

POLLUTION PROBLEMS ASSOCIATED WITH THE DISPOSAL OF PLASTICS

ПРОБЛЕМЫ УТИЛИЗАЦИИ ПЛАСТМАССЫ

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The tremendous amount of plastic used today creates waste disposal problems. The disposal of plastic waste by landfilling and incineration have both caused certain problems. As plastic are chemically tailored for long life, they do not generally undergo decomposition in landfill sites. Plastic waste can last for a long time, thus delaying the reuse of the landfill sites. Incineration of plastic waste produces air pollutants such as hydrogen chloride from polyvinyl chloride and other chlorine-containing polymers. The hydrogen chloride produced can cause acid rain which damages the environment.

Plastic waste in the sea poses direct danger to fishes. Small fishes have been found dead with their digestive tracts clogged by fragments of plastic foam they had ingested. Sea animals have been suffocated to death by plastic bags. The use of certain chemical such as plasticizers and chlorofluorocarbons in the manufacture of plastics leads to further ecological and environmental problems.

Plastic normally undergo extremely slow degradation because the enzyme in micro-organisms tend to attack only the ends of the polymer chains. Attempts have been made to develop plastic which are more degradable. There are several types of degradable plastics. They are biopolymers, photodegradable plastics and synthetic biodegradable plastics.

Biopolymers are polymers made by living micro-organisms such as paracoecus, bacillus and spirillum. Poly (hydroxylutyrate), PHB, is natural polyester made by certain bacteria. Micro-organisms found in soil and natural water sources are able to break down the polymer. Biodegradation of this polymer in the environment is usually complete within 9 months. PHB, however, is 15 times more expensive than poly (ethene).

Light-sensitive functional groups such as the carbonyl group ($-C=O$) can be incorporated into the polymer chains. The long polymer chains will be broken down through the action of sunlight into shorter fragments which can then be biodegraded at a faster rate.

Synthetic biodegradable plastics are made by incorporating starch or cellulose into the polymer during production. As micro-organisms digest starch or cellulose, the plastic is broken down into tiny pieces.

Since plastics are essentially derived from petroleum, which has limited reserves, disposal of plastics by landfilling or incineration is a waste of useful resources. Such wastage may be reduced

by recycling them into one form or another. This method applies only to thermoplastics. The plastics in the waste are separated, cleaned, pulverized, and remolded into new plastic items.