
Degradable plastics – information sheet

UK plastic facts:

- We produce three million tonnes of plastic each year
- Households are the biggest producers of plastic waste
- 60 % of household waste comes from packaging
- More than 80 % of this plastic is used once and then goes to landfill sites
- Only 7 % of plastic is recycled.

In addition to household waste, there is also the issue of plastic litter (mainly packaging) which is discarded in the environment. On land it is ugly but in the sea it can be deadly – it can cause injury and death to birds, fish and other sea creatures. Given all this, it is not surprising that people are concerned about plastic waste and are increasingly looking to scientists to produce a degradable plastic to help solve the problem. However, there is much debate among scientists and environmentalists as to whether degradable or non-degradable plastic is better for the environment. The conclusions drawn by researchers studying this topic are not always what you might expect. To understand fully the effect a product has on the environment it is necessary to carry out a 'life cycle analysis,' which means looking at the impacts of production, use and disposal of the product.

There are two kinds of degradable plastic: photodegradable and biodegradable.

Photodegradable plastic is usually made of oil-based polymers, just like ordinary plastic. It either has bonds in its structure that can be weakened and broken by sunlight, or it contains a chemical additive which absorbs light and then attacks the polymer and breaks some of the bonds. Once a photodegradable plastic is exposed to light it begins to break down – whether you want it to or not. This can be disastrous if it is mixed in with other plastics during recycling. Photodegradable plastics tend to break down into small particles of plastic rather than decomposing completely. The idea is that these small pieces will then biodegrade. Unfortunately, they are often not biodegradable and so remain in the environment. The effect that a build-up of small pieces of plastic in the soil might have on the environment has not been investigated. At present, most plastic waste ends up in a landfill site where it is buried in a dark hole in the ground. Under these conditions, photodegradation cannot take place.

Biodegradable plastics can be made from oil or from plant-based products. They are attacked by bacteria, fungi or other micro-organisms which use them as food. The most commonly used plastics have been tested to find out whether they are biodegradable. Polythene is biodegradable as long as its chains have a molecular weight of less than 500; most other polymers are not. Polyesters are susceptible to biodegradation but they are used very little in packaging materials. As the majority of plastic waste is from packaging, using polyesters will not really help solve either the problem of the large quantity of waste produced or that of litter in the environment.

There is a lot of interest in the idea of making a plastic that can biodegrade in a landfill site. Unfortunately, once a landfill is covered with soil, there is limited oxygen and water available (the conditions are said to be 'anaerobic') and the rate of degradation of all materials (even those that biodegrade rapidly on the surface) becomes extremely slow. Discarded food has been found in landfill sites several years after it was thrown away.

With this in mind, the British Plastics Federation (a trade association of plastics manufacturers) opposes degradable plastics on the grounds that plastic waste is best recycled. The environmental pressure group 'Friends of the Earth' agrees, arguing that degradable plastic does nothing to promote lasting solutions to plastic waste and that we should be aiming to reduce the amount of plastic we use in the first place and reuse or recycle what we do use.

For further information you could try looking at:

<http://www.co-op.co.uk/> – type 'consumer issues' into the search facility then click on 'Consumer issues index page.'

<http://www.foe.co.uk/resource/factsheets/plastics.pdf> – this link goes directly to a pdf file. Alternatively, go to <http://www.foe.co.uk> and type 'plastics' into the search facility.

<http://www.degradable.net/> – this company sells degradable bags and chemicals that can be added to plastic bags to make them degradable.

<http://www.guardian.co.uk/supermarkets/story/0,12784,1274047,00.html> – a newspaper story on degradable bags.

(All sites accessed December 2005.)