

BIOPLASTIC SYNTHESIS

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ABSTRACT

This report presents an innovative proposal to make Bio-plastic. In this method we can make bio-plastic using easily available materials.

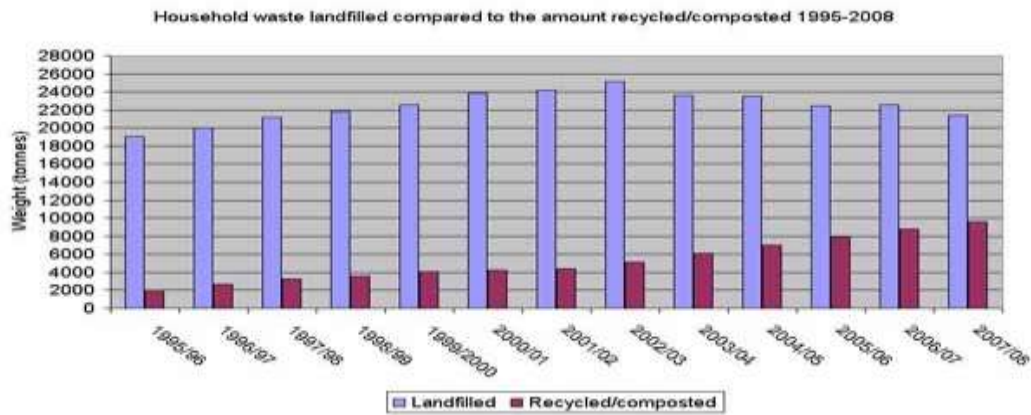
Synthetic polymers are important in many branches of industry, particularly in the packaging industry. However, it has an undesirable influence on the environment and causes problems with deposition of waste and consumption. Therefore, there is a tendency to replace the polymer with biodegradable polymer that undergoes a process. This review summarizes the data on consumption, the level of biodegradation, the reliability of commercialization and production from renewable sources. Some biodegradable plastics that have been commercialized are starch based plastics, bacteria based plastics, soy based plastics, cellulose based plastics, lignin based plastics and natural fiber reinforced plastics. Production of this kind of material and its introduction to the market is important for the natural environmental.

Keywords: Biodegradable Polymers - Starch Based Plastics - Bacteria Based Plastic

I. INTRODUCTION

Plastic products have become an integral part in our daily life as a basic need. It produced on a massive scale worldwide and its production crosses the 150 million tonnes per year globally. In India approximately 8 Million tonnes plastic products are consumed every year (2008) which is expected to raise 12 million tones by 2012. Its broad range of application is in packaging films, wrapping materials, shopping and garbage bags, fluid containers, clothing, toys, household and industrial products, and building materials. It is a fact that plastics will never degrade and remains on landscape for several years. The recycled plastics are more harmful to the environment than the virgin products due to mixing of colour, additives, stabilizers, flame retardants etc. Further, the recycling of a virgin plastic material can be done 2-3 time only, because, after every recycling, the strength of plastic material is reduced due to thermal degradation. It is to mention that no authentic estimation is available on total generation of plastic waste in the country however, considering 70% of total plastic consumption is discarded as waste, thus approximately 5.6 million tons per annum (TPA) of plastic waste is generated in country, which is about 15342 tons per day(TPD).So we made a biodegradable plastic known as bio plastic.

Bio plastic is easy to make and require cheap and easily available ingredients as mentioned above.



II. HEADINGS

Bio plastic can be made by different methods or we can say by using different ingredients.

Bio plastic can be made from plants and it's fibbers known as Lining Based Plastic, from soyabean based on the oil content present in it and is known as Soya Based Plastic, from Bacteria based on the polymer chain polyhydroxyalkanoate (PHA) produced in bacterial cells Bacteria Based Plastic etc.

But here we made the bio plastic by using corn starch known as Starch Based Plastic. Now the question arises why we use corn starch over other methods mentioned above the answer is mentioned below:

Starch based plastics are mostly made from wheat, potatoes, rice, and corn. Of these four starches, corn is the cheapest and most commonly used, while starch is the most expensive. Starch based plastics have been processed into eating utensils, plates, cups and other products. Starch biodegradable plastics can be processed using conventional technologies such as injection molding, blow molding, blown film, extrusion and thermo forming. The process changes the starch into lactic acid monomers in the polymer chain called polylactide (PLA) or polyglycolic (PGA). Both PLA and PGA are crystalline polymers, but PLA is more hydrophobic than PGA. PLA is very brittle and stiff and requires plasticizers for most applications. High gloss and clarity are other features of PLA plastic. PLA is distinctive because it can be found in renewable sources such as starches

III. RESOURCES

- . 10 ml distilled water
- . 0.5g-1.5g glycerol
- . 1.5g corn starch
- . 1ml white vinegar
- . 1-2 drops of food colour
- . Adult supervision is required

IV.PROCEDURE

- . Take all necessary materials required
- . Combine all the materials or ingredients in a beaker or non stick pan
- . Stir the mixture with help of spatula, until you get rid off all the lumps formed in the mixture
- . Place the pan on the stove and heat it on medium flame
- . Stir it continuously as the mixture heats
- . Remove the mixture from heat when it becomes clear and thick
- . Total heating time will be around 10-15 min.
- . Pour the mixture on any non-sticky surface or mould
- . Allow the plastic to dry for at least 2 days under normal climatic conditions

V.FIGURES AND PICTURES



(Ingredients Required)

(Clicked during heating the mixture)

VI.CONCLUSION

Technical and economic problems associated with recycling materials have prompted researchers to look for new materials that can be recycled organically. The negative impact of synthetic polymers on the natural environment creates a lot of problems with deposition of waste and consumption. Biodegradable polymers have been studied, but polymer based sources that are renewable are the most desirable. The main advantage of biodegradable polymers is that they can be composted with organic waste and release back to enrich the soil. Their use will not only reduce threats to wildlife caused by dumping conventional plastic but will also reduce the cost of labor for removal of plastic waste in the environment because they are parsed by nature. Decomposition will help increase the longevity and stability of the landfills by reducing the amount of waste, which can be recycled to useful monomers and oligomers by microbial and enzyme treatments. Using biodegradable polymers in a variety of industries instead of synthetic materials can significantly help to protect the natural environment.

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REFERENCE

- [1.] Hand book of bio plastic and bio composites engineering applications
- [2.] (Editor: Srikant Pilla)
- [3.] Bio-Based Plastic: Materials and Applications
- [4.] (Editor: Stephan Kabasci)