Biodegradable Plastic... Too Good to be True?

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Plastic is one of the largest pollutants that threaten the environment. We conducted a simple experiment as an initial procedure, which aims to test how applicable our future solutions are to the local geology as well as to almost 30% of the Earth. We questioned the ability of sand to biodegrade materials by immersing microscope slides into sand and soil samples for 3 weeks. They were heated, stained and observed under the microscope to look for the presence of bacteria which are responsible for decomposition. The results showed a presence of bacterial cultures. We then aimed to propose alternatives to PLA plastic – a common plastic made of starch known as "biodegradable" because of its natural monomers. However, PLA has various disadvantages such as soil acidification. Hence, we proposed three better alternatives: PHA, PHB and chitosan plastics. PHA is a substance produced by bacteria during the fermentation process which we plan to use to make biodegradable plastics. It will attract microbial organisms and lead to faster degradation. Since PHA is expensive, PHB could be used instead. It is a mixture of PHA and cellulose which reduces its price. Chitosan plastic is made of chitin which could be extracted from crab shells and shrimps. We believe they are better replacements due to the various advantages they attain. Moreover, we proposed a diagram/system which will be capable of recycling petrochemical plastics and changing them back to oil using the simple process of heating. To try this, our team is collaborating with an institution which attempted to support us to design the desired experiment. This way, we would contribute in sustaining oil and using it as a natural resource as well as decreasing the total plastic waste and improving the environment.

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