SYNTHETIC FIBRES AND PLASTICS

Rayon
Nylon
Polyester
Acrylic
Plastic

Biodegradable Vs Non-Biodegradable
Synthetic Fibres

Synthesis means to make and synthetic means man-made, so man made fibres are called synthetic fibres. A synthetic fibre is also a chain of small units joined together. Each small unit is actually a chemical substance. Many such small units combine to form a large single unit called a polymer. The word 'polymer' comes from two Greek words; poly meaning many and mer meaning part/unit. So, a polymer is made of many repeating units.

Types of Synthetic Fibres

A). Rayon

Towards the end of the nineteenth century, scientists were successful in obtaining a fibre having properties similar to that of silk. Such a fibre was obtained by chemical treatment of wood pulp. This fibre was called rayon or artificial silk. Although rayon is obtained from a natural source, wood pulp, yet it is a man-made fibre. It is cheaper than silk and can be woven like silk fibres. It can also be dyed in a wide variety of colours. Rayon is mixed with cotton to make bed sheets or mixed with wool to make carpets.

B). Nylon

Nylon is another man-made fibre. In 1931, it was made without using any natural raw material (from plant or animal). It was prepared from coal, water and air. It was the first fully synthetic fibre.

Nylon fibre was strong, elastic and light. It was lustrous and easy to wash. So, it became very popular for making clothes.

We use many articles made from nylon, such as socks, ropes, tents, toothbrushes, car seat belts, sleeping bags, curtains etc.

Nylon is also used for making parachutes and ropes for rock climbing. A nylon thread is actually stronger than a steel wire.

C). Polyester and Acrylic

Polyester is another synthetic fibre. Fabric made from this fibre does not get wrinkled easily. It remains crisp and is easy to wash. So, it is quite suitable for making dress material. Terylene is popular polyester. It can be drawn into very fine fibres that can be woven like any other yarn.

PET is a very familiar form of polyester. It is used for making bottles, utensils, films, wires and many other useful products.

We wear sweaters and use shawls or blankets in the winter. Many of these are actually not made from natural wool, though they appear to resemble wool. These are prepared from another type of synthetic fibre called acrylic. The wool obtained
from natural sources is quite expensive, whereas clothes made from acrylic are relatively cheap. They are available in a variety of colours. Synthetic fibres are more durable and affordable which makes them more popular than natural fibres.

**Characteristics of Synthetic Fibres**

Synthetic fibres possess unique characteristics which make them popular dress materials. They dry up quickly, are durable, less expensive, readily available and easy to maintain.

**Plastics**

Plastic is also a polymer like the synthetic fibre. All plastics do not have the same type of arrangement of units. In some it is linear, whereas in others it is cross linked. Plastic articles are available in all possible shapes and sizes. The fact is that plastic is easily mouldable i.e. can be shaped in any form. Plastic can be recycled, reused, coloured, melted, rolled into sheets or made into wires. That is why it finds such a variety of uses.

Some plastic articles can bend easily while some break when forced to bend. When we add hot water to a plastic bottle, it gets deformed. Such plastic which gets deformed easily on heating and can be bent easily are known as **thermoplastics**. Polythene and PVC are some of the examples of thermoplastics. These are used for manufacturing toys, combs and various types of containers.

On the other hand, there are some plastics which when moulded once, can not be softened by heating. These are called **thermosetting** plastics. Two examples are bakelite and melamine. Bakelite is a poor conductor of heat and electricity. It is used for making electrical switches, handles of various utensils, etc. Melamine is a versatile material. It resists fire and can tolerate heat better than other plastics. It is used for making floor tiles, kitchenware and fabrics which resist fire.

The characteristic properties of plastics.

**A). Plastic is non-reactive**

We know that metals like iron get rusted when left exposed to moisture and air. But plastics do not react with water and air. They are not corroded easily. That is why they are used to store various kinds of material, including many chemicals.

**B). Plastic is light, strong and durable**

Since plastic is very light, strong, and durable and can be moulded into different shapes and sizes, it is used for various purposes. Plastics are generally cheaper than metals. They are widely used in industry and for household articles.
C). Plastics are poor conductors

Plastics are poor conductors of heat and electricity. That is why electrical wires have plastic covering, and handles of screw drivers are made of plastic.

Plastics and the Environment

A material which gets decomposed through natural processes, such as action by bacteria, is called **biodegradable**. A material which is not easily decomposed by natural processes is termed as **non-biodegradable**.

Since plastic takes several years to decompose, it is not environment friendly. It causes environmental pollution. Besides, the burning process in the synthetic material is quite slow and it does not get completely burnt easily. In the process it releases lots of poisonous fumes into the atmosphere causing air pollution.

<table>
<thead>
<tr>
<th>Type of waste</th>
<th>Approximate time taken to degenerate</th>
<th>Nature of material</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peels of vegetable and fruits, leftover foodstuff, etc.</td>
<td>1 to 2 weeks.</td>
<td>Biodegradable</td>
</tr>
<tr>
<td>Paper</td>
<td>10–30 days</td>
<td>Biodegradable</td>
</tr>
<tr>
<td>Cotton cloth</td>
<td>2 to 5 months</td>
<td>Biodegradable</td>
</tr>
<tr>
<td>Wood</td>
<td>10 to 15 years</td>
<td>Biodegradable</td>
</tr>
<tr>
<td>Woollen clothes</td>
<td>About a year</td>
<td>Biodegradable</td>
</tr>
<tr>
<td>Tin, aluminums, and other metal cans</td>
<td>100 to 500 years</td>
<td>Non-biodegradable</td>
</tr>
<tr>
<td>Plastic bags</td>
<td>Several years</td>
<td>Non-biodegradable</td>
</tr>
</tbody>
</table>