Bioremediation technology for plastic waste.

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Description

Plastic waste is one of the major solid waste pollutants in the world. Increasing the accumulation of plastic waste is one of the biggest environmental problems facing modern society today. This waste is considered a serious global problem because it affects all forms of life. Slow decomposition rates of plastic waste can kill billions of organisms in marine and terrestrial environments.

Therefore, there is an urgent need to demonstrate effective ecological methods for overcoming the dangerous environmental impacts of traditional disposal routes. To dispose of plastic waste, different people around the world are using different methods to break down plastic waste and convert it into usable forms. When incinerated, plastic waste is burned and toxic gas is generated. Recycling is another way to convert plastic waste into other usable forms of plastic. However, this method consumes energy and leaves the plastic intact, even when converted to other shapes. Landfill is one of the plastic disposal methods where the decomposition of plastic does not occur as expected because there is not enough oxygen for the microorganisms to decompose the plastic. Road construction by mixing plastic and bitumen and making gasoline from plastic may be a better way to recycle plastic waste. Of all these methods, the biodegradation method is considered to be the most environmentally friendly and inexpensive method of plastic decomposition.

However, current knowledge of the general mechanism and effectiveness of biodegradation of synthetic plastics seems to be limited. The microorganisms plays a vital role in the overall biodegradation process of plastics, with a particular focus on algae, with an emphasis on the depolarization of different types of synthetic plastics.

Plastics and their types

Plastics are defined as the synthetic long chain polymeric units. They are nonmetallic moldable compounds, a property responsible for their widespread utility.

1. Classification on the basis of thermal properties

- Thermoplastics
- Thermosetting polymers

2. Classification on the basis of degradability

- Non-biodegradable plastics
- Biodegradable plastics
- Bio-based bio plastics
- Biodegradable bio plastics
- Compostable bio plastics
- Photodegradable bio plastics

3. Classification on the basis of chemical composition

- Addition polymers
- Condensation polymers

Applications of plastic

Plastics are non-metallic malleable compounds that have contributed to their widespread use and popularity. More than half a century ago, synthetic macromolecules replaced natural materials in almost every field and became an integral part of our lives due to their availability and convenience. Plastics are the parent industry of hundreds of components and products manufactured and used in our daily lives and are therefore an integral part of every sector of the economy. For example, in areas such as agriculture, telecommunications, construction, consumer goods, packaging, health and medical, there are high-growth areas that are meeting the current demand for plastics.

Bioremediation

Bioremediation has become a powerful way to counteract the negative effects of environmental pollution in a variety of ways. According to the EPA, bioremediation is microbially dependent, uses the biological activity of the microorganisms to interact with environmental factors, alters the physicochemical conditions of hazardous wastes, and ultimately is relatively less toxic. , Or a waste management technique that converts it into a non-toxic product. Microbial or biodegradation is the result of enzymatic activity associated with the formation of biofilms.

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