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Original Research Paper

Social Work

SYNTHETIC FUTURE

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ABSTRACT No doubt the adverse effect of plastic is a global issue which threaten to entire living world. This paper tried to emphasise the different uses of plastic in very specific way with its adverse effect in more scientific manner though, most of researcher prioritised to only polythene which is a one of the single product of plastic.

KEYWORDS : Plastic, Polythene, Effects.

INTRODUCTION:

In the 21st century where man is reaching new heights of scientific research, development, and innovation, technology influences our thoughts and actions to a great degree.

Plastic is one of the major inventions of this age, and now is a time when we cannot imagine life without plastic, as similar to water and oxygen. The entire human society now is addicted to plastic as it is now an inevitable part of life. Although we are very well versed with the adverse effects of plastic, we are still reluctant to avoid it. If this addiction will continues, then the time is not far when we would be solely responsible for the total degradation and destruction of the environment around us.

DIFFERENT USE OF PLASTICs:

Below are seven of the most popular and commonly used plastics:
Acrylic or Polymethyl Methacrylate (PMMA)

- Polycarbonate (PC)
- Polyethylene (PE)
- Polypropylene (PP)
- Polyethylene Terephthalate (PETE or PET)
- Polyvinyl Chloride (PVC)
- Acrylonitrile-Butadiene-Styrene (ABS)

Let's take a look at each of these distinctive plastics in more detail.

Acrylic or Polymethyl Methacrylate (PMMA)

Well-known for its use in optical devices and products, acrylic is a transparent thermoplastic used as a lightweight, shatter-resistant alternative to glass. Acrylic is typically used in sheet form to create products such as acrylic mirrors and acrylic Plexiglas. This transparent plastic can be made colored and fluorescent, abrasion-resistant, bullet-resistant, UV-tolerant, anti-static and many more. In addition to being light weight than glass and polycarbonate sheeting, acrylic is seventeen times more impact resistant than glass, easier to handle and process, and has endless applications.

Polycarbonate (PC)

Tough, stable, and transparent, polycarbonate is an excellent engineering plastic that is as clear as glass and two hundred and fifty times stronger. Thirty times stronger than acrylic, clear polycarbonate sheets are also easily worked, molded, and thermo-formed or cold-formed. Although extremely strong and impact-resistant, polycarbonate plastic possesses inherent design flexibility. Unlike glass or acrylic, polycarbonate plastic sheets can be cut or cold-formed on site without pre-forming and fabrication. Polycarbonate plastic is in a wide variety of products including greenhouses, DVDs, sunglasses, etc.

Polyethylene (PE)

The most common plastic on earth, polyethylene can be manufactured in varying densities. Each different density of polyethylene gives the final plastic unique physical properties. As a result, polyethylene is in a wide variety of products.

Here are the four common polyethylene densities:

- Low-Density Polyethylene (LDPE)

This density of polyethylene is ductile and used to make products like shopping bags, plastic bags, clear food containers, disposable packaging, etc.

- Medium-Density Polyethylene (MDPE)

Possessing more polymer chains and, thus, greater density, MDPE is typically in gas pipes, shrink film, carrier bags, screw closures, and more.

- High-Density Polyethylene (HDPE)

More rigid than both LDPE and MDPE, HDPE plastic sheeting is in products such as plastic bottles, piping for water and sewer, snowboards, boats, and folding chairs.

- Ultra High Molecular Weight Polyethylene (UHMWPE)

UHMWPE is not much denser than HDPE. Compared to HDPE, this polyethylene plastic much more abrasion resistant due to the extreme length of its polymer chains. Possessing high density and low friction properties, UHMWPE is in military body armour, hydraulic seals and bearings, biomaterial for hip, knee, and spine implants, and artificial ice skating rinks.

Polypropylene (PP)

This plastic material is a thermoplastic polymer and the world's second-most widely produced synthetic plastic. Its widespread use and popularity are undoubted because polypropylene is one of the most flexible thermoplastics on the planet. Although PP is stronger than PE, it still retains flexibility. It will not crack under repeated stress. Durable, flexible, heat resistant, acid resistance, and cheap, polypropylene sheetsare used to make laboratory equipment, automotive parts, medical devices, and food containers.

Polyethylene Terephthalate (PETE or PET)

The most common thermoplastic resin of the polyester family, PET is the fourth-most produced synthetic plastic. Polyethylene Terephthalate has excellent chemical resistance to organic materials and water and is easily recyclable. It is practically shatterproof and possesses an impressive high strength to weight ratio. This plastic material is in fibres for clothing, containers for foods and liquid, glass fibre for engineering resins, carbon nano tubes, and many other products that we use on a daily basis.

