



زانكۆی سه‌لاحه‌دین - هه‌ولێر
Salahaddin University-Erbil

Effects of Plastics on Human Health

Prepare by Sumaya Khalid Ismail
Supervised By Dr. Zhian Rashid Salih

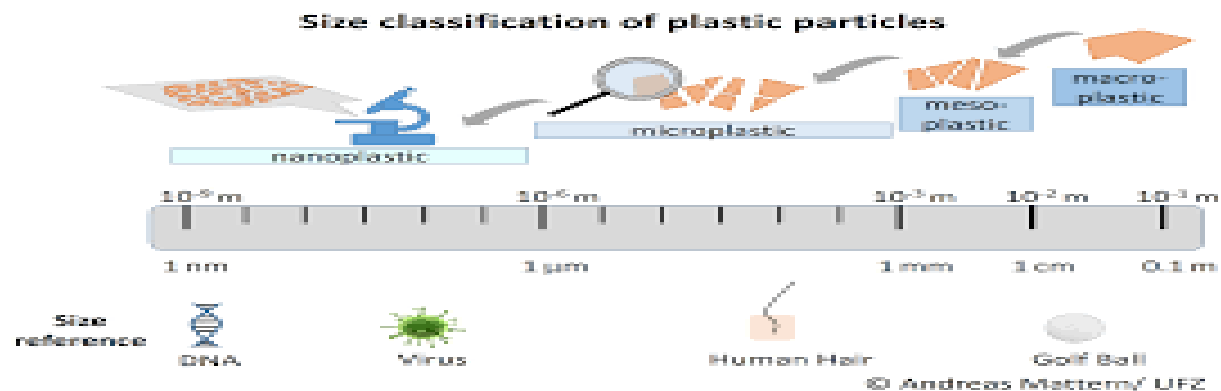
(April-2024)

- Since their invention in the 20th century, plastics have changed our lives, bringing many benefits
- the use of plastics in everyday life, commerce, and trade will not decrease because of their unique features such as relatively low cost, versatility, light weight, and recyclability.



- Plastics are organic polymeric materials consisting of giant organic molecules that can be formed into shapes by various processes, such as extrusion, molding, casting, or spinning.
- plastic generation doubled globally to 353million metric tonnes (Mt) between 2019 and 2000, the majority of post-usage plastic is landfilled (44%), much is mismanaged through open dumping or burning (22%), and only a small proportion (9%) is recycled .
- Uncontrolled disposal is expected to continue to rise until 2028, reaching 730million Mt of municipal solid waste (MSW) per year, while the new infrastructure like engineered landfills, incin- eration plants, recycling facilities and biological treatment plants, will rise only by 2% annually under an optimistic scenario that is not enough to cover the current and future demand of MSW treat- ment facilities .

- plastics adsorb chemical pollutants from the surrounding environment, which makes plastic a hub for toxic substances.
- Once disposed of, plastic waste is exposed to biological, chemical and environmental elements, and will break down into huge amounts of microplastics (measuring < 5 mm) and nanoplastics (<0.1 μm), As plastic pervades every aspect of life and then breaks down into smaller particles, the possible impacts of micro- and nanoplastics on the human body and the environment are of global concerns.



- Plastics pose potential risks to human health due to their monomeric building blocks, additives, or a combination of both. These include substances like Bisphenol A (BPA) .
- Various studies have discovered that BPA is linked to numerous health issues, including ovarian chromosomal damage, decreased sperm production, rapid puberty, rapid changes in the immune system, type-2 diabetes, cardiovascular disorders, and obesity, among others.
- The adverse effects of BPA on thyroid hormone action have very well been documented. BPA is produced in large amounts in each year. It leaches into food and water supplies, and humans are widely defenseless to it .
- Phthalates, which are diesters of phthalic acid, have been produced in large quantities since the 1930s and produced annually in quantities of 2 million tons.

- Both BPA and phthalates can enter the body of newborns through pregnancy and breastfeeding, posing potential harm.
- Phthalates, which are widely used in medical devices, is an example of a phthalate Similar to BPA, phthalates can cause hormonal imbalances, disrupting normal hormone function and daily activities. However, it is important to note that phthalates are slightly less harmful to humans compared to Phthalates.

