

Biodegradable Plastics (BDP): One of the common constituents of BDP is polyhydroxyalkanoate (PHA). The BDP are similar to conventional plastics in all aspects with the additional quality of being able to naturally decompose and break into natural and safe byproducts.

Bioplastics: A bioplastic is a plastic that is made partly or wholly from polymers derived from biological sources such as sugar cane, potato starch or the cellulose from trees, straw and cotton. Some bioplastics degrade in the open air, others are made so that they compost in an industrial composting plant, aided by fungi, bacteria and enzymes.

Polymer Blended Bitumen Roads: The non-wetting property of plastics is implemented successfully in road construction business. Bitumen film is often stripped off the aggregates because of the penetration of water, which results in pothole formation. When polymer (plastic waste) is coated over aggregate, the coating reduces its affinity for water due to non-wetting nature of the polymer, thereby obstructing the penetration of water. Polymers also shows higher softening temperature, thereby reduce the bleeding of bitumen during the summers.

Conclusion

It is the time we must reduce, reuse and recycle. We can reduce by purchasing items with the least amount of packaging and buying in bulk when appropriate. We can reuse by avoiding disposable items. Finally we can recycle by using community recycling programs and purchasing products made from recycled materials. Never before has there been a time when environmental issues such as recycling have been more relevant. We must stop refusing to look past today.

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POLLUTION -CAUSES AND REMEDIAL MEASURES

J.Subha Shini

Abstract

An environment is a complex of external factors that acts on a system and determines its course and form of existence. Environmental science is the study of interactions among the physical, chemical and biological components of the environment related to human activities and the impact on biodiversity. Environmental science encompasses issues such as climate change, conservation, biodiversity, groundwater and soil contamination Recently first time in his entire cultural history man has faced one of the most horrible ecologica crisis the problem of pollution of environment which sometime in past was pure, virgin undistributed.. This paper deals with the causes of pollution and its remedial measures.

Keywords: Flora, Fauna, Disposal, Biodiversity.

Introduction

Everyone is aware that pollution is a virtually inevitable consequence of human interaction with the natural world. While most people probably imagine coal-powered plants belching out black smoke or other forms of exhaust when they hear the word "pollution," the word actually refers to the introduction of any rogue element to the natural environment resulting from people's activities. If you walk through an otherwise placid forest screaming the lyrics to the heavy-metal song that's coursing into your head through your ear buds, that is a form of noise pollution, and it might be detrimental to communities of animals you don't even know are nearby. Much public discourse centers on how to stop or lessen the amount of pollution reaching Earth's air, water and soils, making cleaning up after humanity less burdensome. This is a major part of bettering the planet, of course, but what about ways to lower the amount of harm done by pollutants that are inevitable to some extent, or that already exist in the ecosystem and can't be easily cleaned up in a single energetic effort? How might you go about personally avoiding the damaging health effects of toxins in the atmosphere and water supply?

History of Plastics

In the early part of the 21st century, air pollution claimed the majority of the public's attention in terms of hazards to the environment owing to the roiling debate over what to do about global warming, more broadly called climate change. Nowadays, virtually no honest and informed person disputes the validity of scientific research connecting human activities since the start of the Industrial Revolution in the mid-1800s to warmer average temperatures the world over since that time, with most of the rise occurring more recently.

J.Subha Shini
Assistant Professor of Education, St.Ignatius College of Education

The real debate is not "Is human-caused climate change real?" but "Can anything be done to slow or stop it, and if so, what will this take?" Not all of the damaging effects of air pollution, however, center on the greenhouse 1gases (mostly carbon dioxide, or CO_2) that are in part responsible for climate change. Particulate matter can cause or exacerbate respiratory ailments such as asthma. These pollutants can also damage plant life. Soil pollution, which can also be called soil contamination, is a result of acid rain, polluted water, fertilizers etc., which leads to bad crops. Soil contamination occurs when chemicals are released by spill or underground storage tank leakage which releases heavy contaminants into the soil. These may include hydrocarbons, heavy metals, MTBE, herbicides, pesticides and chlorinated hydrocarbons. Light Pollution includes light trespass, over-illumination and astronomical interference.

Steps to Reduce the Effects of Pollution

The steps to reduce the effects of pollution are as follows

- Conserve energy – at home, at work and everywhere you do.
- Look for the ENERGY STAR label when buying home or office equipment.
- Carpool, use public transportation (electric and hybrid buses are increasingly common in U.S. cities) and commute to work on foot or using a bicycle.
- Closely follow gasoline refueling instructions for efficient vapor recovery, being careful not to spill fuel and always tightening your gas cap securely.
- Purchase portable, spill-proof gasoline containers.
- Keep car, boat and other vehicle engines tuned.
- Always be sure your tires are inflated to the right pressure, boosting gas mileage.
- Use environmentally safe paints and cleaning products, which are easy to find nowadays.
- Mulch or compost plant waste and raked leaves.
- Use gas logs instead of wood, cutting down on creosote emissions.

Plastic Pollution

In 2008, the U.S. State Department undertook a 10-year plan in cooperation with China aimed at achieving cleaner water around the world. The three major areas of focus were water-quality management, the provision of safe drinking water and the prevention and control of pollution from agriculture and rural areas through run-off containing known contaminants. China and the U.S. are the world's two largest sources of pollution among individual nations.

The first five years were devoted to the development of core water-management programs, such as water-permitting systems, the implementation of water-quality standards, and quality-monitoring recommendations. The next two years featured supplementary water-management programs, such as total maximum daily loads and water-quality trading. The successful implementation of permitting programs, monitoring programs and water-quality standards were prerequisites for the

implementation of these management programs. The final three years were dedicated to the continued implementation of additional monitoring and evaluation systems and pollution control through the use of emerging as well as existing technologies.

On an individual and family scale, it is possible to make use of some of the same principles. Home water-testing kits are available to assess your drinking water, whether it comes from a public reservoir or a well. Be sure to report anomalies in the area of metals and ions such as chlorine. Be careful to not waste water through frivolous means, such as leaving sprinklers running when rain is anticipated or has very recently fallen. A smaller burden on municipal treatment and sewage-disposal systems is vital for ensuring the availability of clean water – an indispensable element of good health – for everyone.

Conclusion

Soil, air and water might be considered the three fundamental environmental needs upon which modern life, or any life, relies most prominently. Clean air is required for optimal respiratory and cardiovascular health, and for a generally pleasant everyday outdoor experience. Clean drinking water is perhaps even more vital as toxins in the water can be deadly in various ways, either building up in the system over time (as with lead or other chemical agents) or causing disease and even death in the short term (as with microbial ailments such as dysentery and cholera). Soil pollution, and the related problem of soil erosion, gets less attention than the other forms of environmental degradation, but soil arguably plays just as critical a role as air and water. It is a vital source of carbon and needed to feed the world's people, a major consideration given that the world's population is expected to grow from 7 billion almost two decades into the 21st century to 9 billion by the year 2050.

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MAKE THE WORLD FANTASTIC SAY NO TO PLASTIC

Meera Farzana.S

Abstract

Plastic bags have been a part of our everyday lives. Many of plastic factories are producing tons of plastic bags. More than 400 to 500 million tons of plastic are produced annually. But only 1-2 percentages of plastics are recycled. A large part of the plastic quickly ends up in the garbage. Plastic is a synthetic material created from a board range of organic polymers that have become an indispensable. Today plastics are indispensable in home, offices and industries. The purpose of the paper is to explore how to make the world fantastic, and no to plastic.

Introduction

"Everyone shall taste the death"- Quran.

The world is the fantastic creation by God! There are different theories that how and from where the human came to the world. Every individual is fated to die around 100 years, if not early. No one get a chance to lifetime. God has given a limited life span to all. So every God made creations are destroyed. Plastic! Plastic! Plastic! Plastic waste is everywhere and it polluting land, water and air. But today is the plastic era; millions of plastic products are manufactured each year throughout the world. It does not readily break down in nature. The mass use of plastic started in the 1950s and has steadily grown even since. The popularity of plastic is due not only its low production costs but also its numerous practical characteristics including its low weight, acid resistance and flexibility, particularly in the field of technology it leads to new solution and comfort. Yet the tremendous consumption of plastic also presents numerous problems.

Today, more than 400 to 500 million tons of plastic are produced annually. But only 1-2 percentages of plastics are recycled. A large part of the plastic quickly ends up in the garbage. As standard plastic is not biodegradable, plastic refuse improperly disposed of pollutes our environment for decades or even centuries. Today, mountains of plastic are piling up in garbage dumps and in the natural world. As consumption increases there is an urgent need for far-sighted and holistic solutions to this problem.

History of Plastic

The word comes from the Greek verb '*plassein*', which means "to mold or shape." Plastics have that capacity to be shaped thanks to their structure, those long, flexing chains of atoms or small molecules bonded in a repeating pattern into one gloriously gigantic molecule. The dictionary defines plastic as "a synthetic material that can be molded into shape while soft, and then set into a rigid or slightly elastic form."

Meera Farzana.S
Assistant Professor of English, St. Ignatius College of Education

"The first man-made plastic was created by Alexander Parkes who exhibited it at the 1862 Great International Exhibition in London," says BP Patra of the Central Institute of Plastics Engineering and Technology. Named Parkesine, this was the predecessor of celluloid, which was created by John Wesley Hyatt a few years later. In 1880, cellulose nitrate replaced horn as the preferred material for combs.

Another early plastic was Bakelite, the first to be created completely from synthetic materials. Made from phenol and formaldehyde, it was invented in 1907 by Leo Hendrik Baekeland. So fascinating did this man-made wonder seem back then that it is said that in 1915 when Queen Mary of Britain saw products made from casein plastic (derived from milk) at the British Industries Fair, she ordered several pieces of jewellery to be made from it. In 1916, when Rolls Royce began to use phenol formaldehyde (a kind of synthetic polymer) in its car interiors, it was something for the premium automobile company to boast of.

And every day, the list of items being produced from plastic was increasing. In 1926, Harrods hosted the first display of coloured thermosetting plastic tableware, the first toothbrush with nylon tufts was manufactured in 1938, and a couple or so decades later, in the 1960s, the plastic T-shirt bag – the humble and ubiquitous carrier of all our vegetables, grocery, meat and other necessities from the market – was invented by Swedish engineer Sten Gusted Thule. Today, from medicine, to arms and ammunition, construction, automobiles, attire and packaging, plastic, in some form or the other, and in varying proportions, is present in every item of daily use.

The India Narrative

"When plastic entered the mass market in India in the 1960-70s as the preferred material for everyday consumer goods, it was a powerful and tangible sign of modernity," explains social commentator and marketing professional Santosh Desai. "It was durable, light, colourful and cheaper than the materials it replaced, thus giving people the ability to buy more. There was an almost child-like pleasure in its shiny, colourful, brightness," adds Desai.

Some of the first plastic products to be made in India were tableware, crockery and other items of household use, says Deepak Ballani of the All India Plastic Manufacturers' Association. " Brite was one of the first brands. They made all things plastic," - Prahlad Kakkar.

Types of Plastics & Uses

Today plastics are indispensable in home, offices and industries. A variety of objects throughout the home, including some may never have guessed, that contain plastic. The common types of plastics, known as the mass plastics are,

- Polyethylene
- Polypropylene
- Polyvinyl ChloridePVC

- Polystyrene
- **Polyethylene Terephthalate** PET and
- Polyurethane

These are used to make living plastics.

Polyethylene: Mattresses, car seats, kitchen sponges, thermal insulation, rust protection in the automotive industry, coatings for furniture and floors, textiles (elastane)

Polypropylene: CDs and DVDs, automotive industry, electronics, eyeglass lenses, safety helmets

Polyvinyl ChloridePVC: CD jewel cases, electric cable insulation, casings for electrical appliances, yoghurt containers, packaging foils, thermal insulation, insulating packaging material

Polystyrene: HDPE: Beverage crates, barrels, bottles and vials, buckets, bowls LDPE, LLDPE: Wrapping foils, plastic bags, cable coverings, tubes

Polyethylene Terephthalate PET: Food packaging, electrical household appliances, automotive parts, construction, garden furniture, artificial lawns, suitcase shells, medical appliances, plastic bags.

Polyurethane: Flooring, drainage pipes, window profiles, seals, tubes, records, baby products, swim rings. Bottles, packaging for food and cosmetics, household appliances, mechanical engineering, safety belts, medical implants

Living Plastics

These above living plastics take up landfill spaces, enter water bodies and in the process of degrading, release toxic chemicals which mix with the soil and water and are a threat to life and environment.

Need of Alternatives to Plastics

Plastic is a non bio-degradable substance. So plastic is hard to dispose. It doesn't get disposed off. It contributes to major pollution on earth. It is damaging the world rapidly. The increasing use of plastic bags, utensils and furniture, the amount of plastic waste has also gone up and so has the plastic pollution. It is time to take this problem seriously and work towards eradicating it. Plastic bags, plates, spoons, glasses and other material are economical and easy to use. People like to use and throw materials during functions as it is easy of clearing and cleaning. It style of living, in a world of short-term convenience and harms the environment.

Say no to Plastics: The most important step is beating pollution is to avoid the usage of plastic products that can easily be replaced with eco-friendly alternatives.

Use reusable bags: Plastic bags get broken into tiny pieces that go into water bodies and enter the soil there by disturbing the growth of plants and animals. For instance, instead of using plastic bags, simply opt for a cloth or paper bag.

Use metals, woods, clays, glasses and banana leaves: Avoid usage of packed food and drinking water. Avoid ordering food and buy water. It is better to have home cooked and take Tiffin box, silver or glass bottle.

Use fountain pen: Avoid use and throw ball point or gel pens. Use fountain ink pen.

Bio plastics: Plastic is biodegradable if it can be broken down into the elements water, carbon dioxide, methane, and biomass. The biodegradability does not have to do with the particular raw material on which a plastic is based but rather with the structure of the material. There are also petroleum-based plastics that are biodegradable. The problem is that the composting of biodegradable materials can often only be achieved under very specific circumstances, such as that found in industrial composting plants. A lot of biodegradable plastics, however, do not decompose in water.

Conclusion

The way to a cleaner future cannot be paved with plastic intention. Plastic in any form is dangerous to health and environment. In a perfect world want to avoid exposure to all forms all plastics. Considering plastic keep out of sight in every nook and corner of lives, banishing it completely seems unrealistic and impractical. But we can start with more awareness about the every ways with which can reduce exposure to plastic. This can move long way in reducing toxicity, hormonal imbalance, cancer, etc. Some practical and handy solutions that can help gradually do away with plastic free life. Discard plastic bottles and switch to stainless steel or copper, glass and clay bottles. Traditional India consumes of stainless steel, copper, clay, metal, wooden plates and banana leaf. We have to stop believing in the efficacy of plastics, other than healthcare. Educating peoples about the effects of 'Make the World to Fantastic Say no Plastic' and ways in which it can be controlled and prevented is a step in the right route because it raises awareness.

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SINGLE –USE PLASTICS AND ITS EFFECT ON HUMAN HEALTH

V. Jani

Abstract

Plastics are used widely everywhere in our life and without plastic, modern civilization would indeed look very diverse. One of the most ubiquitous and long-lasting recent changes to the surface of planet is the accumulation and fragmentation of plastics, Starting from health problems from BPA and phthalates leeching in to water and drinks, to the great plastic patch in the oceans, the impact of plastics on the environment is profound. The present paper made an attempt to analyze the problems concern to single use plastics and its effects on land, water, terrestrial, aquatic animals and humans. Main focus in this paper is how the ecosystem as a whole is affecting by indiscriminate use of plastics and the health problems cause by plastics to the human beings and also emphasized the reuse of plastic by following various management practices.

Keywords: Bisphenal A; Phthalates;

Introduction

Plastic is the most useful synthetic 'manmade' substance, made up of elements extracted from the fossil fuel resources. This study focuses on the single use plastic and its effect on human health and possible consequences of health risk assessment. Plastics are essential materials in modern civilization, and many products manufactured from plastics and in numerous cases, they promote risks to human health and the environment. Plastics are contained many chemical and hazardous substances such as Bisphenal A (BPA), phthalates, antiminitroxide, brominates flame retardants, and poly- fluorinated chemicals etc. which are a serious risk factor for human health and environment. Plastics are being used by people without knowing the toxic effects of plastic on human health and environment. Different human health problems like irritation in the eye, vision failure, breathing difficulties, respiratory problems, liver dysfunction, cancers, skin diseases, lungs problems, headache, dizziness, birth effect, reproductive, cardiovascular, genotoxic, and gastrointestinal causes for using toxic plastics. Plastics occur serious environment pollution such as soil pollution, water pollution, and air pollution. Application of proper rules and regulations for the production and use of plastics can reduce toxic effects of plastics on human health and environment.

Single-use plastics

Single-use plastics, often also referred to as disposable plastics, are commonly used for plastic packaging and include items intended to be used only once before they are thrown away or recycled. These include, among other items, grocery bags, food packaging, bottles, straws, containers, cups and cutlery.

V. Jani
Assistant Professor of Mathematics, St. Ignatius College of Education

The nature of petroleum based disposable plastic makes it difficult to recycle and they have to add new virgin materials and chemicals to it to do so. Petroleum based plastic is not biodegradable and usually goes into a landfill where it is buried or it gets into the water and finds its way into the ocean. Although plastic will not biodegrade it will degrade into tiny particles after many years. In the process of breaking down, it releases toxic chemicals which make their way into our food and water supply. These toxic chemicals are now being found in our bloodstream and the latest research has found them to disrupt the Endocrine system which can cause cancer, infertility, birth defects, impaired immunity and many other ailments.

Characteristic of Plastics

Plastics are inexpensive, lightweight, strong, durable, corrosion-resistant materials, with high thermal and electrical insulation properties. The diversity of polymers and the versatility of their properties are used to make a vast array of products that bring medical and technological advances, energy savings and numerous other societal benefits. Almost all aspects of daily life involve plastics, in transport, telecommunications, clothing, footwear and as packaging materials that facilitate the transport of a wide range of food, drink and other goods.

- Manufacturing or burning of plastics cause emissions of toxic gases and release a toxic carcinogen called dioxin. The dioxin affects the function of the reproductive and immune system. It also causes hormonal disruption and growth problems
- Electrical and thermal insulator.
- Resistant to penetration of water and gases.
- Non-biodegradable and takes hundreds of years to break down.

Plastic Toxicity for Human Health

Plastic is an organic material manufactured from petroleum derivatives. It is composed of one organic substance or more. It can be shaped into any form or shape as desired. Plastics can be made of a selection of many different chemicals to improve its properties, to prevent degradation in the environment when exposed to light, humidity, temperature or microorganisms, to make it more or less flexible, to lessen flammability. Many of these substances are not bound to the chemical chain of the plastic, which means that they can migrate under different circumstances as small as a change in temperature or light. Toxic ingredients can evaporate into the air and be breathed in. They can readily absorb into the skin. And they can leach into food or drink and then be ingested. Breathing near plastic trash being burned, opening a new plastic item that releases a strong, applying body lotion, drinking hot coffee from a Styrofoam cup , reusing a water bottle, eating food microwave in a plastic container, or that has been frozen in a plastic container or even food that has simply been stored any of these common practices allow chemicals from plastic to migrate easily into the body. Plastic comes in many forms but there is general consensus that while a useful material, there are serious concerns about harmful effects of plastic on human health.

