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Green plastic: An Introduction to the new science of biodegradable plastic

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ABSTRACT

Plastic have transformed everyday life, usage is increasing and annual production is likely to exceed 300 million tonnes by 2010.In this concluding paper to the theme issue on plastic. The environment and human health, we synthesize current understanding of the benefits and concerns surrounding the use of plastic and look to the future priorities, challenges and opportunities. It is evident that plastic bring many societal benefits and offer future technological and medical advances. Bio plastic made from natural materials such as corn starch. Biodegradable plastics made from traditional petrochemicals, which are engineered to break down more quickly. Eco/recycled plastic, which are simply plastic made from recycled plastic materials rather than raw petrochemicals.

Plastic are everywhere bags, bankcards, bottles and even boats can all be made of this celebrated but much-maligned materials. Yet most of us know next to nothing about plastic. We do not know that they are practical and cheap but they also represent a huge environmental problem, for they literally take ages to decompose. In this engaging book, E.S. Stevens tells us everything .We have always wondered about plastics and of the efforts, in America, Europe, and Asia, to develop a new breed of environmentally friendly plastic. Biodegradable plastics are plastic that decompose by the action of living organisms, usually bacteria. Two basic classes of biodegradable plastics exist. Bio plastic whose components are derived from petrochemicals containing biodegradable additives which enhance biodegradation. It is important to understand the nature of plastic, and the consequences of their production and use. Virtually all plastics are made from non-renewable resources, such as oil, coal or natural gas, which will eventually become exhausted.

Plastic waste is increasing addicting to the already burdensome problems of waste management. And the use of plastics continues to grow, raising the important question: How can we balance convenient living with concern for ecology? To understand this concern, it is helpful to understand what plastic are?

Green plastics are the focus of an emerging industry focused on making convenient living constituent with environmental stability .One reason to make a shift toward the use of green plastic is the availability of raw materials. Green plastics can be made using polymer that come from agriculture and marine feed stocks. Favourable property of green plastics is their biodegradability, making them a natural material for use in such applications as compostable collection bags, such as for food or yard waste. The biodegradability of plastic-and bio plastic in particular is addressed in detail. Bio degradability is a property of a certain synthetic plastic (especially those with oxygen molecules in the polymer chain), but it is one of the biggest selling points of bio plastic, in which biodegradability is very to achieve, biodegradation is particularly important for such application as six-pack rings that decompose in sea water and agricultural row-crop mulches that break-down in soil but biodegradability is a two edged sword, since breaking down too rapidly compromises performance.

Biodegradable plastics are made of normal (petrochemicals) plastics and do not always break down into harmless substances: Sometimes they leave behind a toxic residue and that makes them generally (but not always) unsuitable for composting. Most of plastic is non biodegradable and so it is very harmful and big issue for the society .Cater pillar is searching it's food near the honeycomb and it has the capacity to digest plastic as like a honey and it is first found in forest area of the Europe. First time spenish scientists found it, when these scientists keep it in plastic bag accidently they observed that some holes in the plastic bag. Then they developed a new types of cater pillar known as " Galaria Malonella", with the help of Institute of biomedicine and biotechnology (Catabria. Spain) and Department of biochemistry (Cambridge University). They kept the cater pillar in plastic bag and found some surprising results, there are some holes in this plastic bag and cater pillar used plastic, 92 mg in 12 hours as a food. During this experiment which plastic was used it is after known as "Cater pillar plastic".

METHODS AND MATERIALS

Researchers have invented several different types of plastic and variety of manufacturing methods.

Polyhydroxy alkonoates (PHAS)

PHAs are biodegradable thermoplastic that are synthesized are many different types of bacteria. When bacteria develop in nutrient deficient environment, bacteria create PHAs as food and energy reserves, which are then stored as in soluble granules in the cytoplasm (2,3).

Depending on their molecular composition, PHAs have varying physical properties but all PHAs biodegradable in carbon dioxide and water. But PHAs had high production costs, low yields and limited availability.

Polylactide (PLA)

Another popular biodegradable plastic is polylactide or PLA. PLA is synthetic polyester that biodegrades within a year, decaying mach faster than conventional petroleum based plastic. The creation of PLA involves bacterial fermentation, similar to the fermentation in the synthesis of PHAs. This fermentation creates lactic acid which is then polymerised. Manufactures use PLA because its method of synthesis is more economical than the synthesis of other biodegradable plastic.

Cellulose Acetate (CA)

Biodegradable plastic based on cellulose acetate were studied and the produced plastic decomposed in soil or water within a few years. However the material can be recycled also or incinerated without residue. There were studies of the important properties of CA including mechanical strength, impact resistance, transparency, colourability, fabricating versatility.

CONCLUSION

Biodegradable polymers will play a greater role in the packaging sector in the future .Post – use biodegradable plastics and other biowastes like paper, food and garden waste are generally unsuitable for landfill due to their potential to release methane under an aerobic conditions and their disposal by this method is inconsistent with policies like the EU Landfill directive.

Biodegradable bioplastics are most suitable for biological waste treatment through industrial and or domestic composting and subject to further demonstration, potentially in anaerobic digestion systems. Biodegradable plastics offer a promising alternative to petroleum based plastics. While petroleum based products use oil in their manufacturing and take up space in landfills, biodegradable plastics can be synthesized in bacteria or plants and have the potential to be disposed of in a way that is less damaging to the environment. Biodegradable plastics have a variety of applications from agriculture and food packaging to biomedical devices and tableware. The major obstacle to replacing petroleum based plastics with the biodegradable plastics is high costs and low yields associated with existing methods of biodegradable plastic production. The last obstacle to surmount is the proper disposal of biodegradable plastic. In order for biodegradable plastics to be effectively disposed of the current waste management infrastructure must change or methods with less economic and environmental costs must be developed.

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