BAP



Phthalate

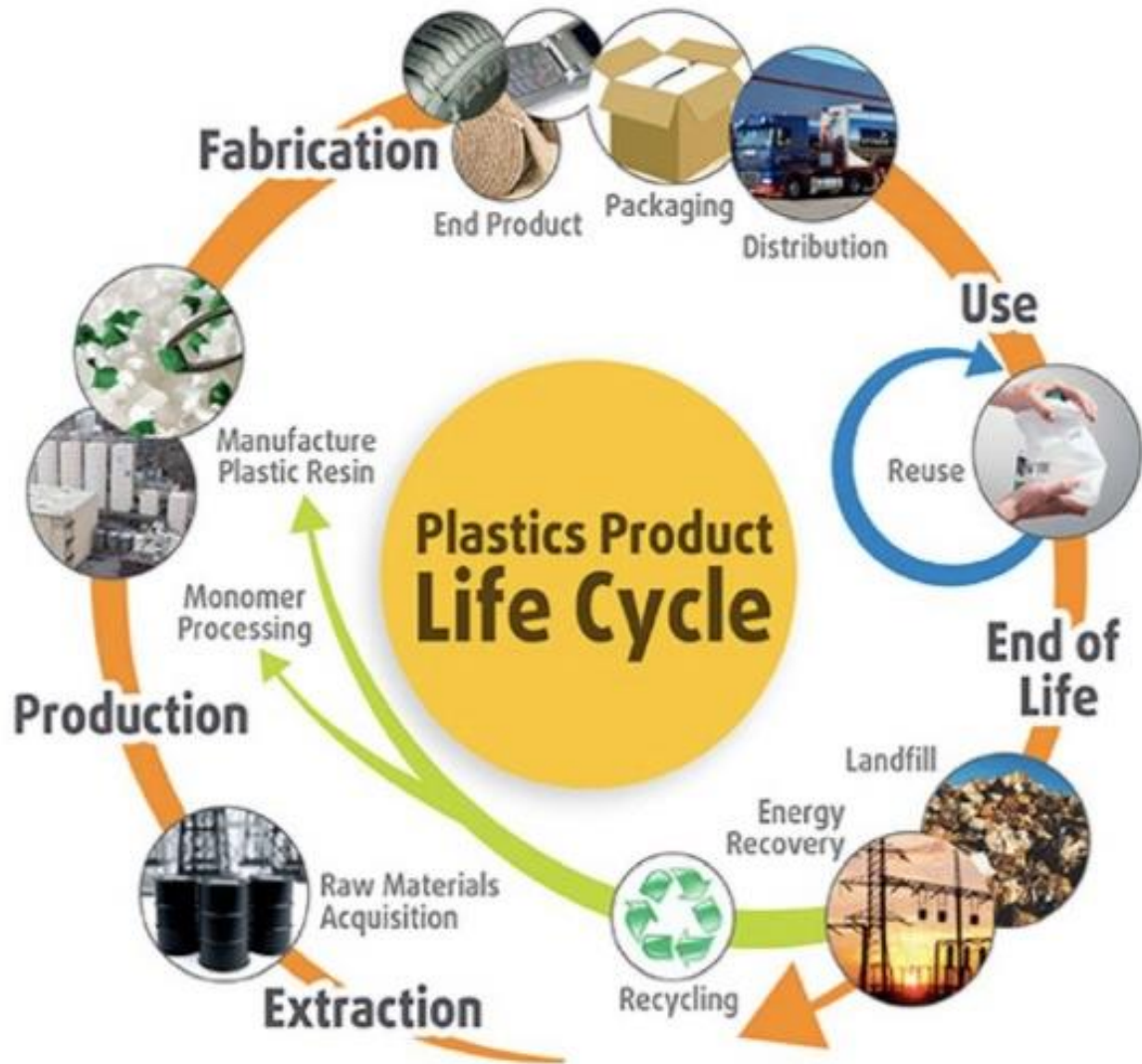


- This waste stream has significant adverse effects on the environment. Uncollected plastic waste is reported to block drains and waterways, causing flooding and water stagnation and resulting in outbreaks of waterborne diseases .
- On the other hand, plastics from landfills emit dangerous gases (methane and carbon dioxide) which contribute to climate change, while harmful chemicals leach into the soil and groundwater.
- Incineration causes air pollution, with the released carbon dioxide contributing to global warming.
- The heavy metals of cadmium and lead contained in the pigments used in the manufacture of plastic bags, and the antioxidants and stabilizers, are inorganic and organic chemicals that serve to protect the plastic against thermal decomposition during the manufacturing process.

- These industrial chemicals are thought to be a great source of atmospheric pollution since they are able to bond with other elements and form compounds such as chlorides, oxides, and sulfides all of which contribute to a considerable degree towards ozone destruction based on their varying proportions and depending on a range of factors .
- The effects of ozone depletion on health are due mainly to the increased action of ultraviolet B on the skin and eyes (box). Sunburn and snow blindness result from acute exposure to intense sunlight. Long term exposure to the sun is associated with skin cancer and cataract formation.
- poor waste management, have raised concerns about the depletion of fossil resources, the destruction of marine and terrestrial ecosystems, and climate change .