Effects of Plastic on Humans

The chemical compounds found in plastics are harming and causing biological effects in both humans as well as animals. Two broad classes of plastic-related chemicals are of critical concern for human health-bisphenal-A or BPA, and phthalates.

Bisphenal A: Bisphenal A (also known as BPA) can leech into the contents/liquids that plastic container is holding. BPA is a basic building block of polycarbonate plastics, such as those used for bottled water, food packaging and other items. It is a hormone disrupter that is used to make polycarbonate plastic (hard clear plastic). Bisphenal A can be found in baby bottles, water bottles, canned food liners, and sippy cups. Human exposure occurs primarily through ingestion: diet, sucking/mouthing plastics, and skin contact. There have also been studies that showed bisphenal A increases the occurrence of diabetes, heart disease, birth defects, early puberty, low sperm count, hyperactivity, aggressiveness and high levels of certain liver enzymes. Women who have everyday contact with this chemical can have an increase in miscarriages, polycystic ovarian syndrome which is known to cause infertility, baldness in women, prostate cancer, breast cancer and ovarian cysts.

Phthalates: Phthalates are a class of chemicals that are used to soften plastics, such as PVC (Polyvinyl Chloride), bind fragrances in products, and act as solvents and fixatives, such as nail polishes. Human exposure of this occurs through different ways like: Inhalation i.e., breathing in fragrances, or fumes from solvents and fixatives Ingestion- chewing on a plastic toy creates small openings in the plastic, providing an avenue for leaching of chemicals from the toy into a child's mouth Skin Absorption-lotion, perfumes, and deodorants. Adverse health effects include hormone disruption, developmental and reproductive problems, asthma, preterm birth, low sperm count, undecided testes, genital malformations, premature puberty, and development of some cancers. The health effects of these chemicals is decreased lung function, increased weight gain, increased resistance to insulin, low sperm count and DNA damage to sperm. There have also been studies that show infant males exposed to this chemical have negative reproductive development.

Harmful effects of plastic bags on human health

- Using Plastic bags in packaging of hot bread and meals makes these bags flexible and able to interact with high heat resulting in release of the carcinogenic dioxin.
- The light weight and high consumption of plastic bags and their ability to persist for long periods of time in the environment without decomposing made them one of the main factors of pollution in the open spaces, public squares, main roads inside and outside cities, sea beaches and water.
- The easy evaporation and wide use of plastic bags make it difficult to collect and dispose them. They also distort the general appearance of the places where they are.
- When plastic bags stick to trees and plants they obstruct the natural light from reaching parts of the plant causing impairment to the process of photosynthesis.

- Plastic bags cause diseases and even death to the cattle that come across and eat them during pasture.
- Plastic bags create a fertile environment for the growth of infectious bacteria because of their ability to float on the surface of water and for long periods.
- Burning of plastic bags causes the emission of chlorine dioxide, carbon dioxide, dioxin, other gaseous compounds, acids and many harmful toxic compounds.
- Plastic bags pose danger to the environment and marine organisms when they exist and pile up in the coastal areas.
- Using plastic containers to save food especially pickles, acid and fatty food causes plastic to decompose, and toxic carcinogens to access the body.

Remedies to the single use plastics problem.

- Keep Reusable Shopping Bags and Use Less Single-Use Plastic
- Carry Water Bottle Everywhere
- Use Glass Jars for Leftovers and Storage
- Snag Some Stainless Steel Straws
- Skip the Fast Food
- Reducing the dependence on single use plastics

Conclusions

Exposures to plastics, plasticizers, and other additives to polymers are ubiquitous in modern society. Of principal concern from a human health perspective are endocrine disrupting properties of plastic components, such as BPA and DEHP. Another issue that may drive changes in production and consumption are the undesirable effects of plastics on the environment and wildlife. The quantity of plastics produced worldwide in the first decade of this century is equivalent to the total world production in the century prior. The need for changes in manufacturing and consumption patterns of plastics is both public health stand an ethical issue.

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GET BACK TO FABRIC BAGS

Subbulakshmi Murugan
Dr. V.M.Kavitha

Abstract

The present study intends to measure the awareness regarding biodegradable fabric bags among whatsapp users. In view of the objectives of the study, the investigators had adopted descriptive method using survey as a technique.A sample of 168 whatsapp users were selected by random sampling method. Biodegradable fabric bag awareness tool was developed and validated by the investigators. Statistical technique't' test was used to find out the differences between whatsapp users in their awareness regarding the biodegradable fabric bags with reference to their educational qualification.

Key words: Bio-degradable, fabric bags

Introduction

On-the-go lifestyles require easily disposable products, such as soda cans, plastic carry bag or plastic bottles of water, but the accumulation of these products has led to increasing amounts of plastic pollution around the world. Our homes, offices, schools, hospitals, factories -indeed, our entire surroundings – are dominated by products made from this material. We live in the age of plastics; bright, attractive, colourful, long-lasting, relatively inexpensive substances whose invention has revolutionized the manufacturing industry. Plastic certainly have advantages. Unfortunately, they also bring problems to our world, not the least among these being the generation of vast quantities of waste material. As plastic is composed of major toxic pollutants, it has the potential to cause great harm to the environment in the form of air, water and land pollution. Data released by the United States Environmental Protection Agency shows that somewhere between 500 billion and 1 trillion plastic bags are consumed worldwide each year (National Geographic News, 2006).As the number of usage increases, the rate of plastic pollution grows eventually to be an immeasurable environmental obstacle that is difficult to control. Its time to focus on the solution of the problem. Thus the investigator felt the need to find the awareness regarding usage of biodegradable fabric bags.

Statement of the problem.

The level of awareness regarding biodegradable fabric bags among whatsapp users.

Subbulakshmi Murugan
Assistant professor of Mathematics, St. Ignatius College of Education
Dr. V.M.Kavitha
Correspondent, Dr.V.M. Nursery and primary school

Operational Definition

Whatsapp users refers to the person having access to smartphone with whatsapp facility.

Objectives of the Study

- To find out the level of awareness regarding biodegradable fabric bags among whatsapp users.
- To find out the significant difference between whatsapp users in their awareness regarding the biodegradable fabric bags with reference to their educational qualification.

Hypothesis

- There is no significant difference between whatsapp users in their awareness regarding the biodegradable fabric bags with reference to their educational qualification.

Methodology for the Present Study

In view of the objectives of the study, the investigators had adopted descriptive method using survey as a technique. The population for the present study includes whatsapp users. A sample consisting of one hundred and sixty eight whatsapp users was selected by random sampling method. Awareness scale developed and validated by the investigator was used to measure the awareness of the whatsapp users regarding biodegradable bags. The content validity was established by experts and the reliability correlational coefficient was found to be 0.72. The investigator used' test to find out the differences in the awareness of whatsapp users regarding biodegradable bags

Data Analysis

Table 1.1

Level of awareness regarding biodegradable fabric bags among whatsapp users.

Variable	low		Average		High	
	Count	%	Count	%	Count	%
Awareness	121	71.73	15	9.03	32	19.25

Table 1.2

Difference between whatsapp users in their awareness regarding the biodegradable fabric bags with reference to their educational qualification.

Variable	Category	Count	Mean	SD	't'	Result
Awareness	HSC	70	4.02	1.049	0.68	NS
	Professional Degree	41	4.09	0.300		

(At 5%level of significance, the table value of 't' is 1.96)

Findings and Discussions

There is low level of awareness regarding biodegradable fabric bags among whatsapp users.71.73 % of whatsapp users have low, 9.03% of them have moderate and 19.25 % of them have high level of awareness. This finding draws support from the study of Noha Mohamed (2015) which reports the respondents have low awareness in biodegradable bags.

There is a no significant difference between whatsapp users in their awareness regarding the biodegradable bags with reference to their educational qualification. This may be due to the fact the irrespective of our educational qualification we are addicted to the usage of plastic bags in our day to day life.

Implications

- Use biodegradable bags made of fabrics
- Educate the local retailer the ill effects of plastic bag.
- Offices can distribute fabric bags as New Year gift instead of diaries.
- Encourage kids and teens to use bio degradable fabric bags.

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PLASTIC FREE ENVIRONMENT - POSSIBLE OR IMPOSSIBLE

A. Nancy

Abstract

People use plastics for various purposes. Over the past 60 years, the plastic uses have expanded to infiltrate virtually every aspect of life. Because of how versatile the material is, and how affordable it can be, it has taken the place of other products including wood and metals. The properties of the various types of plastics make it beneficial for manufacturers to use. Consumers like it because it is easy to use, lightweight and easy to maintains. Extraneous use of plastic materials contaminates the global environment. Disposal of waste plastics may cause serious environmental pollution. To avoid such pollution problems, people must adopt certain remedial measures to evade plastic materials by creating a degradable, recyclable bio-plastic for pollution free environment.

Keywords: Plastic, Environment.

Introduction

The term ''plastic'' is derived from the Greek word "plastikos", which means fit for moulding. Plastic is the term used in science to explain a different synthetic or semi-synthetic materials which are used in a number of applications. People can see the plastic materials everywhere. People use various plastic products in their day-today life. People live cleaner, easier, safer and more enjoyable by using various range of plastics. People use plastic bags, clothes, home products, cycles, bikes and cars, toys, televisions, computers etc. Plastics are organic materials, just like wood, paper or wool. The raw materials used to produce plastics are natural products such as cellulose, coal, natural gas, salt and, of course, crude oil. Plastic products have become the modern material of choice because they make it possible to balance people's needs.

History of Plastics

According to Marry Bellis (2018) the first man-made plastic was created by Alexander Parkes who publicly demonstrated it at the 1862 Great International Exhibition in London. The material, called Parkesine, was an organic material derived from cellulose that once heated could be molded and retained its shape when cooled.

Celluloid

Celluloid is derived from cellulose and alcoholized camphor. John Wesley Hyatt invented celluloid as a substitute for the ivory in billiard balls in 1868. He first tried using a natural substance called collodion after spilling a bottle of it and discovering that the material dried into a tough and flexible film.

A. Nancy
Ph.D, Research Scholar, Mother Teresa Women's University, Kodaikanal

However, the material was not strong enough to be used as a billiard ball, not until the addition of camphor, a derivative of the laurel tree. The new celluloid could now be molded with heat and pressure into a durable shape. Besides billiard balls, celluloid became famous as the first flexible photographic film used for still photography and motion pictures. Hyatt created celluloid in a strip format for movie film. By 1900, movie film was an exploding market for celluloid.

Formaldehyde Resins - Bakelite

After cellulose nitrate, formaldehyde was the next product to advance the technology of plastic. Around 1897, efforts to manufacture white chalkboards led to casein plastics (milk protein mixed with formaldehyde) Galalith and Erinoid are two early tradename examples.

In 1899, Arthur Smith received British Patent 16,275, for "phenol-formaldehyde resins for use as an ebonite substitute in electrical insulation," the first patent for processing a formaldehyde resin. However, in 1907, Leo Hendrik Baekeland improved phenol-formaldehyde reaction techniques and invented the first fully synthetic resin to become commercially successful with the trade name Bakelite.

Here is a brief timeline of the evolution of plastics.

1839 - Natural Rubber - Method of processing invented by Charles Goodyear

1843 - Vulcanite - Invented by Thomas Hancock

1843 - Gutta-Percha - Invented by William Montgomerie

1856 - Shellac - Invented by Alfred Critchlow and Samuel Peck

1856 - Bois Durci - Invented by Francois Charles Lepage

Beginning of the Plastic Era with Semi-Synthetics

1839 - Polystyrene or PS discovered by Eduard Simon

1862 - Parkesine - Invented by Alexander Parkes

1863 - Cellulose Nitrate or Celluloid - Invented by John Wesley Hyatt

1872 - Polyvinyl Chloride or PVC - First created by Eugen Baumann

1894 - Viscose Rayon - Invented by Charles Frederick Cross and Edward John Bevan

Thermosetting Plastics and Thermoplastics

1908 - Cellophane - Invented by Jacques E. Brandenberger

1909 - First true plastic Phenol-Formaldehyde trade name Bakelite - Invented by Leo Hendrik Baekeland

1926 - Vinyl or PVC - Walter Semon invented a plasticized PVC.

1933 - Polyvinylidene chloride or Saran also called PVDC - Accidentally discovered by Ralph Wiley, a Dow Chemical lab worker.

1935 - Low-density polyethylene or LDPE - Invented by Reginald Gibson and Eric Fawcett

1936 - Acrylic or Polymethyl Methacrylate

1937 - Polyurethanes tradenamed Igamid for plastics materials and Perlon for fibers. - Otto Bayer and co-workers discovered and patented the chemistry of polyurethanes

1938 - Polystyrene made practical

1938 - Polytetrafluoroethylene or PTFE tradenamed Teflon - Invented by Roy Plunkett

1939 - Nylon and Neoprene - Considered a replacement for silk and a synthetic rubber respectively by Wallace Hume Carothers

1941 - Polyethylene Terephthalate or Pet - Invented by Whinfield and Dickson

1942 - Low-Density Polyethylene

1942 - Unsaturated Polyester also called PET patented by John Rex Whinfield and James Tennant Dickson

1951 - High-density polyethylene or HDPE tradenamed Marlex - Invented by Paul Hogan and Robert Banks

1951 - Polypropylene or PP - Invented by Paul Hogan and Robert Banks

1953 - Saran Wrap introduced by Dow Chemicals.

1954 - Styrofoam a type of foamed polystyrene foam was invented by Ray McIntire for Dow Chemicals

1964 - Polyimide

1970 - Thermoplastic Polyester this includes trademarked Dacron, Mylar, Melinex, Teijin, and Tetoron

1978 - Linear Low-Density Polyethylene

1985 - Liquid Crystal Polymers

Types of Plastics

In the view of Todd Johnson (2017), there are approximately 45 types of plastics and each type has different variations. Plastic manufacturers can change the physical structure of plastic to suit its application. When they change or modify things like the molecular weight distribution, the density or the melt indices, they alter the effectiveness and create plastics with many specific properties.

There are two main types of plastics, thermoset plastics and thermoplastics. Thermoset plastics, the plastic will hold its shape long-term once it has cooled to room temperature and hardened thoroughly. This type of plastic cannot return to its original form. It cannot be melted down into its original form. Epoxy resins and polyurethanes are some examples of this type of plastic. It is commonly used in tires, automobile parts, and composites.

The thermoplastics have more flexibility and versatility. Because it will return to its original form when heated, these plastics are commonly used in various applications. They can be made into films, fibers, and other forms.

Specific Types of Plastics

Below are some of the specific types of plastics:

PET or Polyethylene terephthalate - This type of plastic is ideal for food storage and water bottles. It does not leach into the food materials, but is sturdy and can be drawn into fibers or films.

PVC or Polyvinyl Chloride - This type of plastic is brittle but stabilizers are added to it. This makes it a softer plastic that's easy to mould into various shapes. It is commonly used in plumbing applications because of its durability.

Polystyrene - This type of plastic is one of the less ideal options today for environmental reasons. However, it is very lightweight, easy to mould and it works as an insulator. That is why it is heavily used in furniture, cabinetry, glasses and other impact-resistant surfaces. It is also added with a blowing agent to create foam insulation.

Polyvinylidine Chloride (PVC) - This plastic is used to cover food. It is impermeable to odors from food and can be drawn into various films.

Polytetrafluoroethylene - This plastic is also known as Teflon. It is a heat-resistant form of plastic. It is very stable and strong. It creates a surface that is almost frictionless. This is why it is used in various cookware (non-stick) and in tubing, plumbing tapes and in waterproof coating products.

Polypropylene - This plastic has various forms. It has uses in many applications including tubes, car trims, and bags.

Polyethylene - This plastic is one of the most common forms of plastics. New formations of it make it possible for this plastic to be flat. Its initial uses were for electrical wires but it is now found in many disposable products, including gloves and garbage bags. It is also used in other film applications such as wraps, as well as in bottles.

The use of plastics every day is more commonplace than many might think. By making small changes to these chemicals, new and versatile solutions are obtained.

Uses of Plastics

Plastics are extremely versatile materials and are ideal for a wide range of consumer and industrial applications. The relatively low density of most plastics gives plastic products the advantages of light weight. And, although most have excellent thermal and electrical insulation properties, some plastics can be made to conduct electricity when required. They are corrosion resistant to many substances which attack other materials, making them durable and suitable for use in harsh environments. Some are transparent, making optical devices possible. They can easily be moulded into complex shapes, allowing other materials to be integrated into plastic products, and

making them ideal for a wide range of functions (Joseph L. Nicholson and George R. Leighton, 1942). Furthermore, if the physical properties of a given plastic do not quite meet the specified requirements, its balance of properties can be modified with the addition of reinforcing fillers, colours, foaming agents, flame retardants, plasticisers, etc., to meet the demands of the specific application.

In principle, plastics can be developed with virtually any combination of properties to accommodate almost any application you can think of. As a result of these attractive properties, plastics are increasingly being used in packaging, building and construction, mobility and transport, electronics, agriculture, healthcare, sports and leisure, and energy industries.

Pollution Problems of Plastic

The status of plastic is deteriorated from the year 1970s regarding its increase in waste. Plastic became a special target because, so many plastic products are disposable. Susan Freinkel (2011) opines that plastic lasts forever in the global environment. The recycling of plastic is the only solution for this waste problem. From the year 1980 onwards, the plastic industries led an significant force by encouraging governmental agencies to collect and process recyclable plastic waste materials by introducing waste-management process. Plastic bags specially meant for grocery storage have become the prime target for environmental activists to ban these bags and disposable plastics.

The extraneous use of plastic materials and the disposal of waste plastic materials are the growing threats to the human health as well as environmental issues. Scientists and members of the public are concerned about evidence that these chemicals leach out of plastics and into our food, water, and bodies. In very high doses, these chemicals can disrupt the hormonal system of the human being. Recently, environmental activists worry about the evil effects of these plastic materials and its waste on the general public and continued accumulation for future generation.

Conclusion

In spite of rising mistrust, plastic materials are critical to modern life. Plastics made possible the development of computers, cell phones, and most of the life-saving equipments of modern medicine. Lightweight and good for insulation, plastics help save fossil fuels used for heating and transportation. Perhaps most important, inexpensive plastics raised the standard of living and made material abundance more readily available. Without plastics, many possessions that people take for granted might be out of reach for all but the richest people. Replacing natural materials with plastic has made many of possessions cheaper, lighter, safer, and stronger.

Since it is obvious that plastics have occupied an important place in our daily life, some scientists are attempting to make plastics safer and more sustainable. Some innovative manufacturers are developing bio-plastics made up of plant crops to create substances that are more environmental friendly than conventional plastics. Some innovators are searching for ways to make recycling more efficient, and they even hope to perfect a process that converts plastics back into the fossil fuels from which they were

derived. All these innovators recognize that plastics are harmful and not suitable for the global environment, but that they are an important and necessary part of our future in one way or the other.

