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Biodegradation of biopolymers under soil and compost conditions

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Over the last six decades, the use of plastic materials had a major impact on our daily lives and has become essential for modern societies due to their extensive and diverse range of applications. However, the recalcitrant nature of many plastics means that they are problematic in terms of disposal and are a major industrial waste product and environmental pollutant. The use of biodegradable polymers can aid in resolving a number of waste management issues as they are degraded ultimately to CO₂ and water and can be directed to conventional industrial composting systems. Four different biodegradable polymers, namely polycaprolactone, polyhydroxybutyrate, polylactic acid and poly(1,4 butylene) succinate were used to study the time required for biodegradation to occur in soil and compost under laboratory conditions. Degradation of polymer discs was measured by monitoring changes in disc weight, thickness and diameter over a period of more than 10 months at three different temperatures: 25°C, 37°C and 50°C. Degradation rates varied widely between the polymers and the incubation temperatures. Polycaprolactone showed the fastest degradation rate under all conditions and found to be completely degraded when buried in compost and incubated at 50°C after 91 days. Fungi from the surface of the polymers discs following colonisation were isolated and identified by ITS rDNA sequencing.

Biography

Asma Alhosni is a PhD student at the University of Manchester. She has completed her MSc from Nottingham University in UK. She is working as a Lecturer at the Higher College of Technology in the Sultanate of Oman.

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