- carbon monoxide, dioxin, and hydrogen cyanide, which heavily pollute the air. The presence of these gases in high proportions poses a threat to the health of both humans and animals, potentially leading to respiratory diseases, nervous system disorders, and weakened immune systems.
- Landfill areas are home to a variety of plastic materials. Within these landfills, numerous microorganisms exist that accelerate the process of plastic biodegradation. These microorganisms consist of bacteria such as Pseudomonas, nylon-eating bacteria, and Flavobacteria. Through the action of the enzyme nylonase, these bacteria break down nylon. The breakdown of biodegradable plastics results in the release of methane, a potent greenhouse gas that significantly contributes to global warming.

- **There are three different kinds of plastics, according with the way in which their chains are bound, and so their properties differ.**
- *Elastomer*
- *Thermoset or Thermosetting plastics*
- *Thermoplastics*
- *Polyethylene terephthalates (PET or PETE)*
- *High density polyethylene*
- *Poly vinyl chloride (PVC)*
- *Polyethylene, LDPE and HDPE*
- *Polypropylene (PP)*
- *Polystyrene*
- *Other Plastics*
- *Microplastic*
- *Macro plastic*



- Management Techniques for Plastic Waste:
- 1.Landfills



Figure .Flowchart of plastic waste management from generation to landfill/shredding.

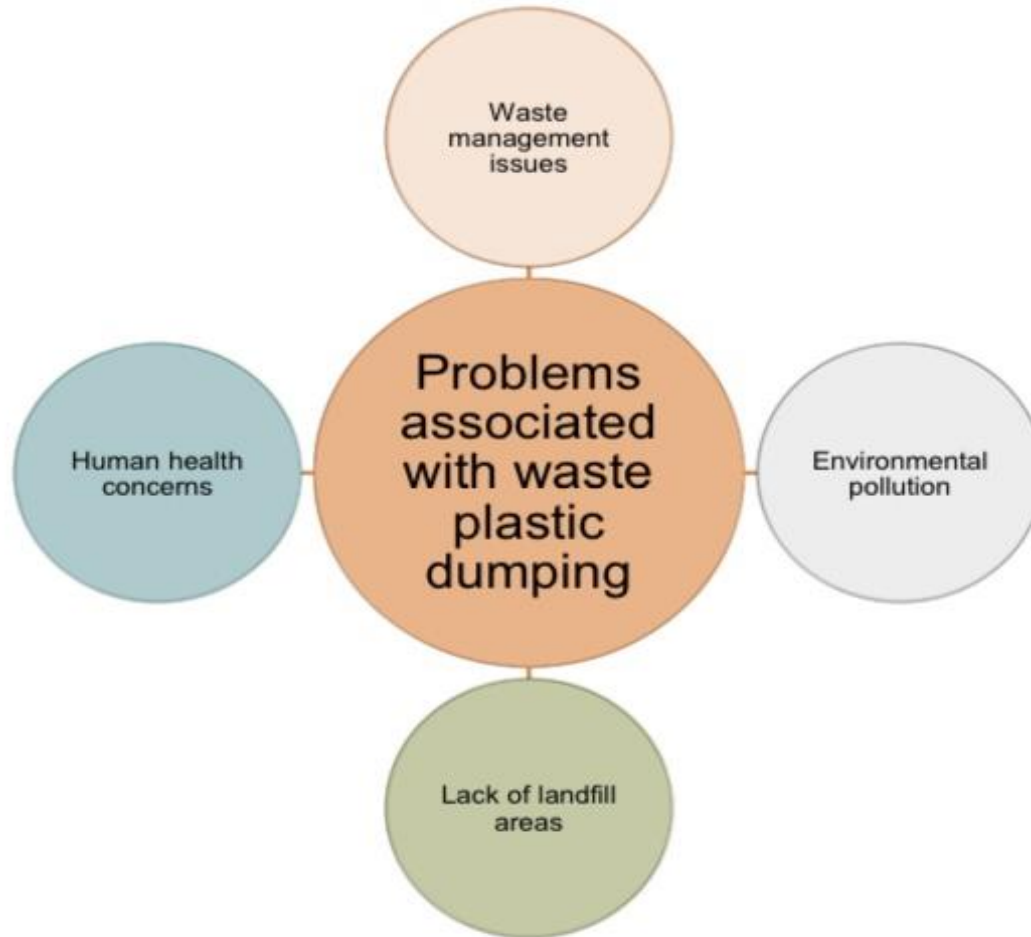


Figure .Disadvantages of plastic waste disposal in landfills.