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HAZARDOUS EFFECTS OF PLASTICS IN HUMAN LIFE

M.Gnana Kamali

Abstract

Bisphenol A (BPA) and Polystyrene (PS)has been shown and proven to interfere with the reproductive systems of animals. PS oligomer and BPA from plastic decomposition are toxic and can be metabolized, while styrene monomer is a suspected carcinogen. Low levels of BPA and PS oligomer have been proven to cause hormone disruption in animals. More scientific reports are being published on the effects of Bisphenol A on animal and human health, and the news is not good. BPA can affect the hearts of women, can permanently damage the DNA of mice, and appear to be entering the human body from a variety of unknown sources. . The cross-sectional study of almost 1,500 people assessed exposure to bisphenol A by looking at levels of the chemical in urine. The authors found that higher bisphenol A levels were significantly associated with heart diseases, diabetes, and abnormally high levels of certain liver enzymes.

Key Words: Bisphenol A (BPA),Polystyrene (PS)

Introduction

Can exposure to plastics harm your health? It's a question currently being explored recent study suggested that traces of a synthetic chemical called Bisphenol A (BPA) can be found in more than 80% of teenagers. BPA is added to plastic to create a special form called polycarbonate plastic, used in making robust, impact-resistant materials for everything from food and drink packaging and medical devices. First created in 1891, it has been used commercially since the 1950s and is now one of the most commonly produced chemicals in the world, with 3.6 bn tonnes of BPA generated every year. The problem is that BPA can be ingested or absorbed through skin contact, meaning that humans are regularly exposed through the chemical leaching out of packaging into food and drink. The biggest concerns have been the impact on foetuses and young children, who have underdeveloped systems for detoxifying chemicals the consequences being that the younger, the higher levels of BPA in our body.

How to BPA Disrupt our Health

Once in the human body, BPA mimics the action of the hormone oestrogen and disrupts the endocrine system – the glands that produce hormones regulating, among other things, metabolism, growth, sexual function and sleep. Studies examining the effects of very high doses of BPA in mice have shown that this can cause problems with liver and kidney function, and mammary gland development.

M.Gnana Kamali
Assistant Professor of Computer Science, St. Ignatius College of Education

would ever be exposed to, there are concerns that the levels of BPA that accumulate in infants can still have adverse developmental consequences, leading to neuro behavioural and immune system abnormalities. The problem with this ready migration is that BPA is an endocrine disruptor, which means that it disrupts the human endocrine system from working properly.

The endocrine system regulates a number of vital body functions including:

- Metabolism
- Digestion
- general mood
- sexual function
- tissue development and function
- heart rate
- temperature
- ability to sleep well
- fertility and reproduction

Generally, the endocrine system works by removing necessary materials from the blood, processing them for the destination and then making sure they get there. It affects every cell in the body and its disruption at any point has consequences. The most common endocrine disease. This occurs when there is a problem within the endocrine system such as the pancreas not making enough of the hormone insulin or the body does not use it as it should so then the sugar in the blood becomes too high. A disrupting chemical like BPA can mimic a hormone or block a receptor or do any number of things to disrupt the proper functioning of any of the endocrine glands. The list of other disorders like:

- Osteoporosis
- Hypo- and hypertension
- Cushing's syndrome
- thyroid cancer
- Addison's disease
- low testosterone

These disorders often cover a host of symptoms and other problems and risks.

Asthma Causing Phthalates

BPA is not the only endocrine-disrupting chemical found to leach from plastics. Phthalates are plastic softeners that have also been finding their way into the human body. Phthalates are linked to: reproductive malformations, developmental disorders, pulmonary system effects including asthma and allergies and direct toxicity. PCB (Polychlorinated biphenyls) pollutant concentrations on plastic pellet were highest on US coasts, followed by Western Europe and Japan. The highest concentrations of DDT (Dichlorodiphenyltrichloroethane), the most toxic of all pesticides, were found on the US west coast and Vietnam

How can we Reduce Plastic Pollution

The market is run by supply and demand and if consumers are not demanding plastic products, there will be no profit in making them. But you don't have to wait for the market to catch up. Start your own trend. For example, it has become trendy to refuse plastic straws. Second, spreading awareness. If people truly understood the environmental and health costs of using plastic bags, perhaps they would not use them so

thoughtlessly. people were to understand society's and their own addiction to useless and sometimes dangerous plastic products, that is, if people could actually see their shopping behaviour from a more objective perspective, they would be more likely to consider the impact of unnecessary purchases. Third, ensuring that plastic to be recycled gets to its end destination rather than ending up in the environment.

Decompose of Plastics

Plastics belong to a chemical family of high polymers, they are essentially made up of a long chain of molecules containing repeated units of carbon atoms. Because of this inherent molecular stability (high molecular weight), plastics do not easily breakdown into simpler components. Plastics do decompose, though not fully, over a very long period of time (in average 100 to 500 years). Commercially available plastics (polyolefin like polyethylene, polypropylene, etc.) have been further made resistant to decomposition by means of additional stabilizers like antioxidants. Thus, unless the plastic is specially designed to decompose in the soil, such materials can last a very long time because the chemical bonds that hold the molecules together are often stronger than nature's power to take them apart. This means that soil microorganisms that can easily attack and decompose things like wood and other formerly living materials cannot break the various kinds of strong bonds that are common to most plastics. This depends upon the plastic (polymer) and the environment to which it is exposed. The Marine Conservancy has published that the estimated decomposition rates of most plastic debris found on coasts are:

- Foamed plastic cups: 50 years,
- Plastic beverage holder: 400 years
- Disposable diapers: 450 year,
- Plastic bottle: 450
- Fishing line: 600 years.

Conclusion

You can do things like buying unpackaged fruit and vegetables and avoiding heavily processed and packaged food, If you go to your average supermarket, you'll find that a lot of food and drink packaging will have labels saying 'BPA free'," Galloway says. "And with regulations like plastic bag bans hopefully reducing the amount of plastic waste in the environment, it'll be interesting to see if that's reflected in population levels of exposure – whether they do start to come down.

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ENVIRONMENTAL PROBLEMS CAUSED BY SYNTHETIC POLYMERS

S. Christabel Bobby

Abstract

Environment is the natural world which surrounds the earth & makes a particular geographical area in which human beings, animals, plants and other living & non-living things exist. Synthetic Polymers are sometimes referred as "Plastic" of which the well - known ones are nylon & polyethylene. Plastic is over whelming the world. Plastic pollution is a man-made disaster. Introduced in the 1950's, plastic have continued to evolve for many purposes & are currently used in all industrial sectors. A noteworthy application is packaging, which currently uses around 30-40% of the exponentially growing annual plastic production. Plastic pollution has become a growing concern worldwide. The government of many countries is taking various measures to reduce plastic pollution. However bringing down this problem is only possible if we all contribute our bits as responsible human beings.

Keywords: Environment, synthetic polymer.

Introduction

Our socio-economic developmental models have led to an increased production of consumer goods every type facilitated by the petrochemical industry's ability to provide a range of cheap materials that are continuously becoming more varied. When any food or blood is stored in the said plastic container then gradually the soluble chemical get, dissolved in them causing death due to cancer & other skin diseases. It has also been found to destroy the fertility of the animal & their respiratory systems.

The History of Plastic

Throughout history, materials such as tortoiseshell & ivory have been highly valued for their beauty, toughness & flexibility. But they were difficult materials to get & very expensive. From around the mid 1800's, scientists were trying to develop substances that had same look, feel and toughness but which would be made quickly and cheaply. An English inventor named Alexander Parkes introduced parkesine. Although it is considered to be the first plastic, it was actually made partly from cellulose in plant walls. It would not be until 1907 that the first truly synthetic plastic was developed.

The Production of Plastic

Plastic comes from petroleum (Oil). Scientist refine oil through a heating process. This produces ethylene and propylene, which are the chemical building blocks of plastic. These chemicals are then combined with other chemicals to form a polymer. A polymer is a chain of a chemical unit such as carbon, hydrogen, oxygen or silicon.

S. Christabel Bobby
Assistant Professor of Mathematics, St. Ignatius college of Education

Plastics are basically very long chains of these chemical units. How not all polymers are plastic. Plastics are divided into two classes based on whether or not they can be formed again after being melted. Thermoplastics can be melted and formed again & again. Thermosets are plastics which once formed are destroyed by heating.

Use of Plastic by People in Daily Life

Plastic is very strong & chemicals do not wear it away quickly. It provides non-breakable packages for dangerous liquids Cleaning fluids are packaged in plastic for safety. Plastic insulates against heat & electricity. Plastic is very light. Compared to stone concrete, steel, copper or aluminum all plastics are light weight. Plastic is versatile. It can be processed into very thin fibers or mould into large car parts. It can be foamed into polystyrene or mixed with liquid to become adhesives or paints. Plastic comes in a countless range of characters & colours. Plastic also come as clear sheets & flexible film.

Fantastic Plastic

Plastic has become an important & useful part of our world. But the strength & durability of plastic has a flip side. The world now finds itself polluted with disposable plastics that will not go away. They do not decompose on break down as fast as wood or paper. And when they do start to break down, they are harmful to the environment. Plastic increasingly threatens the environment as pollution on land and in the ocean.

Problems Related to Plastic Pollution

Plastic is amazing. Without it, life would be less convenient. But the convenience of plastic has come at a price, mostly because so many plastics are used for disposable items that people throw away. The problem is that the items do not ever go "away" from the planet, they pollute it.

Reasons to Ban Plastic

- Cause of environmental pollution.
- Problematic degradation
- Harmful to human health
- High costs for clean-up
- Bans in other countries

Made from fossil fuels

killing wild life

nor easy to recycle

better alternatives are available

Marine Pollution Caused by Plastic

Over the past 15 years, plastic impacts in the sea have increased and the number of marine (eg. fishing) species known to be affected by this contaminant. A substantial portion of these impacts involves entanglement in fishing equipment & ingestion of debris, and occur mainly in developing regions. The alteration of ecosystems caused by the transport of species over long distances also represents a major problem.

Plastic Production: Consuming Useful Resources

Not only is disposing of plastic a serious concern but the production of this substance is equally deviating for us. The production of plastic involves valuable fossil fuels such as oil & petroleum. These fossil fuels are non-renewable & hard to extract. A lot is invested in fetching these fossil fuels and these are required for various other purposes. Some steps to reverse the tide of toxic non-biodegradable pollution so that it may not overtake our planet.

- put products in paper, canvas & other healthy – fiber bags
- Use more paper bags cloth napkins or re - usable sandwich.
- use only glass bottles or can
- support recycling scheme & promote support for one in your local area
- Practice & promote paper disposal of plastic in your homes.

Conclusion

We hope to eventually see a product design revolution that replaces plastic across the board with safer, non-polluting materials our focus here in on the plastic that cause the most harm & that can be easily avoided in everyday life. Plastic free living is a goal. We have spent much of the past decade working on & helping folks around the world strive to achieve.

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PLASTIC FREE FUTURE

P.Akilandaeswari

Abstract

In the last decade, plastic has affected the health and life of human beings very badly. Some incidents have attracted the attention of the whole world and put a question mark about the use of plastic in daily life. Plastic the wonder material that we use for everything and which pollutes our environment, is perhaps the most harmful of trash dumped by mariners and sea-goers in sea because it does not readily break down in nature. In-fact, the plastic that goes over the side today may still be around in hundreds of years to foul up the finishing gear, boat propellers, and beaches of future generations. Careless disposal of plastic can have dire consequences. A plastic bag looks like a tasty jelifish to an indiscriminate feeder like the sea turtle, but plastic is indigestible. It can choke, block the intestines of, or cause infection in those animals that consume it.

Key words: Consequences, Plastic

Introduction

Plastic as a synthetic polymer substitute natural materials in almost every aspect of our life and become an essential part of our society. Nature has witnessed a considerable intensification in the production of plastics in last few decades and simultaneous increased consumption of plastic materials. With time, stability and durability of plastics have been improved continuously, and hence these groups of materials are now considered as a synonym for materials being resistant to many environmental constraints. The basic properties viz. durability, resistance to chemicals, safety and hygienic nature, relative inexpensiveness to produce, thermal and electrical insulations, and lighter weight than the competing materials helped plastics to be indispensible in every aspects of life. Plastics compromise diverse group of chemically complex compounds. Plastics are formed into any number of products, and different plastic resins are difficult to differentiate. This leads to problems in collection, separations, and recycling. Because of its durability, plastics accumulate and remain persistent in the environment at the rate of MT per year. Moreover, converting plastics down to their original chemical constituents is often technologically infeasible or otherwise unprofitable. Management of plastics found in municipal 31 solid waste (MSW) is most critical sector because of continuous increase in plastic proportion in MSW, it's no biodegradability, and direct harmful effect to society.

Pollution Due to Plastic

Plastic pollution, accumulation in the environment of synthetic plastic products to the point where they create problems for wildlife and their habitats as well as for human populations.

P.Akilandaeswari
V.O.C.College of Education, Thoothukudi

In 1907 the invention of Bakelite brought about a revolution in materials by introducing truly synthetic plastic resins into world commerce. By the end of the 20th century, however, plastics were found to be persistent polluters of many environmental niches, from Mount Everest to the bottom of the sea. Whether being mistaken for food by animals, flooding low-lying areas by clogging drainage systems, or simply causing significant aesthetic blight, plastics have attracted increasing attention as a large-scale pollutant.

THE PROBLEM OF PLASTICS

Plastic is a polymeric material—that is, a material whose molecules are very large, often resembling long chains made up of a seemingly endless series of interconnected links. Natural polymers such as rubber and silk exist in abundance, but nature's "plastics" have not been implicated in environmental pollution, because they do not persist in the environment. Today, however, the average consumer comes into daily contact with all kinds of plastic materials that have been developed specifically to defeat natural decay processes—materials derived mainly from petroleum that can be molded, cast, spun, or applied as a coating. Since synthetic plastics are largely no biodegradable, they tend to persist in natural environments. Moreover, many lightweight single-use plastic products and packaging materials, which account for approximately 50 percent of all plastics produced, are not deposited in containers for subsequent removal to landfills, recycling centres, or incinerators. Instead, they are improperly disposed of at or near the location where they end their usefulness to the consumer. Dropped on the ground, thrown out of a car window, heaped onto an already full rubbish bin, or inadvertently carried off by a gust of wind, they immediately begin to pollute the environment. Indeed, landscapes littered by plastic packaging have become common in many parts of the world. (Illegal dumping of plastic and overflowing of containment structures also play a role.) Studies from around the world have not shown any particular country or demographic group to be most responsible, though population centres generate the most litter. The causes and effects of plastic pollution are truly worldwide.

Plastic Pollution on Land and in Oceans

Since the ocean is downstream from nearly every terrestrial location, it is the receiving body for much of the plastic waste generated on land. Several million tonnes of debris end up in the world's oceans every year, and much of it is improperly discarded plastic litter. The first oceanographic study to examine the amount of near-surface plastic debris in the world's oceans was published in 2014.

It estimated that at least 5.25 trillion individual plastic particles weighing roughly 244,000 tonnes (269,000 tons) were floating on or near the surface. Plastic pollution was first noticed in the ocean by scientists carrying out plankton studies in the late 1960s and early 1970s, and oceans and beaches still receive most of the attention of those studying and working to abate plastic pollution. Floating plastic waste Subtropical Gyres, whose eastern "garbage patches" (zones with high concentrations of plastic waste circulating near the ocean surface) have garnered the attention of scientists and

the media. The other gyres are the North and South Atlantic Subtropical Gyres and the Ocean Subtropical Gyre.has been shown to accumulate in five subtropical gyres that cover 40 percent of the world's oceans. Located at Earth's multitudes, these gyres include the North and South Pacific

Solution

- Bring your own cloth bags to the grocery store, Don't buy beverages bottles in plastic. Glass is great, Carry your own reusable steel or ceramic beverage container
- Go to the farmer's market and purchase fruits and veggies, Don't buy convenience foods packages in plastics.
- Buy bread from bakeries that package in paper, Clean with baking soda and vinegar instead of cleaners packaged in plastic, Buy laundry detergent in boxes, not liquid in plastic containers.
- Buy farm fresh eggs in reusable paper containers, Get your cheese from the deli and place it in your own container.
- Bring your own containers to restaurants to package leftovers. Use bar soap to wash your dishes.
- Use perfume in a glass bottle if you want a nice smell, do not use air fresheners. Light a candle or incense instead, Store all your food in glass containers
- Use cloth rags for clean up around the house, no paper towels – reduces your trash and need for trash bags,
- Use matches instead of plastic encased lighters.
- Use baby bottles made of glass, Use stainless steel Sippy cups for kids, Use cloth based toys for your pets, like catnip mice and soft squishy balls, Buy cloth diapers.
- Buy CDs packaged in cardboard sleeves or buy your music online, Use junk mail and other paper to stuff into big packages to ship instead of bubble wrap or air filled plastic.

Conclusion

While plastic pollution is very serious problem, there are solutions. One solution to prevent to the negative health effects is to provide clean water. In rural areas, instead of using a municipal watershed, residents use their own private wells. These wells are encased and protected from any potential bio-hazardous runoff (Wilcox, 2010). Another solution is plastic alternatives. One of these alternatives is ceramic fibers made from inorganic substances. Many of these fibers are heat resistant and can withstand great thermal temperatures (Ishikawa, 2005). Another, and more cost effective, example of a plastic alternative is Polyhydroxybutyrate(PHB). PHB is a biodegradable plastic alternative. PHB can be created using abundant and cost effective organic materials such as bacteria and other carbon based substances..According to Oregon State University's Sustainable Technologies Laboratory, it would cost roughly $363,340 for

15,000,000 kilograms of the raw materials necessary to produce PHB. A potential source of funding would be an EPA grant. The EPA has awarded over $4 billion worth of grants every year. By reducing the health risks caused by micro plastics, and by reducing the amount of overall plastic through mechanical recycling and biodegradable alternatives, plastic pollution can become a thing of the past.

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HEALTHY OCEAN PREVENTING PLASTIC POLLUTION

C.Rathna kirubha

Abstract

Plastic addiction and waste mismanagement is condemning countless marine birds and animals to death by entanglement or poisoning, and even leading to chemical contamination of the fish we eat. Right from the teacups to a computer mouse and from mobile phones to computer monitor to name the few. This is not the end of the list, if you turn around you would find plastic products everywhere. Everyone uses the plastic product, but what do we do after using it? The simple answer is we throw it and that lead to plastic pollution. While some of the product is picked and recycled, some are simply thrown into landfills making environment unclean. Besides, the loosely disposed plastic finally ends up settling into waterways making the water contaminated. In this article let us discuss about the impact of plastics on the ocean. Let us discuss in detail.

Introduction:

Plastic pollution will be one of the most challenging ecological threats for the next generation. A recent research study estimated that 4.8–12.7 million metric tons (MMT) of plastic waste enter the world ocean. Of the top 20 countries releasing waste into the oceans, 10 have shores on the Indian Ocean, the third largest ocean in the world. Until now, all studies have focused on the environmental and the economic impact of macro-sized plastics. Plastic pollution in the marine and coastal environment is a challenging restoration and governance issue. Similar to many environmental problems, marine plastic pollution is trans boundary and therefore the governance solutions are complex. Although the marine environment is unlikely to return to the condition it was in before the "plastic era," it is an example of an environmental restoration challenge where successful governance and environmental stewardship would likely result in a healthier global oceanic ecosystem. We argue that a holistic, integrated approach that utilizes scientific expertise, community participation, and market□based strategies is needed to significantly reduce the global plastic pollution problem.