Polyvinyl Chloride (PVC)

The third-most produced synthetic plastic polymer, PVC can be manufactured to possess rigid or flexible properties. It is well-

known for its ability to blend with other materials. For example, expanded PVC sheets are a foamed polyvinyl chloride material that is ideal products like kiosks, store displays, and exhibits. The rigid form of PVC is commonly in construction materials, doors, windows, bottles, non-food packaging, and more. With the addition of plasticizers such as phthalates, the softer and more flexible form of PVC is in plumbing products, electrical cable insulation, clothing, medical tubing, and other similar products.

Acrylonitrile-Butadiene-Styrene (ABS)

Created by polymerizing styrene and acrylonitrile in the presence of polybutadiene, ABS is robust, flexible, glossy, highly processable, and impact resistant. It can be manufactured in a range of thicknesses from 200 microns to 5mm with a maximum width of 1600mm. With a relatively low manufacturing cost, ABS plastic sheeting is typically used in the automotive and refrigeration industries but is also in products such as boxes, gauges, protective headgear, luggage, and children's toys.

EFFECTS OF PLASTIC ON ENVIRONMENT:

Toxic chemical released during manufacture of plastic is a significant cause of the negative environmental impact of plastics. A whole host of carcinogenic, neurotoxic, and hormone-disruptive chemicals are standard ingredients and waste products of plastic production, and they inevitably find their way into the ecology through water, land, and air pollution. Some of the more familiar compounds include vinyl chloride (in PVC), dioxins (in PVC), benzene (in polystyrene), phthalates and other plasticizers (in PVC and others), formaldehyde, and bisphenol-A, or BPA (in polycarbonate). Many of these are persistent organic pollutants (POPs)—some of the most damaging toxins on the planet. In this context, the effect of plastic on land and ocean are discussed in detail here.

Land:

Chlorinated plastics can release harmful chemicals into the surrounding soil, which can then seep into groundwater and other water sources. This can cause serious harm to the species that drink this water. Landfill areas are constantly piled high with many different types of plastics. In these landfills, there are many micro organisms, which speed up the biodegradation of plastics. Regarding biodegradable plastics, as they are broken down, methane is released, which a very powerful greenhouse gas that contributes significantly to global warming. Plastic bags are derived from petroleum and polyethylene. Petroleum is a non-renewable natural resource. Extracting petroleum causes damage to the environment while diminishing a natural resource. Polyethylene is extremely hazardous to make they also take approximately 450 years to decompose in water and 1,000 years to decompose on land.

Ocean:

The effects of plastic on the ocean present an obvious problem to aquatic habitat and life. As far as plastic entering the ocean, about 20% of the trash comes from ships and platforms that are offshore. The rest sources are from litter being blown into the sea, picked up by tides on the beach, or intentional garbage dumping. As these plastics don't biodegrade, chemicals in them are released into the water as well as the atmosphere and they break up into tiny pieces and then the fish easily become contaminated from the chemicals in the water. This is a direct link of how plastic chemicals enter the food chain. Another example is, as Styrofoam breaks into smaller parts, polystyrene components in it sink lower in the ocean, so that the pollutant spreads throughout the sea column.

Some plastics are produced with the assistance of a substance call Bisphenol, which is a synthetic chemical and can interfere with the regulation of both development and reproduction through its interaction with estrogens. 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, as humans ingest contaminated fish and mammals. This is resulting in impaired movement and feeding, reduced reproductive output, lacerations, ulcers and death. Plastic is killing more than 100,000 sea turtles and birds a year from ingestion and entanglement.

EFFECTS OF PLASTIC ON HUMANS

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

Bisphenol A:

Bisphenol 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. BPA has been recognized since the 1940s as an endocrine disrupting chemical that interferes with normal hormonal function. It is a hormone disrupter that is used to make polycarbonate plastic (hard clear plastic). Bisphenol A can be found in baby bottles, water bottles. Human exposure occurs primarily through ingestion: diet, sucking/mouthing plastics, and skin contact. There have also been studies that showed bisphenol 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, undescended testes, genital malformations, premature puberty, and development of some cancers. Another important chemical typically found in plastic items with a recyclable symbol number 3, is Polyvinyl Chloride (PVC) leaches the chemical phthalates out into the items/liquids within the containers. 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.

CONCLUSION:

In this growing and rapid developing world it's very difficult to stop the use of plastic in revolutionary way, but it can be possible by gradual and evolutionary process by using different BCC strategies which should be taken by government with collaborating civil societies, even government of India now decided to impose restriction on using of polyethylene at the same time the industrial sector should emphasis to produce eco friendly products which can be the best replacement of plastic products without hampering the need and routine life of common people.

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