



LIFE WITHOUT PLASTIC

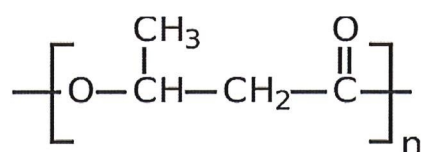


Plastic is the building block of domestic modern materials, we use plastic objects hundreds of times every day. Unfortunately, despite its being an extremely useful material, plastic is an environmental disaster. It is made almost exclusively from non-renewable oil sources, is not biodegradable and is increasingly building up in landfills and oceans and is harmful to many species on earth. We all know about its environmental implications yet we cannot live without it, at this point we reach the problem how can we make plastic in a less destructive way? We need a plastic that can be made from renewable resources, is biodegradable and can be produced by sustainable means in a great enough quantity to meet our ever growing demands for plastic.



One method uses sugars and genetically modified bacteria. Polyhydroxyalkanoates (PHAs) are a biodegradable group of plastics that are produced naturally through the fermentation of sugars by a few species of bacteria as an energy or carbon storage material. Some attempts to commercialize this process that have involved plant-derived sugars as the input for genetically modified organisms. The problem with these methods is that they are largely unsustainable as it is denting into the human food supply and depends upon land to grow the crops. This is a barrier called the food vs fuel debate and effects the production of many plastic alternatives that I could have chosen to write about.

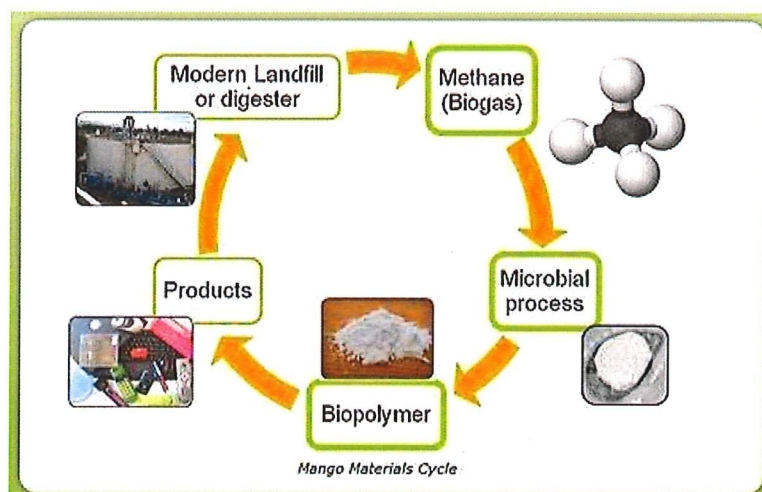
POLY-HYDROXYBUTYRATE



However, a new way of producing plastics using methane has been developed. The process begins with waste methane from a landfill or treatment plant. The methane is captured and fed to non-genetically modified bacteria that with a supply of oxygen and a few other nutrients to produce a biopolymer called poly-hydroxybutyrate, which has similar properties to polypropylene, one of the most widely used plastics in everyday life. This

method is hugely advantageous as it creates a use for a harmful gas that contributes to global warming, whilst solving the immense problem of plastic and the environment.

The plastic that is produced can be sold in the form of pellets or powder to companies who will be able to use it in the same ways as the plastics that we have now. But, unlike our current plastics, at the end of the life of a product made with poly-hydroxybutyrate, it can be given back to a waste treatment plant, like the one where it originated from where it can decompose by being degraded anaerobically in a process that produces methane. Which can, in turn, be used to make more plastics in the same way, starting the cycle all over again.



Poly-hydroxybutyrate, is the 'plastic of the future' because it provides all the solutions for our current plastic dilemmas. It is biodegradable and decomposes safely in large amounts at waste treatment plants, is made from renewable resources as methane is a waste gas that humans produce in many different industrial processes, and is sustainable as it's entire production is a cycle that, for the most part, supports itself fully.