Material Science of Plastics

The mass use of plastic started in the 1950s and has steadily grown ever since. Today, more than 300 million tons of plastic are produced annually. While in Europe the production of plastic has remained relatively constant over the last decade, in developing countries in particular it continues to rise. The popularity of plastic is due not only to its low production costs but also its numerous practical characteristics, including its low weight, acid resistance, and flexibility. In addition, plastic's flexible properties encourage technological innovations and—particularly in the fields of medicine, building technology, and aircraft and automobile manufacturing—lead to new solutions, improvements, and comfort.

C.Rathna kirubha
V.O.C College of Education, Thoothukudi

Types of Plastic

Plastics consist of long molecular chains, known as polymers, created by linking the same repeated building element (monomer). Synthetically produced plastics are made from mineral oil, coal, or natural gas. A total of 4 percent of the worldwide production of oil and gas is destined for the manufacture of plastics. In addition to synthetic plastics there are also the semi-synthetics that are made from natural polymers such as cellulose. Today, organic plastics made from sustainable raw materials are being produced in increasing amounts. The most common types of plastics, known as the mass plastics, are: polyethylene, polypropylene, PVC, polystyrene, PET, and polyurethane.

Affected Ocean

Oceans are regarded as the lungs of our planet and home for sea animals. Plastic and the use of the plastic product are posing an environmental threat. Plastic pollution mainly involves the gathering of plastic products in the environment. This adversely affects lands, waterways, oceans, living organisms and even the marine animals. A report says that about 80% of all pollution in the ocean is manmade. It is also stated that per year 8 million tonnes of plastic are dumped into the ocean. This creates havoc on wildlife, fisheries, and tourism. Beside this, it is due to the plastic pollution that every year 1 million seabirds and 100,000 marine mammals dies.

Sources of Plastic Toxins Entering the Oceanic Food Chain

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 worse 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. See Earth Times for more on this.

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.

Prevention of Contamination

As Rolf Halden asserts, the only way for this unsustainable plastic production to decrease would be a global staggering petroleum supply, because of environmental worry. About 8% of the world's oil use is from manufacturing plastics. There are efforts to protect the oceans from plastic pollutants along with human health, but they are

mostly grassroots organizations. One in particular that I discovered during my research is Save My Oceans which anyone can become involved with. 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.

Recycle Plastic

"Marine debris – trash in our oceans – is a symptom of our throw-away society and our approach to how we use our natural resources."

Our tendency as 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. In fact, it takes two-thirds less energy to make products from recycled plastic than it does by using virgin materials. When one ton of plastic bottles is recycled, almost four barrels of oil are saved. That means there is more oil available for home heating, which in turn helps keep the price down. Furthermore, recycling just one ton of plastic saves 7.4 cubic yards of landfill space. The more plastic we recycle, the less chance it has to end up either in landfills or as plastic littering our landscape and our oceans.

Eco –Friendly

In fact, consumers can do to a lot to greatly reduce the plastic waste scourge. As more towns embrace a plastic bag ban, using reusable bags is a must. Consumers "vote" with their dollars, so when grocery shopping, see about purchasing products in recycled packaging. More manufacturers are shifting to this all the time. And as for those plastic water bottles, there are plenty of eco-friendly options – from installing a home water filter, to using water pitchers and "green" stainless steel water bottles with built-in filters (e.g. Klean Kanteen) Cutting back on plastic isn't difficult to do. Doing so saves you money in the long run, and it helps save wildlife and the environment too.

Alternatives

Paints and varnishes with the "Blue Angel" symbol contain no plasticizers. Safe or harmless products are often clearly marked as such. Halogen-free cables and wiring are free of fluoride, chlorine, bromine, and iodine, chemicals that, in the event of a fire, can have dangerous effects similar to those of PVC. As a result, in buildings where groups of people congregate or where valuable material has to be protected, these cables and wiring have become increasingly popular.

Bio-Based Plastics

A plastic is bio-based if it is made from a sustainable (vegetable) raw material. For example, bio-based plastics can be manufactured from starch, cellulose, sugar, vegetable oils, lignin, and proteins. These basic substances can be derived from maize,

wood, sugar, or potatoes. Bio-based plastics are not without their critics. And the criticism is much the same as that applied to bio-fuels: "full tanks—empty plates"—as the area on which to cultivate crops for food production is reduced. Similarly, the question of whether bio-based plastics are in fact more environmentally friendly than those based on mineral oil is hotly debated. If one looks at the entire life cycle of such a plastic—from planting to watering, harvesting, and production, and transport—biological plastics do not necessarily score any better.

Conclusion

A report by the American Chemistry Council shows that the demand for recycled plastics exceeds the available supply, and that demand may increase given current green trends. The more we recycle plastic, the more of it will be available to manufacturers to produce new products. Surprisingly, there are still communities where recycling is not only non-mandatory but is not even offered to residents. This too is something that consumers can have a say in.

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HEALTHY OCEAN: PREVENTING PLASTIC POLLUTION

P.Sherin Priscilla Poomani

Abstract

Plastic pollution is one of the greatest threats to ocean health worldwide. With skyrocketing plastic production, low levels of recycling and poor waste management, between 4 and 12 million metric tons of plastic enter the ocean each year—enough to cover every foot of coastline on the planet! And that amount is expected to more than double in the next 10 years. In the ocean, plastic pollution impacts sea turtles, whales, seabirds, fish, coral reefs, and countless other marine species and habitats. In fact, scientists estimate that more than half of the world's sea turtles and nearly every seabird on Earth have eaten plastic in their lifetimes. Plastic pollution also mars otherwise beautiful beaches, coastlines, and snorkel and dive sites worldwide. One of the reasons that plastic pollution is such a problem is that it doesn't go away: "plastics are forever." Instead, plastic debris simply breaks down into ever-smaller particles, known as microplastics, whose environmental impacts are still being determined.

Key words: Environment, Plastic

Introduction

Plastic accumulating in our oceans and on our beaches has become a global crisis. Billions of pounds of plastic can be found in swirling convergences that make up about 40 percent of the world's ocean surfaces. At current rates plastic is expected to outweigh all the fish in the sea by 2050.Plastics pollution has a direct and deadly effect on wildlife. Thousands of seabirds and sea turtles, seals and other marine mammals are killed each year after ingesting plastic or getting entangled in it. Endangered wildlife like Hawaiian monk seals and Pacific loggerhead sea turtles are among nearly 700 species that eat and get caught in plastic litter.

Deadly Plastic

We're surrounded by plastic. It's in the single-use packaging we discard, the consumer goods that fill our stores, and in our clothing, which sheds microplastic fibers in the wash. In the first decade of this century, we made more plastic than all the plastic in history up to the year 2000. And every year, billions of pounds of *more* plastic end up in the world's oceans. Studies estimate there are now 15–51 trillion pieces of plastic in the world's oceans — from the equator to the poles, from Arctic ice sheets to the sea floor. Not one square mile of surface ocean anywhere on earth is free of plastic pollution. The problem is growing into a crisis. The fossil fuel industry plans to *increase plastic production* by 40 percent over the next decade. These oil giants are rapidly building petrochemical plants across the United States to turn fracked gas into plastic.

P.Sherin Priscilla Poomani
V.O.C.College of Education,Thoothukudi

This means more toxic air pollution and plastic in our oceans. We need urgent action to address the global plastic pollution epidemic. Unfortunately, plastic is so durable that the EPA reports "every bit of plastic ever made still exists." All five of the Earth's major ocean gyres are inundated with plastic pollution.

Sources of Plastics in 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.

Plastic Getting to Human 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. For more information on this topic on toxins in the ocean, see this article by National Geographic. 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. To learn more on effects of plastics on humans visit the Ecology Center. 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.

A Heavy Toll on Wildlife

Thousands of animals, from small finches to blue whales, die grisly deaths from eating and getting caught in plastic.

- **Fish** in the North Pacific ingest 12,000 to 24,000 tons of plastic each year, which can cause intestinal injury and death and transfers plastic up the food chain to bigger fish, marine mammals and human seafood eaters. A recent study found that a quarter of fish at markets in California contained plastic in their guts, mostly in the form of plastic microfibers.

- Sea turtles can mistake floating plastic garbage for food. They can choke, sustain internal injury and die — or starve by thinking they're full from eating plastic. Tragically, research indicates that half of sea turtles worldwide have ingested plastic. New studies find plastic pollution is so pervasive on many beaches that its affecting their reproduction.
- Hundreds of thousands of **seabirds** ingest plastic every year. Plastic ingestion reduces the storage volume of the stomach, causing starvation. It's estimated that 60 percent of all seabird species have eaten pieces of plastic, with that number predicted to increase to 99 percent by 2050. Dead seabirds are often found with stomachs full of plastic, reflecting how the amount of garbage in our oceans has rapidly increased in the past 40 years.

Conclusion

While plastic pollution is very serious problem, there are solutions. One solution is plastic alternatives. One of these alternatives is ceramic fibers made from inorganic substances. Many of these fibers are heat resistant and can withstand great thermal temperatures (Ishikawa, 2005). Another, and more cost effective, example of a plastic alternative is Polyhydroxybutyrate (PHB). PHB is a biodegradable plastic alternative. PHB can be created using abundant and cost effective organic materials such as bacteria and other carbon based substances. By reducing the health risks caused by micro plastics, and by reducing the amount of overall plastic through mechanical recycling (manually separating, cleaning, and reusing plastic of any form) and biodegradable alternatives, plastic pollution can become a thing of the past.

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PLASTIC FREE INDIA

T.Josphin Anto Monisha

Abstract

The 2018 World Environment Day was momentous for India as the country was the global host and joined the league of the nations which hosted this prestigious event before. With "Beat Plastic Pollution" as the theme for this day, India went big with an announcement to wipe out all the single-use plastics from the country by 2022. Prime Minister Narendra Modi applauded World Environment Day as an outset of a global movement to overthrow single-use plastics which will contribute to the country's rapid economic development. This exceptional and ambitious action against the disposable plastic will drastically curb the flow of plastics from 130 crore people and businesses in the fastest growing economy in the world.

Introduction

The 2018 World Environment Day was momentous for India as the country was the global host and joined the league of the nations which hosted this prestigious event before. With "Beat Plastic Pollution" as the theme for this day, India went big with an announcement to wipe out all the single-use plastics from the country by 2022. This announcement gave an extension to the activities carried on by millions of Indians like policymakers, celebrities, business magnates and small entrepreneurs, innovators, environmentalist, and activists against plastic pollution around the country.

Pan-India Initiatives on Plastic Pollution

Several pan-India initiatives will be launched to fight plastic pollution like clean-up drives of public spaces, national reserves, forests, and beaches. These initiatives also include making 100 monuments across the country into plastic and litter-free zones. Even the Tourism Ministry will contribute their lot to the cause by vowing to avoid plastic straws at public places. Nevertheless, many developmental measures have already been initiated by various states across the country to lower their plastic consumption and handle the existing waste across their jurisdiction. These actions serve as perfect examples and can be adopted by other states as well. Below are some initiatives adopted by the municipalities, the state administration and the common public to tackle the plastic crises at their own level across the country.

- **Use of Recyclables in Government Offices in Kerala**

  Many government offices in Kerala are contributing in their own way towards the Beat Plastic Pollution initiative of the government to make India plastic free. The employees in these offices have shifted from using plastic-made items like plastic water bottles and disposable teacups to steel cutlery, and from pens made of plastic to pens made of steel.

T.Josphin Anto Monisha
V.O.C College of Education, Thoothukudi.

This action of the government offices was mooted by the Suchitwa Mission and Haritha Keralam Mission, which aimed at making the government departments an example of a clean environment. This step can also be easily implied in corporate and private organizations while paving the way for an environment-friendly work culture.

- **Extracting of Plastic Waste From Water Bodies in Kerala**

It's really sad that the marine creatures are paying the price of our callousness and impotence to handle the plastic waste. It becomes very depressing when multiple reports highlighting the dead bodies of the marine animals found on the seashores, with plastic waste inside their tummies. To handle this grave situation, Kerala's Suchitwa Mission has launched an excellent project in which 28 fishermen have been employed from the Neendakara harbor in not just finding the fishes but also extracting the plastic from the water bodies that either gets stuck in the fishing nets or float on the sea. The Mission has managed to retrieve 25 tones of plastic waste in last 10 months of the project launch.

- **Tackling Plastic Use in Sikkim**

Sikkim has always been at the forefront when it comes to tackling the plastic pollution. Its success in restricting usage and sale of plastic bags is an example for the other states to learn from. This success is not achieved by Sikkim by just imposing random fines on the plastic use, but by making people aware of the dangers caused by plastics. In 1998, it became the first Indian state to ban disposable plastic bags and single-use plastic bottles.

The Sikkim government took two bigger decisions in 2016. Firstly, it targeted the government offices for imposing a ban on the use of packaged drinking water on its premises to reduce an unnecessary burden on the dump yards. Secondly, it completely banned the consumption of Styrofoam and thermocol disposable plates and cutlery in the entire state in order to reduce harmful effects of the plastic pollution and tackle its ever-increasing garbage problem. Ever since 2005, the state has been engaged in conducting significant campaigns to spread awareness among people about the harms imposed by plastic on the environment. Similar success stories have emerged out of Nainital and Jaipur, where shopkeepers have begun to use chargeable cloth bags instead of plastic ones.

- **Utilizing Plastic for Road Surfacing**

Due to the plausible efforts of Professor Rajagopalan Vasudevan of the Thiagarajar College of Engineering in Madurai, the road surfacing using plastics is now a reality. The plastic which is banned and considered a waste can now be utilized in flagging off development projects across the country. Many states in India are planning to implement this pioneering technique to manage their plastic waste. The states of Kerala, Maharashtra, and Tamil Nadu have already started to work on this unique technique.

- **Recycling Plastic for Better Purposes**

It is an impossible task to dispose of such huge amounts of plastic waste generated in India at one go. The only option available is to use this plastic waste in an eco-friendly manner that the burden on the country's dumping grounds gets reduced. Many organizations in India have been recycling plastic in an efficient manner to avoid any harmful effects caused by it. The plastic is being utilized and recycled in construction materials, making of threads and fabrics for the textile industry, and many other better purposes. The government's recent proposal to introduce plastic currency notes is a major step in reusing plastic waste.

- **Adoption of "Co-Processing of Waste" Technique in Gujarat to Deal with Plastic Pollution**

The Gujarat state government, in association with the Gujarat Pollution Control Board, had introduced the concept of "co-processing of waste" to the industries producing huge amounts of plastic wastes and working closely with them on this concept. Co-processing is the process of utilizing waste materials in the industrial processes or substituting them for primary fuel or raw material. The paper mills in Vapi collected their plastic byproducts and then used them to fire cement plants. This co-processing of hazardous waste in the cement production is an eco-friendly and sound method for its disposal.

- **The State of Andhra Pradesh**

The state of Andhra Pradesh has started a scale-out program to convert 6 million farms from conventional synthetic chemical agriculture to Zero-Budget Natural Farming.

- **Introduction of "Beat Plastic Pollution" Drive by (SEEDS) in East Delhi Schools**

The SEEDS implemented a drive in view of beating plastic pollution in six Schools in East Delhi to encourage safe environmental practices among students, children , teachers, parents, and communities in Delhi.

- **Fishermen of Kerala Turning Plastics from Ocean into Roads**

The fishermen in Kerala are pulling out plastics dumped in the oceans with the help of their nets. They have set up first-ever recycling center in Kadalamma with the help of several government agencies to clean, sort, and process all the sea-tossed plastic bags, bottles, straws, etc. that they fish out. The plastic which is damaged, eroded, and cannot be recycled is shredded into a confetti and then sold to the local constructors to be used in paving of the roads.

- **Beat Plastic in Tamilnadu:**

The Tamil Nadu government announced a ban on 'one-time use and throwaway plastics' such as plastic sheets for food wrapping, dining table spread, plates, teacups and tumblers, water pouches and packets, straw, carry bags and flags, irrespective of their thickness.

Conclusion

How much we shut our eyes to the dangers caused by plastic, plastic pollution is indeed a stark reality that requires prompt cooperative action before it gets too late to save our planet. The world didn't become cluttered with plastic pollution overnight, so it'll take a bit more time and effort to get rid of it completely. The actions taken to reduce the impact of the plastic pollution on the environment doesn't need to be grand or sweeping, just an honest effort every day will definitely make a great contribution to the subject.

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SYNTHETIC POLYMERS

S.Komalavalli

Abstract

The traditional polymer materials available today, especially the plastics, are the result of decades of evolution. Their production is extremely efficient in terms of utilization of raw materials and energy, as well as of waste release. The products present a series of excellent properties such as impermeability to water and microorganisms, high mechanical strength, low density (useful for transporting goods), and low cost due to manufacturing scale and process optimization . However, some of their most useful features, the chemical, physical and biological inertness, and durability resulted in their accumulation in the environment if not recycled. Unfortunately, the accumulation of plastics, along with other materials, is becoming a serious problem for all countries in the world. These materials occupy significant volume in landfills and dumps today.

Key words: Microorganisms, Plastics

Introduction

The traditional polymer materials available today, especially the plastics, are the result of decades of evolution. Their production is extremely efficient in terms of utilization of raw materials and energy, as well as of waste release. The products present a series of excellent properties such as impermeability to water and microorganisms, high mechanical strength, low density (useful for transporting goods), and low cost due to manufacturing scale and process optimization . However, some of their most useful features, the chemical , physical and biological inertness, and durability resulted in their accumulation in the environment if not recycled. Unfortunately, the accumulation of plastics, along with other materials, is becoming a serious problem for all countries in the world. These materials occupy significant volume in landfills and dumps today.

Polymers

Polymers are long chain giant organic molecules are assembled from many smaller molecules called monomers. Polymers consists of many repeating monomer units in long chains .A polymer is analogous to a necklace made from many small beads (monomers).Another common name for many synthetic polymers is plastic which comes from the Greek word "plastikos",suitable for molding or shaping .Many objet in daily use from packing ,wrapping and building materials .

Concept of Polymers

Polymers are large molecules made up of many smaller and identical repeating units joined together by covalent bonds .These molecules are called monomers. Polymerisation is the chemical process by which the monomers are joined together to form a big molecules known as polymer.

S.Komalavalli,
V.O.ChidambaramCollege of Education – Thoothukudi

A polymer is a macromolecules (a very big molecules).Hence, the relative molecular mass of a polymer is large.

