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Degradation of biopolymer ecovioc2203 by using the landfill operation in the clay soil

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Statement of problem: Increased use of bio-polymers would reduce the dependence on fossil fuels; another advantage is that biopolymers are easily bio-degradable. The fact that the biopolymers degrade in a sequence of abiotic and biological steps means that the standardized tests for measuring biodegradation of many small molecules do not realistically address what actually happens to a bio polymer in nature. The process of degradation includes, depolymerisation, disintegration, fragmentation or chain cleavage step. Among the most investigated bio polymers used as a degradable polymer. Biopolymers are polymers that bio-degrade with the action of micro-organisms, heat and moisture. There is no specific standard for biodegradation. The purpose of this study is degradable the Biopolymer "Ecovio C2203" in a landfill manner.The landfill process was used and the addition of Glycogen to increase the biodegradation and thus contribute to the preservation of the environment from the accumulation of organic waste. An ecological frame work was utilized to focus on the treatment of waste accumulation and disposal problem, which consists of biopolymer by using the buried in the clay soil a ph of 6.5. To accelerate the degradation of the biopolymer, Glycogen with 3% was added as a filler to the soluble ecovioc2203 using the Brabandr device (as twin screw extruder), the product poured into a thin films with special dimensions and used 13 pieces were used for certain dimensions and the weight of one piece was 0.472 grams. In this study we can find the Glycogen is very active filler to degrade the ecovioc2203 in a short time, easy method, economic as well as be harmless. Finding that the biopolymer "Ecovio C2203" has been disintegrated within three months. The recommendation are being developed by adding microbial bacteria, changing in ph of the soil, using another filler, and the idea of using aerobic and anaerobic digesters for bio-waste and biopolymers is one of the best options to reuse the biomass in energy conversion techniques rather than to end up in landfill..

Process diagram of biopolymer degradation

Recent Publications:

1. Swift, G. (1997) Non-medical biodegradable polymers: Environmentally degradable polymers. In A. J. Domb, J. Kost, and D. M. Wiseman, eds., Handbook of Biodegradable Polymers, arwood Academic, Amsterdam, pages 473-511.
2. Kamal, M. R., and B. Huang.(1992) Natural and artificial weathering of polymers. In Hamid, .H., M. B. Ami, and A. G. Maadhan. Eds., Handbook of Polymer Degradation.
3. Maurizia Seggiani, P, N, E, C and Andrea Lazzeri (2017) Biodegradability of PHA-based composites in marine and terrestrial environments. 5th International Conference on Bioplastics and 6th World Congress on Biopolymers
4. Jack Preiss (2005) Glycogen Synthesis and its Regulation in Bacteria, https://doi.org/10.1002/3527600035.bpol5002
5. Kamal, M. R., and B. Huang. (1992) Natural and artificial weathering of polymers. In Hamid, S.H., M. B. Ami, and A. G. Maadhan. Eds., Handbook of Polymer Degradation. Marcel Dekker, New York, NY pp. 127-168.

Biography

Shatha Kaduhm Abdul-Latif Muallah, has completed his Ph D. in Biomaterial Science from Al- Khwarizmi Engineering College, University of Baghdad. She is Head of Department & Asst. Professor at Dept. Of Biochemical Engineering. She has done Various Research Projects in The Felid of Specialization to The Environment and Society or the Development of Education. She has expertise in Biodegradation studies.

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