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Bioplastics and Biopolymers: Uses and Future Prospects

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Introduction

Since synthesized enzymes with simple or multiple toxin systems involve a reduction in activation energy to weaken the chemical bonds in the polymer, it was recently discovered that various microalgae promote biodegradation of polymers and reduce the energy required for degradation. In oil fields, polymers like partially hydrolyzed polyacrylamide (HPAM) are frequently utilized to enhance or enhance crude oil recovery from reservoirs. It works by making the water that is injected more viscous, which makes it more mobile and helps recover oil. However, in addition to oil, these enhanced oil recovery (EOR) operations also produce a significant amount of water. The oil field produces between seven and ten times more water than oil, depending on the age and stage of the oil reserve [1,2].

Description

Numerous researchers have investigated and reported the potential of such bioremediation technology with varying HPAM removal efficiency from oil field produced water. The current review is in line with the UN Sustainable Development Goal 6 for water security. It emphasizes the scope of these HPAM-based EOR applications, the difficulty of produced water treatment, current and potential solutions and the potential for future reuse of treated water sources. The large amount of plastic that is currently contaminating the land, air, waterways and oceans in which we live is another issue that requires our attention. Worldwide, approximately 380 million tons of plastic are produced annually as of 2018. Between the 1950s and 2018, an estimated 6.3 billion tons of plastic were produced worldwide, of which only 9% were recycled and 12 percent were burned. Not only do the discarded plastics put human lives in danger, but they also pose a serious threat to the lives of animals, birds, fish and other wildlife. There hasn't been a good way to quickly degrade these plastic wastes since the plastics industry started. The majority of plastics are slow to degrade due to their chemical structure, which makes them resistant to numerous natural processes of degradation.

Especially during the current COVID-19 (SARS-CoV-2 coronavirus) pandemic, an increase in plastic-related pollution and their weathering can pose a serious threat to human health and the sustainability of the environment. The sorption and desorption dynamics of micro- and nanoscale plastic (MPs/NPs) polymers for emerging contaminants (e.g., endocrine-disrupting chemicals (EDCs), polycyclic aromatic hydrocarbons (PAHs), polychlorinated biphenyls (PCBs), pharmaceuticals and personal care products (PPCPs) and certain heavy metals) are discussed in relation to the fate and cycle of environmental contaminants as well as the effects of weathering-driven Based on multiple kinetic and isotherm studies, the weathering processes, pathways and mechanisms that control the adsorption of specific environmental pollutants on the surface of MPs/NPs are evaluated in relation to the physicochemical changes.

Dumping plastic waste makes it difficult to keep the environment clean and green. However, the plastic and petrochemical industries are anticipated to benefit from a profit-pool growth of USD 60 billion from the reuse and recycling of plastic waste. A petrochemical company should develop a waste collection system to adapt plastic waste recycling strategies in order to make money. In addition, the plastic and petrochemical industries require a new business model that allows them to utilize plastic waste supplies from a variety of sources as opposed to acquiring raw materials from a single source. Product portfolios should remain top priorities in these industries and a circular economy should be used as much as possible. For the biodegradation of PET plastic, a number of researchers have proposed using consortia of bacteria, whole microbes, or multiple enzyme systems. In the absence of enzyme catalysis, ethylene glycol can be converted to acetaldehyde in acidic conditions following the hydrolysis that is driven by bacteria and results in the production of ethylene glycol. Second, bacterial alcohol dehydrogenases converted ethylene glycol into acetaldehyde to produce the acetaldehyde. Harmful algal blooms (HABs) spread to previously unaffected regions as a result of the global spread of industrialized agriculture and the growing use of chemical fertilizers [3-5].

Conclusion

The use of polysaccharide-based materials in edible packaging is the subject of a comprehensive review in this article. The fundamental compositions and properties, functional modifications, applications in food packaging and safety risk assessment of polysaccharides (such as chitosan, cellulose, hemicellulose, starch and polysaccharide gums) are the primary areas of focus. Consequently, to serve as a model for the development of contemporary edible packaging.

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Conflict of Interest

There are no conflicts of interest by author.

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