Types of Polymers

Polymers can divided into two types

- ➔ Naturally occurring polymers
- ➔ Synthetic polymer

Naturally Occurring Polymers:

This group consists of naturally occurring polymers and chemical modifications of these polymers. Cellulose, starch, lignin, chitin, and various polysaccharides are included in this group.These materials and their derivatives offer a wide range of properties and applications. Natural polymers tend to be readily biodegradable, although the rate of degradation is generally inversely proportional to the extent of chemical modification. Naturally occuring polymersexist in plants or animals.Natural polymers are made up ofcarbon, hydrogen, nitrogen and oxygen

SYNTHETIC POLYMER AND THEIR USAGE IN DAILY LIFE

Synthetic polymer	**Uses**
Neoprene	Shoes soles ,hoses, radiator hoses ,wetsuits
Polyvinyl chloride (polychlrothene)	Raincoats, pipes, to insulate electric wires
Polyamide(nylon)	Parachutes ,carpet, ropes, form-fitting skiwear, hosiery
Polypropene	Plastics ,bottle, plastic table and chairs
Teflon (polytetrafluroethene)	To make non-stick pots and pans
Polyester	Filters, conveyor belt, sleeping bag insulation
Polyethylene terephthalate	soft drinks bottle, peanut butter jars
Polythene (polyethylene)	Plastic bag ,containers and cups
Perspex(polymethyl2-methyl propene)	Aeroplane windows panes, lenses, car lamp covers
Polystyrene	Styrofoam cups, grocery store trays

Synthetic polymers have been used widely to replace natural materials such as metals, wood, cotton, animal skin and natural rubber because of the following advantages

- Strong , light and Cheap
- Able to resist corrosion
- Inert to chemical reactions
- Easily moulded or shaped and be colored
- Can be made to have special properties

The Effect of the Uses of Synthesis Polymers to our Environment

The use of synthetic polymers, however results in environmental problems

- Most polymers are *not biodegradable*
- Polymers cannot be decomposed biologically or naturally by bacteria or fungi as in the case of other garbage. Thus, the disposal of polymers has resulted in environmental pollution because they remain in the environment forever.
- Discarded plastic items may cause blockage of drainage systems and rivers thus causing flash floods.
- Plastic containers and bottles strewn around become good breeding places for mosquitoes which cause dengue fever, or malaria .
- Small plastic items that are thrown into the rivers, lakes and seas are some things swallowed by aquatic animals .These animals may die from choking
- The open burning of plastics gives rise to poisonous and acidic gases like carbon monoxide, hydrogen chloride and hydrogen cyanide. These are harmful to the environment as they cause acid rain.
- Burning of plastics can also produce carbon dioxide, too much of this gas in the atmosphere leads to the `greenhouse effect' .
- The main source of raw materials for the making of synthetic polymers is petroleum
- Petroleum is a non – renewable resource

This problem can be overcome by the following ways:

Recycling polymers: Plastics can be decomposed by heating them without oxygen at700°C. This process is called pyrolysis. The products of this process are then recycled into new products.

Inventing biodegradable polymers: Such polymers should be mixed with substances that can be decomposed by bacteria (to become biodegradable) or light (to become photodegradable) .

Conclusion

Recently, the presence of huge amounts of plastic fragments on the oceans has been observed, considerable part of them coming from the streets, going through the drains with the rain, and then going into the rivers and lakes, and then to the oceans . As a result, there is a very strong and irreversible movement, in all countries of the world, to use materials that do not harm the planet, that is, low environmental impact materials.

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TECHNIQUES USED IN PLASTIC WASTE DISPOSAL

S.Iswariya

Abstract

Plastic is basically made of virgin materials and that is why it is very difficult to decompose. Even when it is disposed off in the landfills, plastic materials do not get decomposed and that is why plastic is considered to be a substance that is very harmful for humans as well as animals. There are various disadvantages of using plastic bags and plastic bottles that is why these days most people are considering recycling the plastic materials in order to save the precious natural resources that are wasted when new materials are created. Plastic recycling is a very beneficial technique not only for the humans but also for the natural stability of the earth. Recycling this material is very easy and the process can easily be carried out at home.

Key words: Recycling, Virgin plastics

INTRODUCTION:

Plastic is a non- biodegradable organic polymer, which is very commonly used in materials, large amounts of discarded plastics accumulating in oceans as Garbage islands and in land as landfills or blocking streams and waterways. Leaching of waste plastics from land filling and fumes released during incineration resulting major health impacts to living things as well as polluting the air, water, and soil, burning PVC releases cancer causing dioxins and PCB. Addition to recycling waste plastics also used in production of energy or in co-processing. Oxo-degradable plastics end up in fragments which cannot be compostable and also resulting in particles that can cause bioaccumulation. Consumption of plastic materials increasing rapidly, in 1990 worldwide production was 86 million tons it reaches 190 million tons in 2004 and 259million tons in 2010. Almost same amount of plastics has to be discarded or recycled every year. Plastic recycling is a very beneficial technique not only for the humans but also for the natural stability of the earth. Recycling this material is very easy and the process can easily be carried out at home.

Efficient Techniques of Recycling the Plastic Product

Dividing the Plastic Products: There are various different categories of the plastic materials therefore before you carry out the recycling process it is very important for you to divide them in different categories so that the procedure becomes easier for you. Once you have divided the materials and categorized them accordingly it would give you a better idea about the waste that should be decomposed and the ones that can be re-used for other purposes in your home.

S.Iswariya, V.O.Chidambaram College of Education – Thoothukudi

Mechanical Recycling: Mechanical recycling of the plastic products is a very efficient way through which you can recycle the products without any trouble. This method is gaining rapid popularity and most people use it for recycling their household plastic waste materials. This process involves the melting of plastic after which it is shredded and granulation is done for completing the process. Some of the most frequently used techniques and methods are infrared spectroscopy, electrostatics, fluorescence and the X-ray process

Chemical Recycling: This is another very efficient way of recycling the plastic products. This method is generally used for disposing off the waste materials that are in bulk. This method is a little different from the mechanical recycling process. The chemical technique involves breaking down of the polymers of the plastic in constituent monomers which can be further used in factories and big industries for the production of certain chemicals and petrochemical. It is capital incentive process that really requires a large quantity of plastic to be processed.

Cleaning the Plastic Products: Cleaning and removing the dirt from the plastic products is another very efficient way through which you can make the plastic reusable. While you are carrying out this task, you must make sure that each and every product that has to be recycled is cleaned in the most efficient manner otherwise the recycling process would not be completed properly. Ensure that you have removed every contaminant that might be left on the surface.

Squeeze the Plastic Products Carefully: Before the plastic products are taken to the recycling station they would be properly squeezed and squashed so that any material that is left behind in the bottles or the back can come out. This process also helps in compressing the plastic materials and compressed products are very easy to recycle than the normal ones.

Recycling of Plastics through Environmentally Sound Methods:

Recycling of plastics must be carried out in such a way that it minimizes the pollution level throughout the process and as a result, increase the efficiency of the process and conserve the energy. Plastic recycling technologies have been divided into four general types primary, secondary, tertiary and quaternary.

- **Primary:** Primary recycling includes processing of scrap/waste into a product with features similar to the original product.
- **Secondary:** Secondary recycling involves processing of waste plastics into products that have characteristics dissimilar from those of original plastic products.
- **Tertiary:** In tertiary recycling, basic chemicals and fuels are produced from plastic scrap as part of the municipal waste stream or as a segregated waste.
- **Quaternary:** Quaternary recycling reclaims the energy content of the scrap plastics by burning/incineration. This process is not in use in India.

Steps Involved in the Plastic Recycling Process:

- **Segregation:**The plastic waste need to be segregated as per the codes stated in the BIS guidelines.
- **Processing:** After selection and segregation, the pre-consumer waste shall be recycled directly. The post consumer waste (used plastic waste) shall be washed, shredded, agglomerated, extruded and granulated.
- **Land filling:** All plastics can be disposed in landfills. However, land filling is highly wasteful as it requires a vast amount of space and the chemical constituents and energy contained in plastic is lost in this disposal route. In 2008, 29.2 million tons of plastic was disposed in landfills in the United States. In countries where landfills are poorly managed, plastic wastes can be easily blown into waterways or carried out to sea by flood water. In addition, when plastics decompose in landfills, they may leak pollutants (phthalates and bisphenol A) into the soil and surrounding environment.
- **Incineration:** Plastics are derived from petroleum or natural gas, giving them a stored energy value higher than any other material commonly found in the waste stream. Incineration returns some of the energy from the plastic production
- **Recycling:** Many plastics can be recycled, and the materials recovered can be given a second life. However, this method is not fully utilized, due to difficulties with the collection and sorting of plastic waste. Even though recycling is the most effective way to deal with plastic waste, its effectiveness is highly depended on public awareness, economic viability, and the implementation of public infrastructures to make recycling more efficient.(recycling bins, specialized waste collecting trucks)
- **Biodegradable Plastics:** Biodegradable Plastics are plastics that decompose by the action of living organisms. Biodegradable plastics have the potential to solve a number of waste- management issues, especially for disposable packaging that cannot be easily separated from organic waste. However, biodegradable plastics can be completely metabolized by organisms into carbon dioxide and water; there are allegations that Oxo-Biodegradable plastics may release metals into the environment.

Reduction Strategies:

Non-Usage or Reduction in Usage: This has to happen on a personal level. Avoiding plastic bags, cups, foils, wraps, bottles can be effective if it becomes a lifestyle.

Government Policies:

a) Ban on use of Plastic bags and bottles

b) Fine on illegal dumping or littering

c) Landfill tax

d) Regulation on packaging

e) Recycling pickups are subsidized or free

f) Extra charge for plastic bags

g) Encouragement to used old recycled products

h) Create jobs/management to oversee the problem

i) Ban on production

Innovative Uses: Plastic roads,Plastic Homes,Plastic Bricks, Plastic Clothing,3D printing

Conclusion:

Plastic Waste Management has assumed great significance in present day context. People should join with efforts to increase the specification and use of recycled grades as replacement of virgin plastic, recycling of waste plastics is an effective way to improve our environment and to support the better human survival.

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PLASTIC AND LIFE

S.Jeya Powerna

Abstract

Global production of plastics is increasing every year (245 million metric tons in 2008) and the amount of plastic litter that is finding its way into the environment and into the oceans is also increasing, especially in the areas of the world where waste management practices are not keeping up with the rapid development. Over a few decades, humans have managed to dump tons upon tons of garbage into the ocean. Of the most devastating elements of this pollution is that plastics takes thousands of years to decay. As a result, fish and wildlife are becoming intoxicated. Consequently the toxins from the plastics have entered the food chain, threatening human health. In the most polluted places in the ocean, the mass of plastic exceeds the amount of plankton six times over. This is a large piece of evidence that leaves the problem of polluted oceans undeniable. It is upsetting that more of cleanup effort is not taking place.

Key words: Toxins, Plankton, Plastics

Introduction

Global production of plastics is increasing every year (245 million metric tonnes in 2008) and the amount of plastic litter that is finding its way into the environment and into the oceans is also increasing, especially in the areas of the world where waste management practices are not keeping up with the rapid development. Over a few decades, humans have managed to dump tons upon tons of garbage into the ocean. Of the most devastating elements of this pollution is that plastics takes thousands of years to decay. As a result, fish and wildlife are becoming intoxicated. Consequently the toxins from the plastics have entered the food chain, threatening human health. In the most polluted places in the ocean, the mass of plastic exceeds the amount of plankton six times over. This is a large piece of evidence that leaves the problem of polluted oceans undeniable. It is upsetting that more of cleanup effort is not taking place.

Plastic Comes from River

By analyzing the waste found in the rivers and surrounding landscape, researchers were able to estimate that just 10 river systems carry 90% of the plastic that ends up in the ocean. Eight of them are in Asia: the Yangtze; Indus; Yellow; Hai He; Ganges; Pearl; Amur; Mekong; and two in Africa – the Nile and the Niger. The rivers all had two things in common; a generally high population living in the surrounding region – sometimes into the hundreds of millions – and a less than ideal waste management process.

The Indus and the Ganges, which flow through India, carry the second and sixth highest amounts of plastic debris to the ocean

S.Jeya Powerna, V.O.C.College of Education,Thoothukudi

A Heavy Toll on Wildlife

Thousands of animals, from small finches to blue whales, die grisly deaths from eating and getting caught in plastic.

- Fish in the North Pacific ingest 12,000 to 24,000 tons of plastic each year, which can cause intestinal injury and death and transfers plastic up the food chain to bigger fish, marine mammals and human seafood eaters. A recent study found that a quarter of fish at markets in California contained plastic in their guts, mostly in the form of plastic microfibers.
- Sea turtles can mistake floating plastic garbage for food. They can choke, sustain internal injury and die — or starve by thinking they're full from eating plastic. Tragically, research indicates that half of sea turtles worldwide have ingested plastic. New studies find plastic pollution is so pervasive on many beaches that its affecting their reproduction.
- Hundreds of thousands of seabirds ingest plastic every year. Plastic ingestion reduces the storage volume of the stomach, causing starvation. It's estimated that 60 percent of all seabird species have eaten pieces of plastic, with that number predicted to increase to 99 percent by 2050. Dead seabirds are often found with stomachs full of plastic, reflecting how the amount of garbage in our oceans has rapidly increased in the past 40 years.

Marine mammals ingest, and get tangled up in, plastic. Large amounts of plastic debris have been found in the habitat of critically endangered Hawaiian monk seals, including in areas that serve as pup nurseries. Entanglement in plastic debris has also led to injury and mortality in the endangered stellar sea lion, with packing bands the most common entangling material. Dead whales have been found with bellies full of plastic.

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. Diethyl hexyls 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.

Plastic Affect Animals and Plants Plastic water bottles affect animals and plants because animals in the ocean will get caught with in all the water bottles that are being thrown into the ocean. As well as the chemicals in the plastic leaking out into the ocean, and contaminating the sea life. Another situation that the water bottles are creating is that the pollution goes into the ground and kills plants.

Prevention of Contamination: As Rolf Halden asserts, the only way for this unsustainable plastic production to decrease would be a global staggering petroleum supply, because of environmental worry. About 8% of the world's oil use is from manufacturing plastics. 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.

Conclusion

Ocean cover the earth's surface about 71% and play an important role in the chemical and biological balanced of the life on the earth. These are rich with marine resources like minerals, oil and marine life and the sea food supplies meet a substantial food requirement of the world population. We must helps to stop ocean pollution,by recycling,using decomposable materials instead of plastic or glass to decrease our accumulating waste. Marine animals are suffering due to our actions,and if we do not put a half to pollution soon, we too will suffer the consequences.

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THE CRY OF THE CREATION

V. Arockia Jeyasheela

J. Jackuline Baby

Abstract

The plastic is something of a wonderful material, consider as cheap, capable of being made into any conceivable shape, strong and durable by the human beings. The pieces of micro plastic in the earth are 500 times more than the stars in our galaxy. It is predicted that there will be more plastics than the creation by 2050. It has proved that it is so useful to human beings. Hence it is produced 8.3 billion metric tons of the stuff in the year 1950. It is also notable that 79 percent of the plastic was produced over the last 70 years has been thrown away, either into lands or into the environment. Today it's the cry of the creation that only nine percent is recycled with the rest incinerated. However, it appears to be much of life on Earth, gradually the humans one day could find themselves among them. Plastic, if we don't kill it; it will kill us. The complex emerging realities of the world today demands a response from us: '**The Cry of the Creation**'.

Key Words: Plastic, polystyrene, toxic, hazard, WHO

Introduction:

God in His goodness and love created the world and universe. We human beings are intimately one with all of creation and called to be stewards, but in today's reality we human beings have taken the place of God as the center of creation and have exploited and devastated this gift. "Conflict and division spread. Injustice and exploitation became embedded in the very structures of the society". The Web life is disrupted endangering LIFE and quality of all life on the planet.

The earth lies polluted under His inhabitants

For they have transgressed laws,

They violated God's statutes

And broken the everlasting covenant.

The Origin:

It was after the World War II that spurt and escalation in the production plastics started. And now plastic is widely used occupying every space, everywhere in the various forms and shapes. In the year 2015 world produce 448 million tons of plastics that were more than twice as much was created in 1998. China makes the largest amount of plastic followed by North America and Europe. In India 178 million tons of plastic was produced for 'house use' during 2018. The production growth is high, showing no trend of slowing down.

V. Arockia Jeyasheela, St.Ignatius College of Education,Palayamkottai

J. Jackuline Baby, St.Ignatius College of Education,Palayamkottai

Plastic is being used now enormously in packaging things like plastic bottles, consumer goods of all kinds, cell phone, and refrigerator. They are used in house hold furniture, constructions material and pipes, etc. it is also in cars, two wheelers and clothing, usually as polyester and other microfiber material. Over 35% of the plastic produced for packaging like water bottles.

A study by co-author Jenna Jambeck of University of Georgia calculates that of the 9.1 billion tones of plastic produced; nearly 7 billion tons are no longer used. That only 9 percent got recycled and another 12 percent was incinerated; leaving 5.5 billion tones of its being dumped as waste on land and in water. Unlike other material, plastic is such stuff as it does not give way for nature. Therefore, nearly 75 percent of this stuff results in waste; lying scattered on the land, dumped in the landfills in the lakes, rivers and oceans.

Why does creation cry?

Plastic, Plastic everywhere.
Plastic protects don't decay,
In soil do they stand and stay,
To dispose them we have no way,
Like milestones plastic weigh,
Therefore the creations cry.

The irresponsible dumping of plastic waste is one of the major environmental topics that has attracted the attention of many conservationists and countries. A 2014 report by the World Bank indicated that the municipal solid waste is doubling at an amazing rate, much of which is categorized as single-use plastic items. Plastic is almost everywhere and at the use of every human. The growing rate of plastic pollution is even worsened due to the rising utilization and population. Plastic pollution has increasingly becoming a major nuisance and poses significant hazard in the entire creation. It has impact on the natural environment and crucial consequences for humans, wildlife, and plants since they contain numerous toxic compounds.

Effects of Plastic Pollution on the creation:

"I am concerned about the air we breathe and the water we drink. If overfishing continues, if pollution continues, many of these species will disappear off the face of the earth". – Bernard Marcus.

It is very evident that the amount of a material can wreak havoc on natural environments, leading to long-term issues for the whole of creation. Some of the major effects of plastic pollution are:

It affects the Food Chain

Plastic comes in sizes large and small, affect the world's tiniest organisms such as plankton. When they are poisoned due to plastic ingestion, the larger animals that depend on them for food are also affected. This can cause a whole slew of problems,

each step further along the food chain. It means that plastic are present in the fish that many people eat every day.

Water Pollution

According to the U.N plastic waste constitutes between 60% and 80% of marine debris and is "one of the world's most pervasive pollution impacting our oceans and waterways". In 2012, there was about 165 million tons of plastic pollution in the world's oceans. The toxic chemicals such as bisphenol A and polystyrene can seep into waters from some plastics. Today the water is in under threat because of leaking plastics and waste. It's all the more worse when it rains to carry all the garbage to the ocean. Thus the living organism is affected inadequately.

Land Pollution

Plastic is dumped simply in landfills. Gradually it interacts with water and form perilous chemicals. When these chemicals are soaked in underground, they degrade the water quality. Wind comes with its speed to carry and to deposit plastic from one place to another, increases the land trash. It can also get stuck on poles, traffic lights, trees, fences, bushes, pits, tower etc. It might suffocate the animals that are in the vicinity and causes to their death.

