Molecular Identification of Polystyrene-Polycaprolactone Polymers Degrading Bacteria Isolates as a Slow Release Urea Coating

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Abstract:

Research on the molecular identification of potential bacterial isolates to degrade polystyrene-polycaprolactone (PS-PCL) coating polymers as slow-release urea coatings was carried out to see the efficiency of decomposition of slow-release urea fertilizer coating polymers assisted by bacterial microorganisms. The research was conducted using a field survey method and followed by an experimental method. The stages of the research were carried out from taking soil samples in the area of plant roots and isolating bacteria using specific media to obtain bacteria that have the potential to degrade the coating polymer, then testing the weight reduction of the coating polymer film to test the potential ability of the bacteria. Bacteria capable of reducing the weight of the coating polymer film were further tested by SEM observations, FTIR tests and molecular identification using 16s rRNA sequences. The results obtained in this study found PSPC 6 bacterial isolates that had the potential to degrade PCL 6 coating polymers as indicated by the reduction in initial weight of 0.025 grams to 0.01701 grams, observations were carried out for 4 weeks. Furthermore, bacterial 16s rRNA sequences were analyzed through bioinformatics to obtain species phylogenies. The results of 16s rRNA sequence analysis through BLAST analysis and phylogenetic tree construction showed that the bacterial isolate PSPC 6 has similarities to the species Klebsiella aerogenes strain BLPS9 (accession number: ON460268.1).

Keywords:

Coating, Degradation Klebsiella aerogenes strain BLPS9, Polymer, Slowrelease urea