

Low-Density Polyethylene Film Biodegradation Potential by Fungal Species From Thailand

Authors : Patcharee Pripdeevech, Sarunpron Khruegsai

Abstract : Thirty fungi were tested for their degradation ability on low-density polyethylene (LDPE) plastic film. Biodegradation of all fungi was screened in mineral salt medium broth containing LDPE film as the sole carbon source for 30 days. *Diaporthe italiana*, *Thyrostroma jaczewskii*, *Colletotrichum fruticola*, and *Stagonosporopsis citrulli* were able to colonize and cover the surface of LDPE film in media. The degradation test result was compared to those obtained from *Aspergillus niger*. LDPE films cocultured with *D. italiana*, *T. jaczewskii*, *C. fruticola*, *S. citrulli*, *A. niger*, and control showed weight loss of 43.90%, 46.34%, 48.78%, 45.12%, 28.78%, and 10.85%, respectively. The tensile strength of degraded LDPE films cocultured with *D. italiana*, *T. jaczewskii*, *C. fruticola*, *S. citrulli*, *A. niger*, and control also reduced significantly by 1.56 MPa, 1.78 MPa, 0.43 MPa, 1.86 MPa, 3.34 MPa, and 9.98 MPa, respectively. Analysis of LDPE films by Fourier transform infrared spectroscopy and scanning electron microscopy confirmed the biodegradation by the presence of morphological changes such as cracks, scions, and holes on the surface of the film. These fungi have the ability to break down and consume the LDPE film, especially *C. fruticola*. These findings showed the potential of fungi in Thailand that play an important role in LDPE film degradation.

Keywords : plastic biodegradation, LDPE film, fungi, Fourier transform infrared, scanning electron microscopy

Conference Title : ICAMB 2023 : International Conference on Applied Mycology and Biotechnology

Conference Location : Tokyo, Japan

Conference Dates : March 20-21, 2023