Air Pollution

Burning of plastic in the open air, leads to environmental pollution due to the release of poisonous chemicals. When plastic is produced, it's made from toxic materials such as benzene and vinyl hydrochloride. It is intended to be toxic from birth to forever. Air pollution causes 7 million deaths worldwide each year mostly through non-communicable diseases like lung cancer, stroke and chronic obstructive pulmonary disease. Especially the acute respiratory infections like pneumonia. The type of plastic that is the major source of dioxin is PVC. WHO data compiled from thousands of cities, around 90% of all people breathe air contaminated with pollutant.

Animals are at risk

Thousands of whales, birds, seals and turtles are killed every year due to plastic bag litter in the marine environment. Plastic bags, once ingested, cannot be digested or passed by an animal and it stays in the gut.1 millionanimals are killed each year due to plastic trash in the ocean and in the landfills.

Climate change

"What does plastic pollution have to do with climate change? They both have their root in fossil fuels." - Anna Cummins, 5 Gyres Institute Human activity is the cause of climate change, which threatens the future generation. Plastic pollution and climate change are linked in a variety of ways, from air quality to ocean toxicity. Plastic contribute to eco-system disruption. Most direct emission come from the burning of fossil fuels. A smaller amount come from natural gas and petroleum systems.(e.g., **petroleum products used to make plastics**) "Considering the amounts

of plastic washing ashore on our coastlines our finding provides further evidence that we need to stop plastic production, especially single-use plastic," said David M Karl.

Is it Danger?

Plastic never goes away. It is a material made to last forever, because 33 percent of all plastic - water bottles, bags, cups, plates and straws - are used just once and thrown away. Plastic cannot biodegrade; it cracks down into smaller and smaller pieces. Plastic waste is one of the many types of wastes that take too long to decompose. Generally, plastic items can take up to 1000 years to decompose in landfills. But plastic bags that are accustomed in our everyday life take 10-1000 years to decompose, while plastic bottles can take 450 years or more. Is it not danger?

The time is taken by other waste items to decompose in landfills.

- Cigarette Butts: 10-12 years
- Monofilament Fishing Line: 600 years
- Rubber-Boot Sole: 50-80 years
- Foamed Plastic Cups: 50 years
- Leather shoes: 25-40 years
- Painted board: 13 years
- Milk Cartons: 5 years
- Plywood: 1-3 years
- Cotton Glove: 3 months
- Styrofoam: Does not biodegrade
- Nylon Fabric: 30-40 years
- Tin can: 50 years

Conclusion:

"Everything is related, and we human beings are united as brothers and sisters on a wonderful pilgrimage, woven together by the love of God has for each of his creatures and which also unites us in fond affection with brother sun, sister moon, brother river, and mother earth." Pope Francis, Laudato Si' (92). "We don't have a society if we destroy the environment"- Margret Mea. Therefore we the stewards of the creation need to give reverence for Life, reverence for Creation.

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ENVIRONMENTAL COMMITMENT OF TEACHERS TOWARDS PLASTIC FREE FUTURE

A. Sindhu Selvi

Abstract

The unlimited exploitation of nature by mankind for the sake of development has threatened the survival of not just human beings but also all other living organisms. So the need of the hour is to develop environmental ethics in students towards plastic free future. This necessitates the knowledge of our environment, the problems caused by plastic and the measures taken to protect the environment. This presentation give the need and the role of teachers towards plastic free future. It will also describe the current barriers advantages and the disadvantages of plastic free future.

Key Words: Polyethylene (PE), polypropylene(PP), Polyvinyl chloride(PVC)

Introduction

The surroundings in which an organization operates, including air, water, land, natural resources, flora, fauna, humans and their interralation is called the environment. Almost all traditions refer to our environment as "MOTHER NATURE". The word plastic comes from the Greek word plastikos, which means able to be shaped or molded. Plastic is any synthetic or semisynthetic organic polymer. The name "plastic" refers to the property of plasticity, which is the ability to deform without breaking.

Need

The need of plastic free future is to understand the adverse effect of the plastic waste incineration, to lantern about the effective transformation of plastic materials, to elaborate the impact of plastic waste on the environment, to emphasize the reduced use of plastic and the beneficial management of plastic waste to the students.

Types

There are two types of plastics. They are thermo set or thermosetting plastics and thermoplastics.

Thermoset or Thermosetting Plastics

Once cooled and hardened, these plastics retain their shapes, it cannot return to their original form. This type of plastic is hard and durable. It can be used for auto parts, aircraft parts and tires

Examples: polyurethanes, polyesters, epoxy resins and phenolic resins

Thermoplastics

The plastic is less rigid than thermosets. It soften upon heating and return to their original form. It can easily be molded and extruded into films, fibers and packaging.

Example: polyethylene (PE), polypropylene(PP), Polyvinyl chloride(PVC).

A. Sindhu Selvi, St. Ignatius college of Education, Palayamkottai.

Role of Teacher towards Plastic Free Future

It is the role of the teacher to create awareness about plastic pollution, to explain about the health effects caused by plastic pollution, to engage the students in identifying the alternate source for plastic, to provide necessary changes in the curriculum, and for being the role model for the students.

Plastic pollution – Awareness:

The teacher may teach their students about plastic its preparation and about the recycling of plastic. He/she may arrange for a rally on plastic awareness and conduct seminars and conferences regarding plastic free future.

Health Effects

The teacher may explain about the ill-effects of plastic waste incineration. During incineration poly vinyl chloride produces dioxin, a poisonous gas. Different health problems like irritation in the eye, vision failure, breathing difficulties, cancer, skin disease, gastrointestinal problems in animals are caused by toxic plastics.

Alternate Source

The alternate source of plastic such as metal bottles or glass with silicone, jute bags, stainless steel lunch box, silicone nipples of babies, reusable shopping bags, horsehair brushes to scrub, glass or stainless steel food containers, stainless steel straw, Bamboo or jute yoga mat can be used and the teacher may encourage the students to discover alternate source or techniques to degrade plastic waste.

Curriculum

The curriculum may include the following topics as environmental education, pollution –causes, effects and its control measures, waste management, recycling process, social issues, laws and act for environmental protection and environmental organizations to protect the environment.

Role Model

"Be that difference, which you want to make" role model is a person who you look up to and aspire to be like. They are someone you learn from and look to for guidance. Anybody can be a role model, but the most influential role models just happen to be teachers. The teachers should be the role model for the students to create a plastic free future.

Suggested Activities for Students

Join a group to study nature, such as WWF (World Wide Fund for Nature), begin reading newspapers articles and periodicals such as 'Down to earth', Sanctuary magazine, frequently visit environment websites, lobby for conserving resources by taking up the cause of environmental issues during discussion with friends and relatives, practice and promote issues such as saving paper, saving water, reducing the use of plastic, practicing the 3 Rs principle of reduce, reuse, recycle and proper waste disposal, join local movements that support activities such as saving trees, recycle waste, buy

environmentally friendly products, practice and promote good civic sense like disposal of waste in proper garbage cans, take part in events organised on World Environment Day, Wildlife week, visit a national park or sanctuary, discover alternate source for the plastic are the suggested activities for the students.

Conclusion

Making students to critically discuss and solve environmental issues allows for 21st Century Skills to be applied in an authentic and meaningful way. Students will learn firsthand from their peers how they are affecting their world and how they can be part of the solutions for present challenges as well as the ones they have yet to face. On a larger scale, when student voices work together to increase awareness in the community opportunities arise for the thinking of our youth to be heard and valued. If these ideals are the goals for the learning environment, creating a successful Plastic free future along with the students, may be the first step in the right direction.

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PLASTIC OCEAN

I.Muthu Mari

Abstract

Plastics now pollute all dimensions of our oceans from the sea surface to the seafloor on remote beaches and in Arctic sea ice. The impact ocean plastics have on marine species is well documented, but increasingly scientists are concerned about the potential threat of plastics to species at the top of the marine food chain. .Plastics are being used by people without knowing the toxic effects of plastic on human health and environment. Different human health problems like irritation in the eye, vision failure, breathing difficulties, respiratory problems, liver dysfunction, cancers, skin diseases, lungs problems, headache, dizziness, birth effect, reproductive, cardiovascular, genotoxic, and gastrointestinal causes for using toxic plastics. Plastics occur serious environment pollution such as soil pollution, water pollution, and air pollution. Application of proper rules and regulations for the production and use of plastics can reduce toxic effects of plastics on human health and environment.

Key words: Pollution,Environment

Introduction

"The tide of plastics entering the ocean can indeed, be reversed" said by Nicholas Mallos.

Plastic touches all of our lives, from the food packaging we by to the computers we work with and the cars we drive. \but many of the plastics you touch in your daily life are used only once and thrown away. So much of this plastic is ending up in the ocean that in just a few years, we might and up with a pound of plastic for every three pounds of fish in the sea. But the future of plastics on land. The flow of plastics into our environment has reached crisis proportions and the evidence is most clearly on display in or oceans. It is estimated that up to 12 million metric tons of plastic enters your ocean, each year.

Plastic Ocean

More than five trillion pieces of plastics are already floating in our oceans. Worldwide 73 percents of beach litter is plastic filters from cigarette butts, bottles, bottle caps, food wrappers, grocery bags, and polystyrene containers. World plastic production has increased exponentially from 2.3 million tons in 1950 to 162 million in 1993 to 48 million by 2015.

Meanwhile ocean plastic is estimated to kill millions of marine animals every year. Nearly 700 species, including endangered ones, are known to have been affected by it. Some are harmed visibly – strangled b abandoned fishing nets or discarded six pack rings. Many more are probably harmed invisibly. Marine species of all sizes, from zooplankton to whales, now ear microplastics, smaller than one-fifth of an inch across.

I.Muthu Mari, V.O.C.College of Education,Thoothukudi

On Hawaii's Big Island, on a beach that seemingly should have been pristine no paved road leads to it walked ankle deep through micro plastics. They crunched like Rice Krispies under my feet. After that I could understand why some people see ocean plastics as a looming catastrophe worth mentioning in the same breath as climate change. At a global summit in Nairobi last December the head of the United Nations Environment Programme spoke of and "ocean Armageddon"

Ocean Trash Effect the Health of Wildlife, People and Local Economics

Ocean trash effects the health of wildlife, people and local economics. Trash in the water and on the shore can be mistaken as food by wildlife, or entangle animals with lethal consequences. Plastics also attracts and concentrates others pollutants from surrounding seawater, posing a contamination risk to those species that then eat it. Scientists are studying the impacts off that contamination on fish and selfish and as well as the possible impact it a have on the human health as well. From plankton to whales, animals across ecosystems have been contaminated by plastics. Plastics has been found in 59% of the sea birds like albatross and pelicans, in 100% of sea turtle species, and more than 25% of fish sampled from seafood markets around the world.

Marine debris isn't an ocean problem-it's a problem. That means people are the solution. Ocean conservancy is committed to keeping our beaches and ocean trash free. Tackling the problem of the plastics in the ocean begins on the land. Reduction in plastics use especially of single use disposable products and the collections and recycling of plastics in developing countries can help to reduce the amount of plastics waste that enters the ocean.

PROBLEM WITH PLASTICS

Plastics has been found in more than 60% of all sea birds and in 100% of sea turtles species, that mistakes plastics for food. And when animals ingest plastics it can causes life-threatening problems, including reduced fitness, nutrient uptake and feeding efficiency- all vital for survival. Every year,8 million metric of plastics enter our ocean on top of the estimated 150 million metric tons that current circulate our marine environments. Weather by errant plastics bags or plastics straws winding their way into gutters or large amounts of mismanaged plastics wastes streaming from rapidly growing economics, that's like dumping one new York city garbage truck full of the plastics into the ocean ever minutes of every day of an entire year! And that much plastics is bound to have an impact on ocean ecosystems

PREVENTING -PLASTICS OCEAN

The oceans seams to fit this paradigm perfectly. The inherent fluid boundaries means that fish stocks, ocean plastics nutrients from agricultural runoff, and any Number of other things can easily move across international maritime boundaries. Furthermore, although the united nations convention on the law of the sea (UNCLOS) formalized a series of exclusive economics zones, (EEZ) that generally extend 2 nautical from coastal boundaries, a number of key EEZ boundaries are disputed. In the addition over 60% of

the oceans surface area is a grey zone with a limited governance framework and even less monitoring, known as the high seas.

We believe that the long term solution to plastics in our oceans is to transform the role that plastics in the world wide economy. But with 8 million metric tons dumped in the oceans every years the ocean can't wait for long terms solution, and we need to act now. Plastics production is expected to double over the next ten years, and we need to make sure the accompanying wave of plastics waste never reaches our oceans. By supporting the development of fundamental waste collection and management in countries with rapidly growing economics and increasing use of disposable plastics we can prevent the growing tide of plastics from entering the ocean now. Wastes management not only provides a critical mid term solution to the problem but it is also the co foundation which the longer term solution of a circular economy is built.

Steps to Prevent Plastics Ocean

Plastics of course, is uniquely problematic because it's biodegradable and therefore sticks around for a lot longer (like up to 1000 years longer) than others forms of trash. And we're not just taking about people dumping their garbage overboard around 80 percent of marine litter actually originates on land – either swept in from the coastline or carried to rivers form the streets during heavy rain via Storms drains and sewer overflows.

- Wean yourself off disposable plastics
- Stop buying plastics water bottles
- Boycott micro beads
- Support a bag tax or ban
- Purchase items second hand
- Recycle

Conclusion

"It's about people-people all over the world who care about the health of our planet and who put that care into action. It's about co operations and coalition sometimes betweens the unlikeliest of groups who, setting aside their differing viewpoints work together for a larger common goal."

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PLASTIC FREE INDIA

A.G.Blessy Joy Priscilla

Abstract

The Indian plastic industry provides employment to over four million people in approximately 30,000 processing and manufacturing units. On 27 March, the Union ministry of environment, forest and climate change amended the Plastic Waste Management Rules (2016). According to the amendment, manufacturers, suppliers, and sellers of plastic (and plastic products) across the nation will now be required to phase out, over a period of two years, all such products which have no alternative use or are non-recyclable and non-energy recoverable.

Key words: Recyclable, Environment

Introduction

The Indian plastic industry provides employment to over four million people in approximately 30,000 processing and manufacturing units. On 27 March, the Union ministry of environment, forest and climate change amended the Plastic Waste Management Rules (2016). According to the amendment, manufacturers, suppliers, and sellers of plastic (and plastic products) across the nation will now be required to phase out, over a period of two years, all such products which have no alternative use or are non-recyclable and non-energy recoverable. This move was preceded by a state-wide ban in Maharashtra on the manufacture, usage, sale (wholesale and retail), distribution, storage and import of plastic bags and all disposable products made out of plastic.

Why is Plastic Pollution a Problem?

Research has shown that the use of plastic bottles and containers is extremely dangerous. Having a hot food or water in a plastic vessel can lead to cancer. When the plastic is hot due to excessive sunlight or temperature, leakage of harmful chemical dioxin in it causes heavy damage to the body.

Plastic bags below 40 microns are not biodegradable: they sustain in the environment for ever. In addition to not being degraded for a long time, plastic causes many ill-effects, which are harmful to human health. For example, PVC, used in the manufacture of pipes, windows and doors, is made by polymerization of vinyl chloride. Chemicals used in its composition can cause cancer of the brain and liver. To make the packing of machines, extremely rigid polycarbonate plastic phosgene is obtained from saturating of the bisphenol compounds. These components generate highly toxic and humid gas. Formaldehyde is used in the manufacture of many types of plastic. This chemical can cause rashes on the skin. Staying in its touch for several days can lead to asthma and respiratory diseases.

A.G.Blessy Joy Priscilla, V.O.C.College of Education,Thoothukudi

Causes of Plastic Pollution

Although plastic-made goods are helpful in improving the quality of the lives of poor and middle-class people, at the same time, they are unaware of the threat posed by their continued use. Plastic has become an object which has started being used in the places of worship, kitchen, bathroom, sitting room and reading-rooms. Not only this, if we have to bring any item such as ration, fruits, vegetables, clothes, shoes, milk, yogurt, oil, ghee and fruit juice etc from the market, then polyethylene is widely used . In today's world, there is a lot of fast food which is also packed in polythene. Man is so accustomed to plastic that he has forgotten to use bags made of jute or clothes. The shopkeepers too keep every type of polythene bag, because the customer has made it compulsory to keep the poly. It was not so four to five decades ago when bags used to be made of clothes, jute or paper that were beneficial for the environment.

Plastic carry bags have created a major problem in modern civilization. Because of no concrete arrangement of their disposal, they pose a grave threat for the environment. Five to seven quintals of carry bags are sold even in a small town. The process of pollution starts when the carry bags are thrown in the form of wastes in the garbage after their use. Due to not being biodegradable, the plastic carry bags never rot or fade and become a threat to the environment. The carry bags hinder the process of photosynthesis of crops in agricultural fields.

Food and drugs wrapped in plastic packing makes it contaminated and spoils it by initiating a chemical process. The consumption of such food threatens human life as it leads to terrible diseases.

Effects of Plastic Pollution

Plastic pollution is a serious threat to the environment. The scientists have been warning about its adverse effects for years. The problem has been particularly grave that despite various widely-publicised cleanliness drives, nothing is untouched by the plastic waste, be it villages, towns, cities, metropolises, not even the country's capital, despite the fact that the use of polyethylene is prohibited. In this regard, the National Green Tribunal has time and again expressed strong displeasure. It has slammed the state governments on the indiscriminate use of plastic across the country.

Studies prove that aquatic creatures are not safe due to plastic waste. Hazardous elements like micro plastic are usually caused by the use of waste such as plastic bags, bottle lid, water flow in containers, emission of ultraviolet rays and large amounts of microbes used in cosmetics and toothpaste. Micro plastic absorbs dangerous chemicals, and when birds and fish eat it, it goes into their body. The latest study on the Arctic Sea proves that plastic will be more in the next three decades than the fishes or other aquatic species.

Solutions to Plastic Pollution

It is the duty of the society to live up to the saying that nature is the unique gift of God. Therefore, the people have to come forward to prevent the pollution caused by polyethylene, and everyone has to be involved in dealing with it at one's own level.

Whether it is children or elderly, men or women, educated or uneducated, rich or poor, urbanites or villagers, all have to work hard to get rid of the menace of plastic. When you go shopping in the market, then take a jute or bag made of clothes with you, and if the shopkeeper gives the poly bag, prevail upon him from offering it. If the consumers stop using it, then its need will decrease day by day and a time will come when polyethylene will be eliminated from the environment. The Government machinery too needs to close the units engaged in the manufacture of polyethylene.

One of the other solutions of plastic waste is its recycling. Recycling mean making things new from plastic by getting back plastics from plastic wastes. Plastic recycling was first done by a California firm in 1970. This firm created tiles for drainage from plastic spills and plastic bottles of milk. But the work of recycling of plastic has its limitations as the recycling process is quite expensive and fraught with the danger of emitting more pollution.