- **2. Recycling**
- **3. Pyrolysis**
- **4. Liquefaction**
- **5. Road Construction and Tar**
- **6. Concrete Production**

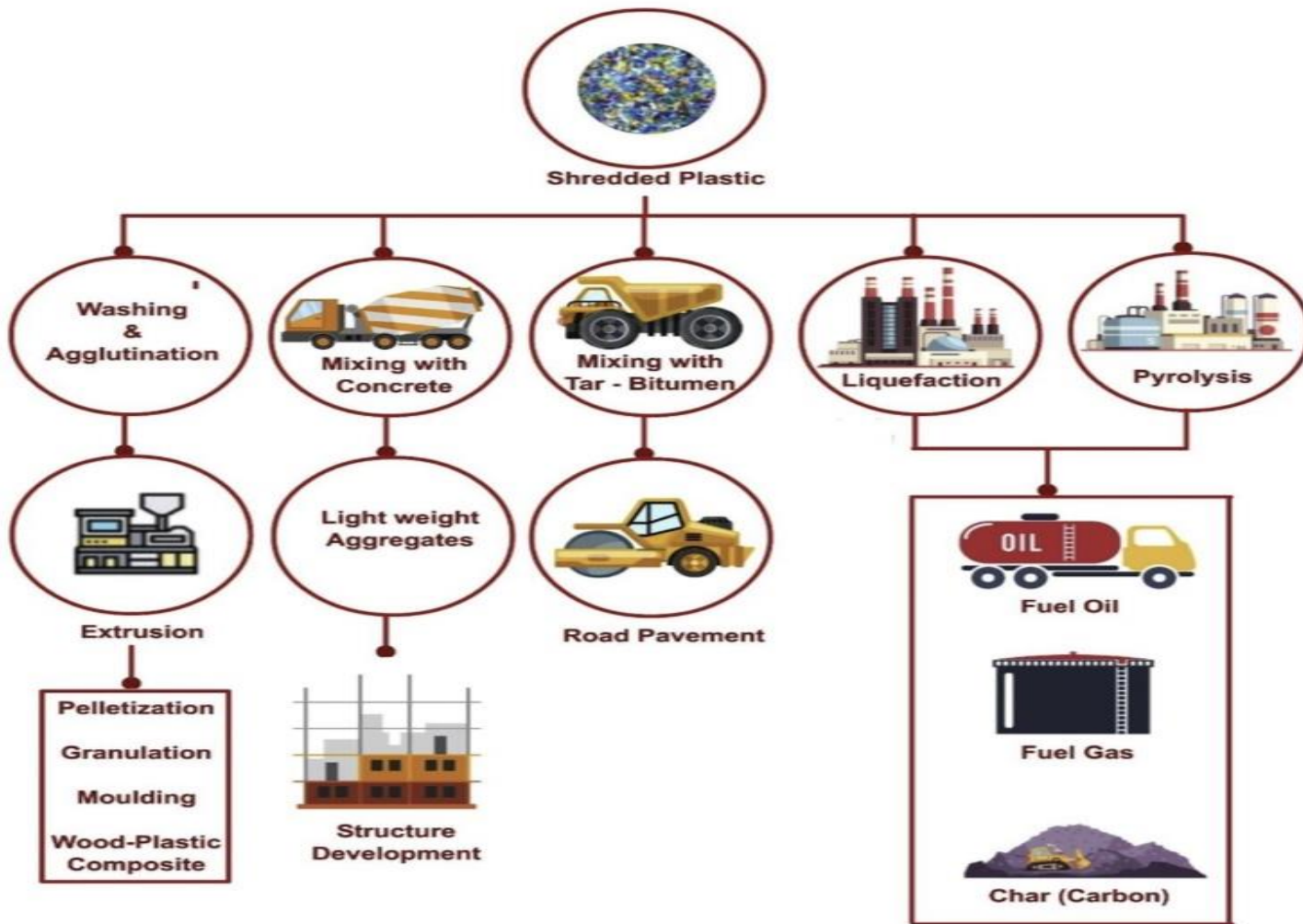


Figure .Flowchart of various management strategies for shredded plastic.

A purple rectangular tag with a hole on the left side is the central focus. The words "Thank you!" are written on it in a black, cursive font. The tag is placed on a light-colored wooden surface with a visible grain. Three white daisies with yellow centers are scattered around the tag: one in the foreground to the right, one in the background to the left, and one in the background to the right. A thin, light-colored string is looped around the tag and extends towards the top left corner of the image.

Thank
you!