Conclusion

As a matter of fact, most of the plastic is biologically non-degradable. This is the main reason why the plastic garbage produced today will last for hundreds of thousands of years, which will continue to play with our lives and the environment. So, to reduce the plastic in the sea, we have to reduce its use on the earth. There is no exaggeration to say that we are living in the polyethylene or plastic era.. If we want to get rid of plastic in the future, it will be too late as by then the entire environment will become contaminated by it. So, the time is to act NOW.

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PLASTIC EFFECT ON HUMAN AND RECYCLING PLASTIC

B.Rajalakshmi

Abstract

Plastic is basically made of virgin materials and that is why it is very difficult to decompose. Even when it is disposed of in the landfills, plastic materials do not get decomposed and that is why plastic is considered to be a substance that is very harmful for humans as well as animals. There are various disadvantages of using plastic bags and plastic bottles that is why these days most people are considering recycling the plastic materials in order to save the precious natural resources that are wasted when new materials are created.

Key words: Landfills, Recycling

Introduction

Plastic pollution is the introduction of plastic products into the environment which then upset the existing ecosystems in different ways. These pollutants cause environmental degradation and also affect different living organisms and their habitats negatively. When plastic products accumulate in the environment, they begin to cause problems for wildlife, humans, and other living organisms. They create conditions that are not favorable for healthy living and proper growth. This is what is essentially referred to as plastic pollution.

Plastic Toxicity for Human Body

Plastics can be made of a selection of many different chemicals to improve its properties, to prevent degradation in the environment when exposed to light, humidity, temperature or microorganisms, to make it more or less flexible, to lessen flammability or to color it. Many of these substances are not bound to the chemical chain of the plastic, which means that they can migrate under different circumstances as small as a change in temperature or light. Toxic ingredients can evaporate into the air and be breathed in. They can readily absorb into the skin. And they can leach into food or drink and then be ingested. Breathing near plastic trash being burned, opening a new plastic item that releases a strong odor, applying body lotion, drinking hot coffee from a Styrofoam cup, reusing a water bottle, eating food microwaved in a plastic container, or that has been frozen in a plastic container or even food that has simply been stored in a while… any of these common practices allow chemicals from plastic to migrate easily into the body.

- **Plasticisers or Phthalates**, primarily used in PVC to make it flexible, these additives can be used in children's toys, flooring, clothes and a myriad of other everyday items.
- **Flame retardants**, used in electric and electronic equipment, upholstery and other items to provide fire safety benefits. Some of these substances have been banned by

B.Rajalakshmi, V.O.C.College of Education,Thoothukudi

the UN due to the detrimental effects they had to the environment and human health.

- **Bisphenol A**: A powerful endocrine disruptor An oft-cited early study from the scientific community showed that 95 percent of the over 2500 participants aged six and older in the United States had Bisphenol A, or BPA, a common chemical component in plastic, in their urine.

The endocrine system regulates a number of vital body functions including: Metabolism, heart rate, digestion, temperature, general mood, ability to sleep well, sexual function, fertility and reproduction, tissue development and function.

The list of other disorders widespread in society includes:

1.Osteoporosis,2.thyroid 3.cancer,hypo and hypertension,4. Addison's disease, 5.Cushing's syndrome, 6.low testosterone, 7.obesity

Cautious in its conclusions due the inability to find and test a baseline of humans who have not been exposed to plastics, but relying on studies of wildlife as well as epidemiological data indicating the alarming increase of endocrine-related diseases, the study concludes that "Together, the animal model data and human evidence support the idea that exposure to endocrine disrupting chemicals during fetal development and puberty plays a role in the increased incidences of reproductive diseases, endocrine-related cancers, behavioral and learning problems, including ADHD, infections, asthma, and perhaps obesity and diabetes in humans."

Plastic Recycling Techniques

Plastic recycling is a very beneficial technique not only for the humans but also for the natural stability of the earth. Recycling this material is very easy and the process can easily be carried out at home. So now let us discuss some efficient techniques of recycling the plastic products.

Dividing the plastic products: There are various different categories of the plastic materials therefore before you carry out the recycling process it is very important for you to divide them in different categories so that the procedure becomes easier for you. Once you have divided the materials and categorized them accordingly it would give you a better idea about the waste that should be decomposed and the ones that can be re-used for other purposes in your home.

Mechanical recycling: Mechanical recycling of the plastic products is a very efficient way through which you can recycle the products without any trouble. This method is gaining rapid popularity and most people use it for recycling their household plastic waste materials. This process involves the melting of plastic after which it is shredded and granulation is done for completing the process. Various trained personnel are employed for sorting out the different plastic matter in order to make the procedure easier. A variety of special high technology techniques are also being used these days with the help of which plastic can be sorted out in different categories. Some of the most

frequently used techniques and methods are infrared spectroscopy, electrostatics, fluorescence and the X-ray process.

Chemical recycling: This is another very efficient way of recycling the plastic products. This method is generally used for disposing off the waste materials that are in bulk. This method is a little different from the mechanical recycling process. The chemical technique involves breaking down of the polymers of the plastic in constituent monomers which can be further used in factories and big industries for the production of certain chemicals and petrochemical. More chemical recycling methods are being explored so that more and more plastic products can be recycled without any difficulties. It is capital incentive process that really requires a large quantity of plastic to be processed.

Cleaning the plastic products: Cleaning and removing the dirt from the plastic products is another very efficient way through which you can make the plastic reusable. While you are carrying out this task, you must make sure that each and every product that has to be recycled is cleaned in the most efficient manner otherwise the recycling process would not be completed properly. Ensure that you have removed every contaminant that might be left on the surface.

Squeeze the plastic products carefully: Before the plastic products are taken to the recycling station they would be properly squeezed and squashed so that any material that is left behind in the bottles or the back can come out. This process also helps in compressing the plastic materials and compressed products are very easy to recycle than the normal ones.

Conclusion

Thus, while tackling the issues related to environmental protection and cleanliness, we started with attack on symptoms rather than causes of pollution (Measurement of pollution and Treatment technologies). Then subsequently we gave stress on Environmental Impact Assessment (EIA) and could work on better planning and better control. And today we have started to attack the root cause of pollution - prevention of pollution. We are talking about clean technologies. We are aiming for biodegradable and ecofriendly products and processes. Bioplastics is only a part of the large efforts that we are determined to make. Bioplastics is a reality and is a practical truth. Our willingness and improvement in technologies will give it a wider success.

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TECHNIQUES USED IN WASTE DISPOSAL

M.ChithraaPriyadharshini

Abstract

Plastic is considered to be a substance that is very harmful for humans as well as animals. Plastic is basically made of virgin materials and that is why it is very difficult to decompose. Even when it is disposed of in the landfills, plastic materials do not get decomposed and that is why There are various disadvantages of using plastic bags and plastic bottles that is why these days most people are considering recycling the plastic materials in order to save the precious natural resources that are wasted when new materials are created.

Key words: Landfills, Plastics

Introduction

Plastic is basically made of virgin materials and that is why it is very difficult to decompose. Even when it is disposed of in the landfills, plastic materials do not get decomposed and that is why plastic is considered to be a substance that is very harmful for humans as well as animals. There are various disadvantages of using plastic bags and plastic bottles that is why these days most people are considering recycling the plastic materials in order to save the precious natural resources that are wasted when new materials are created.

Plastic Waste Collection Methods

Curbside Collection: The first, and most widely accessible, collection method is *curbside collection* (also known as kerbside collection) of recyclables. Curbside recycling programs are generally the most convenient for community residents to participate in and yield high recovery rates as a result.

Drop-off Recycling: The second collection method is known as *drop-off* recycling. In this method, containers for designated recyclable materials are placed at central collection locations throughout the community, such as parking lots, religious places, schools, malls or other civic associations.

Buy-back Centers: The last collection method employs the use of *buy-back* centers. Most buy-back recycling centers are operated by private companies and pay consumers for recyclable materials that are brought to them. Buy-back centers usually have purchasing specifications that require consumers to source separate recyclable materials brought for sale. These purchase specifications can greatly reduce contamination levels and allow the buy-back center to immediately begin processing the recyclables they purchase, while providing consumers with an economic incentive to comply with the specifications.

M.ChithraaPriyadharshini, V.O.C.College of Education,Thoothukudi

Plastic Waste Recycling Methods

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Methods of Plastic Waste Disposal

Landfilling:To be frank, all plastics can be disposed in landfills. However, landfilling is considered highly wasteful as it requires a vast amount of space and the chemical constituents and energy contained in plastic is lost (wasted) in this disposal route. In 2008, 29.2 million tons of plastic was disposed in landfills in the United States. In countries where landfills are poorly managed, plastic wastes can be easily blown into waterways or carried out to sea by flood water. In addition, when plastics decompose in landfills, they may leak pollutants (phthalates and bisphenol A) into the soil and surrounding environment.

Incineration: Plastics are derived from petroleum or natural gas, giving them a stored energy value higher than any other material commonly found in the waste stream. Incineration return some of the energy from plastic production. In fact, one pound of

plastic can generate as much energy as Wyoming coal and almost as much energy as fuel oil. However, plastic incineration tends to cause negative environment and health effects as hazardous substances may be released into the atmosphere in the process.

Recycling: Many plastics can be recycled. and the materials recovered can be given a second-life. However, this method is not fully utilized, due to difficulties with the collection and sorting of plastic waste. Many developing (and even some developed countries) have poor waste management facilities which often result in plastics (and other waste) being recklessly disposed into rivers and waterbodies. Even though recycling is the most effective way to deal with plastic waste, its effectiveness is highly depended on public awareness, economic viability, and the implementation of public infrastructures to make recycling more efficient (recycling bins, specialized waste collecting trucks).

Biodegradable Plastics: Biodegradable plastics are plastics that decompose by the action of living organisms. Biodegradable plastics have the potential to solve a number of waste-management issues, especially for disposable packaging that cannot be easily separated from organic waste. However, biodegradable plastics are not without controversy. Even though biodegradable plastics can be completely metabolize by organisms into carbon dioxide and water, there are allegations that Oxo-Biodegradable plastics may release metals into the environment.

Conclusion

Plastic does not decompose biologically, the amount of plastic waste in our surroundings is steadily increasing. More than 90% of the articles found on the sea beaches contain plastic. Plastic waste is often the most objectionable kind of litter and will be visible for months in landfill sites without degrading. This is an attempt to address the problem of plastic waste disposal and shortage of conventional fuel and thereby help in promotion of sustainable environment.

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PLASTIC TOXICITY FOR HUMAN HEALTH

G. Esakkilakshmi

Abstract

Plastics can be made of a selection of many different chemicals to improve its properties, to prevent degradation in the environment when exposed to light, humidity, temperature or microorganisms, to make it more or less flexible, to lessen flammability or to color it. Many of these substances are not bound to the chemical chain of the plastic, which means that they can migrate under different circumstances as small as a change in temperature or light. Toxic ingredients can evaporate into the air and be breathed in. They can readily absorb into the skin. And they can leach into food or drink and then be ingested.

Key words: Toxicity, Plastics

Introduction

Plastics can be made of a selection of many different chemicals to improve its properties, to prevent degradation in the environment when exposed to light, humidity, temperature or microorganisms, to make it more or less flexible, to lessen flammability or to color it. Many of these substances are not bound to the chemical chain of the plastic, which means that they can migrate under different circumstances as small as a change in temperature or light. Toxic ingredients can evaporate into the air and be breathed in. They can readily absorb into the skin. And they can leach into food or drink and then be ingested.

Plastic Toxicity for Human Body

Breathing near plastic trash being burned, opening a new plastic item that releases a strong odor, applying body lotion, drinking hot coffee from a Styrofoam cup [1], reusing a water bottle, eating food microwaved in a plastic container, or that has been frozen in a plastic container or even food that has simply been stored in a while... any of these common practices allow chemicals from plastic to migrate easily into the body. Plastic comes in many forms but there is general consensus that while a useful material, there are serious concerns about harmful effects of plastic on human health. The three most commonly cited plastic additives that have been linked to such diseases are:

- **BPA or Bisphenol A**, often used in food and beverages containers, such as water bottles. The EU has taken steps to ban the use of BPA in baby bottles and some EU member states have taken restrictions further.
- **Plasticisers or Phthalates**, primarily used in PVC to make it flexible, these additives can be used in children's toys, flooring, clothes and a myriad of other everyday items.
- **Flame retardants**, used in electric and electronic equipment, upholstery and other items to provide fire safety benefits. Some of these substances have been banned by the UN due to the detrimental effects they had to the environment and human health.

G. Esakkilakshmi, V.O.C.College of Education,Thoothukudi

- **Asthma causing phthalates**

BPA is not the only endocrine-disrupting chemical found to leach from plastics. Phthalates are plastic softeners that have also been finding their way into the human body. Phthalates are linked to: reproductive malformations, developmental disorders, pulmonary system effects including asthma and allergies, direct toxicity

Chemicals added to plastics are absorbed by human bodies. Some of these compounds have been found to alter hormones or have other potential human health effects. Plastic debris, laced with chemicals and often ingested by marine animals, can injure or poison wildlife. Many believe that paper bags are more environmentally friendly than plastic bags because they are made from a renewable resource, can biodegrade, and are recyclable. Fact: Plastic shopping bags outperform paper bags environmentally – on manufacturing, on reuse, and on solid waste volume and generation. Plastic bags pollute our land and water. Because they are so lightweight, plastic bags can travel long distances by wind and water. They litter our landscapes, get caught in fences and trees, float around in waterways, and can eventually make their way into the world's oceans. The plastic polymers are not regarded as toxic, but there may be toxic residual chemicals, chemical additives and degradation products in the plastic products that can leach out as they are not bound to the plastic polymer. Plastics also cause many waste problems. They undergo a process known as photo degradation, in which they break down into smaller and smaller toxic particles.

Plastic Threat to Human Health

FACT 1:

National Health and Nutrition Examination Survey produced by the US Centers for Disease Control and Prevention concluded that BPA was found in 93% of urine samples taken from people above the age of six.

FACT 2:

Bisphenol A also known as BPA, used to make billions of plastic beverage containers, dinnerware, protective linings of food cans and toys, is considered an endocrine disruptor, meaning it can both decrease or increase endocrine activity in humans and cause adverse health effects.

FACT 3 :

Based on the weight of existing evidence, it is likely that elevated urinary BPA levels are associated with prostate cancer in humans and may be an independent diagnostic marker in prostate cancer patients.

Some animal studies have indicated adverse effects of BPA on newborns and fetuses.

FACT 4:

Breast milk of most women in the developed world contains dozens of compounds including BPA that have been linked to negative health effects.

FACT 5:

Growing literature links many Phthalates, which are a group of chemicals used to make plastics more flexible and harder to break, with a variety of adverse outcomes including weight gain and insulin resistance, decreased levels of sex hormones, and other consequences for the human reproductive system both for females and males.

Conclusion

Sufficient information exists concerning the drivers of change in ecosystems, the consequences of changes in ecosystem services for human well-being, and the merits of various response options to enhance decision-making in support of sustainable development at all scales. However, many research needs and information gaps were identified in this assessment, and actions to address those needs could yield substantial benefits in the form of improved information for policy and action.

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MOVING TOWARDS PLASTIC FREE OCEAN

Stefi Clara

Abstract

"Moving to plastic free ocean" under this topic I have given introduction about what is plastic? And how plastic spoil ocean and water living organism. Then I have given a important causes of plastic pollution in ocean. Then I give some common effects by plastic and also I have mentioned some important effect in ocean. There is solution for everything so I have mentioned some ways to prevent ocean from plastic. Finally I have concluded that ocean pollution is not only a individual or one national problem it is global problem so we have responsibility for prevent ocean from pollution.

Introduction

Plastic pollution is the accumulation of plastic objects (e.g.: plastic bottles and much more) in the Earth's environment that adversely affects wildlife, wildlife habitat, and humans. Plastics that act as pollutants are categorized into micro-, meso-, or macro debris, based on size. Plastics are inexpensive and durable, and as a result levels of plastic production by humans are high. However, the chemical structure of most plastics renders them resistant to many natural processes of degradation and as a result they are slow to degrade. Together, these two factors have led to a high prominence of plastic pollution in the environment. Plastic pollution can afflict land, waterways and oceans. It is estimated that 1.1 to 8.8 million metric tons (MT) of plastic waste enters the ocean from costal communities each year.[1] Living organisms, particularly marine animals, can be harmed either by mechanical effects, such as entanglement in plastic objects or problems related to ingestion of plastic waste, or through exposure to chemicals within plastics that interfere with their physiology. Humans are also affected by plastic pollution, such as through disruption of various hormonal mechanisms.

Causes of Plastic Pollution: Plain Old Trash Plastic is everywhere, even on those items you may not expect it to be. Milk cartons are lined with plastic, water bottles are handed out everywhere, and some products may even contain tiny plastic beads. Every time one of these items gets thrown away or washed down a sink, the toxic pollutants have more of a chance to enter the environment and do harm. Trash dumps and landfills are unfortunate major problems, as they allow pollutants to enter the ground and affect wildlife and groundwater for years to come. **It is Overused** As plastic is less expensive, it is one of the most widely available and overused item in the world today. When disposed, it does not decompose easily and pollutes the land or air nearby when burned in the open air.

Fishing Nets Commercial fishing is an economic necessity for many parts of the world, and tons of people eat fish for their daily survival. However, this industry has helped contribute to the problem of plastics pollution in the oceans in several ways. The nets used for certain large-scale trolling operations are usually made of plastic.

Stefi Clara, V.O.C.College of Education,Thoothukudi

First, these spend long times submerged in water, leaking toxins at will, but they also often get broken up or lost, left to remain wherever they fall. This not only kills and harms local wildlife, but also ensures that pollutants enter the water and fish of the area.

Disposing of Plastic and Garbagethis may sound a bit confusing, but because plastic is meant to last, it is nearly impossible to break down. Burning plastic is incredibly toxic, and can lead to harmful atmospheric conditions and deadly illness. Therefore, if it is in a landfill, it will never stop releasing toxins in that area.

Effects of Plastic Marine Life

- **Garbage in the ocean** – namely plastic – jeopardises the natural ambience of marine life. It disrupts the entire bio-geo cycle causing unwanted problems to the whole marine eco-system. Plastic threatens the existence of life under water right from smaller fishes to huge mammals and amphibians in several ways. Reports say that around one million seabirds and 100,000 marine mammals are killed every due to plastic ingestion. Unfortunately, several marine species are on the verge of extinction because of such type of ocean pollution.
- **Consumption of plastic by marine creatures** causes severe digestive problems which go mainly untreated. Reports suggest that the consumption of plastic by all type of fish amounts to several of tonnes every year. In addition to causing intestinal injury and death of these fish, this also spread the risk across the food chain, to bigger fish and marine mammals.
- **Sea turtles are the other unfortunate victims** of plastic pollution in the waters, apart from fishes. Similar to fish and other marine beings, Sea turtles also consume plastic garbage as food, leading to blockage in the gut and ulceration, and eventually to death. Studies have found that half of the sea turtles around the world have ingested plastic.
- **Plastic waste in the oceans also threatens the life of birds** and other beings that depend on the oceanic life-forms for their food requirements. Most of the times, these beings suffer because of ingestion of plastic or because of suffocation, especially birds, by merely being tricked by the brighter colours of plastic junk. The birds also often get caught in the debris and end up dying due to suffocation. According to several kinds of research, 44% of all seabird species, along with cetaceans and sea turtle have been documented to have plastic debris in or even around their bodies.

Conclusion

As is commonly known, plastic isn't biodegradable, which accentuates the threat of lingering waste plastic for years and for generations to come. According to estimates, people around the world throw away almost four million tons of trash every day, of which 12.8% is plastic, polluting land, air and water. While plastic thrown into landfills contaminates the soil and groundwater with harmful chemicals and microorganisms, the effects of marine pollution caused by plastic are immeasurable.

In conclusion, the ocean pollution is a global problem in the world that suffered many organisms. It is important to think seriously to solve all pollution in the sea because it is a place to keep marine species survive, as they also consider one of the important sources for humanity .If ocean polluted and or contaminated, it will directly cause an adverse impact on human health and marine organisms as well as cause habitat destruction for marine organisms. So it is our responsibility to protect our ocean.

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A STUDY ON HAZARDOUS WASTE MANAGEMENT

Dr .P.KARPAGAM

Abstract

Hazardous Waste are solid, liquid or gas waste that may be deadly or harmful to people or the environment and tend to be persistent to people or environment and tend to be persistent to people or non-degradable in nature. Such waste include toxic chemicals and flammable or radioactive substances, including industrial waste from chemical plants or nuclear reactors, agricultural wastes such as pesticides and fertilizers, medical wastes and household hazardous wastes such as toxic paints and solvents. Hazard may be defined as "a dangerous condition or event, that threat or have the potential for causing injury to life or damage to property or the environment." One of the primary difficulties encountered by the government and industries engaged in hazardous waste control programs is to realistically define hazardous waste. Within different jurisdiction there have been multiply levels of sophistication in identifying hazardous waste.

Key Words

Hazardous, sedimentation

Four types of hazardous waste

- ignitability, or something flammable.
- corrosivity, or something that can rust or decompose.
- reactivity, or something explosive.
- toxicity, or something poisonous

Treatment, storage, and disposal

Several options are available for hazardous-waste management. The most desirable is to reduce the quantity of waste at its source or to recycle the materials for some other productive use. Nevertheless, while reduction and recycling are desirable options, they are not regarded as the final remedy to the problem of hazardous-waste disposal. There will always be a need for treatment and for storage or disposal of some amount of hazardous waste.

Treatment

i. Hazardous waste can be treated by chemical, thermal, biological, and physical methods. Chemical methods include ion exchange, precipitation reduction, and neutralization. Among thermal methods is high-temperature incineration, which not only can detoxify certain organic wastes but also can destroy them. Special types of thermal equipment are used for burning waste in either solid, liquid, or sludge form. These include the fluidized-bed incinerator, multiple-hearth furnace, rotary kiln, and liquid-injection incinerator. One problem posed by hazardous-waste incineration is the potential for air pollution.

Dr .P.KARPAGAM, Principal,
Sri Renugambal College of Education,Polur,Thiruvannamalai.

ii. Biological treatment of certain organic wastes, such as those from the petroleum industry, is also an option. One method used to treat hazardous waste biologically is called land farming. In this technique the waste is carefully mixed with surface soil on a suitable tract of land. Microbes that can metabolize the waste may be added, along with nutrients. In some cases a genetically engineered species of bacteria is used. Food or forage crops are not grown on the same site. Microbes can also be used for stabilizing hazardous wastes on previously contaminated sites; in that case the process is called bioremediation.

iii. The chemical, thermal, and biological treatment methods outlined above change the molecular form of the waste material. Physical treatment, on the other hand, concentrates, solidifies, or reduces the volume of the waste. Physical processes include evaporation, sedimentation, flotation, and filtration. Yet another process is solidification, which is achieved by encapsulating the waste in concrete, asphalt, or plastic. Encapsulation produces a solid mass of material that is resistant to leaching. Waste can also be mixed with lime, fly ash, and water to form a solid, cement like product.

SURFACE STORAGE AND LAND DISPOSAL

- Hazardous wastes that are not destroyed by incineration or other chemical processes need to be disposed of properly. For most such wastes, land disposal is the ultimate destination, although it is not an attractive practice, because of the inherent environmental risks involved. Two basic methods of land disposal include land filling and underground injection. Prior to land disposal, surface storage or containment systems are often employed as a temporary method.

- Temporary on-site waste storage facilities include open waste piles and ponds or lagoons. New waste piles must be carefully constructed over an impervious base and must comply with regulatory requirements similar to those for landfills. The piles must be protected from wind dispersion or erosion. If leach ate is generated, monitoring and control systems must be provided. Only non containerized solid, non flowing waste material can be stored in a new waste pile, and the material must be land filled when the size of the pile becomes unmanageable.

- A common type of temporary storage impoundment for hazardous liquid waste is an open pit or holding pond, called a lagoon. New lagoons must be lined with impervious clay soils and flexible membrane liners in order to protect groundwater. Leach ate collection systems must be installed between the liners, and groundwater monitoring wells are required. Except for some sedimentation, evaporation of volatile organics, and possibly some surface aeration, open lagoons provide no treatment of the waste. Accumulated sludge must be removed periodically and subjected to further handling as a hazardous waste.

SECURE LANDFILLS

- Land filling of hazardous solid or containerized waste is regulated more stringently than land filling of municipal solid waste. Hazardous wastes must be deposited in so-called secure landfills, which provide at least 3 meters (10 feet) of separation between the bottom of the landfill and the underlying bedrock.
- A secure hazardous-waste landfill must have two impermeable liners and leach ate collection systems. The double leach ate collection system consists of a network of perforated pipes placed above each liner. The upper system prevents the accumulation of leach ate trapped in the fill, and the lower serves as a backup. Collected leach ate is pumped to a treatment plant. In order to reduce the amount of leach ate in the fill and minimize the potential for environmental damage, an impermeable cap or cover is placed over a finished landfill.
- A groundwater monitoring system that includes a series of deep wells drilled in and around the site is also required. The wells allow a routine program of sampling and testing to detect any leaks or groundwater contamination. If a leak does occur, the wells can be pumped to intercept the polluted water and bring it to the surface for treatment
- One option for the disposal of liquid hazardous waste is deep-well injection, a procedure that involves pumping liquid waste through a steel casing into a porous layer of limestone or sandstone. High pressures are applied to force the liquid into the pores and fissure of the rock, where it is to be permanently stored.

THE HAZARDOUS WASTES (MANAGEMENT AND HANDLING) RULES, 1989

Hazardous Wastes Management they are following

- **ENVIRONMENTALLY SOUND MANAGEMENT OF HAZARDOUS WASTES:** taking all steps required to ensure that the hazardous wastes are managed in a manner which will protect health and the environment against the adverse effects.
- **HAZARDOUS WASTE:** any waste which by reason of any of its physical, chemical, reactive, toxic, flammable, explosive or corrosive characteristics causes danger or is likely to cause danger to health or environment.
- **RECYCLING OF WASTE OIL :** reclamation by way of treatment to separate solids and water from waste oils using methods such as heating, filtering, gravity, settling, centrifuging, dehydration, viscosity and specific gravity adjustment;
- **RE-REFINING OF USED OIL:** applying a process to the material composed of used oil so as to produce high quality base stock for further manufacture of lubricants or for other petroleum products by blending or any other process;

RESPONSIBILITY AND DUTIES OF THE OCCUPIER AND OPERATOR OF FACILITY FOR HANDLING OF THE WASTES

- ✓ The occupier and the operator of a facility shall be responsible for proper collection, reception, treatment, storage and disposal of hazardous wastes.
- ✓ The occupier or any other person acting on his behalf who intends to get his hazardous waste treated by the operator of a facility under sub-rule(1), shall give, to the operator of a facility, such information as may be specified by the State Pollution Control Board.
- ✓ It shall be the responsibility of the occupier and the operator of a facility, to take all steps to ensure that the wastes listed in schedules-1, 2 and 3 are properly handled, and disposed of without any adverse effects to the environment.
- ✓ Contain contaminants and prevent accidents and limit their consequences on human and the environment.
- ✓ Provide persons working on the site with information, training and equipment necessary to ensure their safety.

CONCLUSION

Prevention is better than cure, is an old saying which is very apt in the context of disaster management. Every year, colossal amounts of resources are used by our Government as well as aid agencies in relief and rehabilitation measures. Awareness and education is an important tool in creating this culture of prevention and preparedness. Government of India has been stressing the need to sensitize the young learners to the disaster management concept must include in the curriculum of all the classes and will also become part of our assessment system.

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SINGLE USE PLASTIC AND ITS EFFECT ON HUMAN HEALTH

A.Sahaya Teslin,

Sunita Kumari

Abstract

In the modern world plastic has become inseparably part and parcel of our lives. Humans have managed to dump tons upon tons of plastic everywhere that takes thousands of years to decay. Most of this cannot be recycled, reused and decomposed. We live in, use and throw culture where single use plastic plays a significant role. Single use plastics are known as plastics which are used only once. Therefore so much of accumulations of plastics we see in our surroundings. It hinders the human lives, plants, animals, ocean as well as whole of cosmic. Because of the chemical process used during plastic production, plastic have become potentially harmful effects on human health causing cancers, birth defects, impaired immunity and other health problems. Nowadays there is awareness among the people about the defects on plastics. Many attempts are taken to control the use of plastic in our day today life. It is our responsibility to reduce the use of plastic in one's life. When we have the opportunity, we should try to avoid buying products packaged in plastic.

Key words:

Single use plastic and human health

Introduction

Today, single use plastics are designed to be used just once, delivering benefits beyond convenience and cost savings. There are challenges when it comes to disposing of some single-use products. Many of them aren't designed to be reused, and because of their makeup, some can't be recycled. This means many people throw them in the garbage and don't bother to dispose them properly at all, and ultimately sending them into the environment, where they can harm plants and wildlife

Sunita Kumari ,

A.Sahaya Teslin

St.Ignatius college of Education.

Single use plastic

Single-use plastics, or disposable plastics, are used only once before they are thrown away or recycled. These items are things like plastic bags, plastic water bottles, coffee cups with plastic lids, plastic straws, coffee stirrers, soda and water bottles and most food packaging….. Additionally there are a limited number of items that recycled plastic can be used. Much of the single use plastic is thrown away within just a few minutes of its first use. When discarded in landfills or in the environment, plastic takes up to a thousand years to decompose. Single-use plastics have a high environmental impact. After incurring huge production and transportation costs they are used only once, mostly for a few minutes or seconds, and then thrown away.

Harmful Effects

- Plastic is a material made to last forever, yet 33 percent of all plastic - water bottles, bags and straws - are used just once and thrown away. Plastic cannot biodegrade; it breaks down into smaller and smaller pieces.

- Plastic threatens wildlife .Wildlife become entwined in plastic, they eat it or mistake it for food and feed it to their young, and it is found anguished in even extremely remote areas of the Earth.

- Plastic poisons our food chain. Even plankton, the tiniest creatures in our oceans, are eating micro plastics and absorbing their hazardous chemicals. The tiny, broken down pieces of plastic are displacing the algae needed to sustain larger sea life who feed on them.

- Everything suffers: tourism, recreation, and business, the health of humans, animals, fish and birds — because of plastic pollution. The financial damage continuously being inflicted is inestimable.

There are a few single-use products that can be easily discarded from our lives and replaced for reusable and durable products.

Plastic Bottles

Statistics show that worldwide, a minute. Plastic bottles are normally made from polyethylene terephthalate (PET), which is highly recyclable plastic. But when loose in the environment they could take about 400 years to degrade naturally. The problem is that consumption of plastic is increasing. It is estimated that in 2020 over 500 billion bottles will be sold in the world.

Easily reduce plastic bottle consumption by:

- Getting a reusable water bottle
- Drinking tap water when possible

Coffee Cups

Most of us like a coffee to get us up in the morning, and many of us will purchase one in a coffee shop to take away. Even if we only purchase one takeaway coffee a week, it is already 52 disposable cups going to waste every year. Technically, these cups are, in fact, recyclable. What makes it difficult to recycle them is that they are lined with polyethylene (a plastic) to be waterproof and contain the liquid. Take little more efforts to have something with you.

Plastic Bags

According to Environmental Protection Agency, around 500 billion to 1 trillion disposable shopping bags are used around the world each year. On average, a plastic bag is used for only 12 minutes, but it will stay in landfills, oceans and the environment for centuries.

While in the environment, these plastic bags can contaminate the water and land, kill wildlife, and gather rainwater, offering a perfect spot for mosquitoes that transmit diseases to reproduce. There are many alternatives to plastic shopping bags, like canvas bags, reusable bags, backpack, or even cardboard boxes. Try to always carry a reusable bag with you.

Human health hazard

Plastic affects human health. Toxic chemicals strain out of plastic and are found in the blood and tissue of nearly all of us. Contact to them is linked to cancers, birth defects, impaired immunity, endocrine disruption and other ailments.

Most of the plastics we use, we don't need, and our environment pays a high cost for that. Scientific research is not yet out, but we might be paying hugely with our own health.

For example, BPA which stands for bisphenol A. It is an industrial chemical that has been used to make certain plastics since the 1960s. It is used in the production of many plastics, from food containers, drinks bottles, infant feeding (baby) bottles, plates and mugs and storage containers BPA resulted in"increased mammary cancer. It is evident that the chemicals are not healthy for humans.

Dangers of thin plastics towards environmental degradation problems:

i. It blocks the open sewage system and results in stagnation of sewage paving way for the mosquitoes which leads to the spread of various diseases as well as causing flood.

ii. Plastic dumped on the soil prevents water percolation into the water table.

iii. It affects the very structure of soil.

vi. Cattle eat plastic and die as a result.

vii. Burning of plastics results in release of toxins in the atmosphere which, in turn, causes deadly Cancer.

Ways to reduce the single use plastic:

- Use neem stick instead of plastic brush
- Stop using plastic straws, even in restaurants. If a straw is a must, purchase a reusable stainless steel or glass straw
- Use a reusable produce bag. Purchase or make your own reusable produce bag and be sure to wash them often!
- Purchase food, like cornflakes, pasta, and rice from bulk bins and fill a reusable bag or container.
- Use matches instead of disposable plastic lighters or invest in a refillable metal lighter.
- Avoid buying frozen foods because their packaging is mostly plastic. They appear to be cardboard but coated in a thin layer of plastic.

- ❖ Prepare fresh squeezed juice or eat fruit instead of buying juice in plastic bottles. It's healthier and better for the environment.
- ❖ Have your own cleaning products that will be less toxic and eliminate the need for multiple plastic bottles of cleaner.

Responsibility of the individual:

- ❖ Let us consider how our grandparents could manage without using much of plastic in their day today life and could live a healthier life.
- ❖ We should recognize how this issue starts with the individual. By changing our life style we can solve this problem.
- ❖ Striving to get information about the use of plastic we should really all be involved though whatever professions we are, it is everyone's responsibility. Let's make these changes before it is too late.

Conclusion:

It's necessary to dispose of single-use plastics properly. Every person who selects single-use products has the obligation to make sure these items are recycled or disposed of in a trash. It is our responsibility to take care of the common home which is the wonderful gift from the Creator. If the same situation of accumulating the plastic continuous, our life span will be reduced and this will affect our future generation. Thus it is the need of our time to find means and ways to teach our students and children to reduce the use of plastic for better future.

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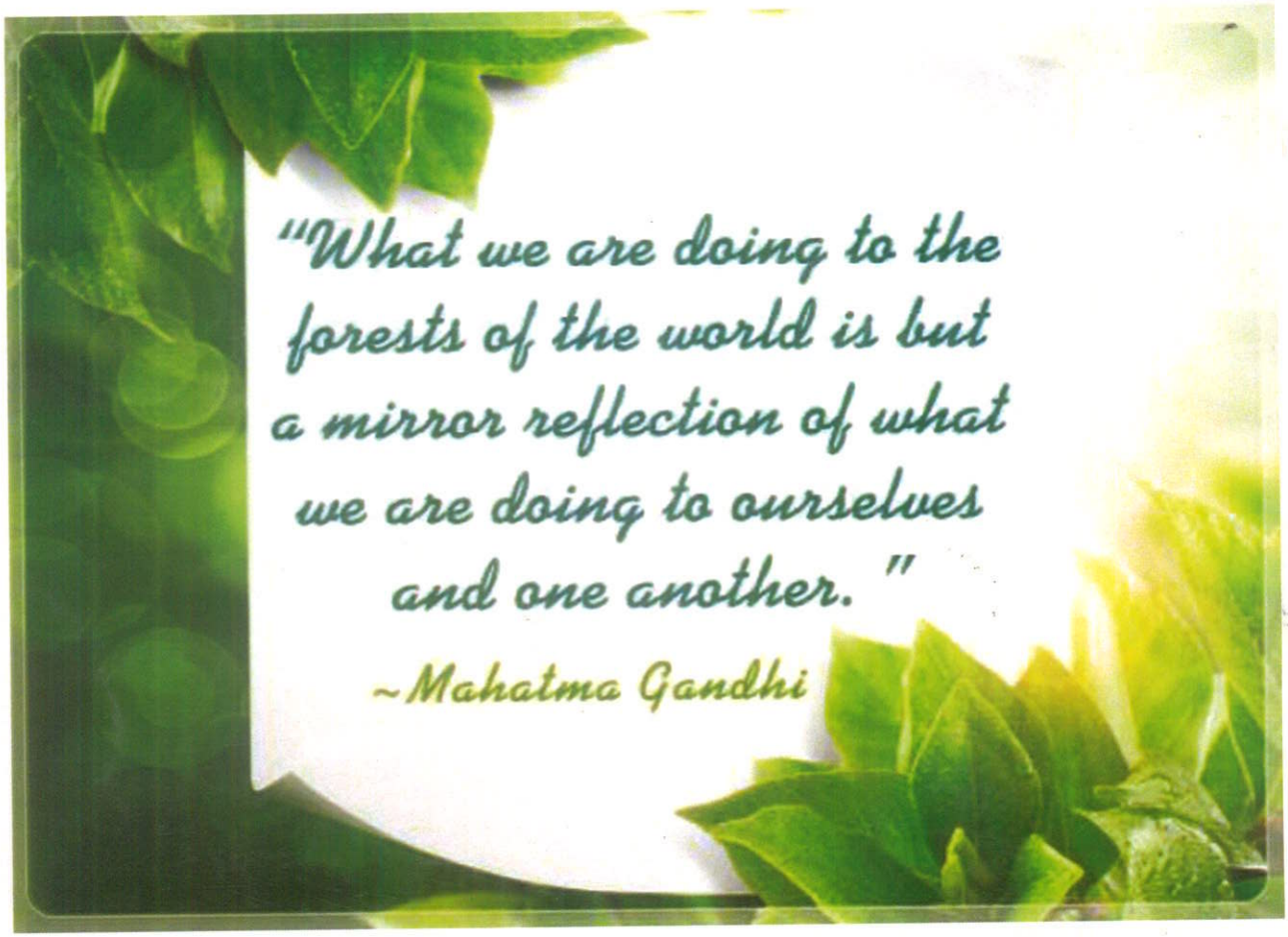

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Office : 0462 - 2560558, Cell : +91 94886 62905
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