

Enumeration of *Phlebiopsis flavidoalba* and *Schizophyllum commune* as Potential Polyethylene Degraders from Decaying Hardwood

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Global plastic accumulation has become a serious concern and each year several million tons of plastics are accumulated on earth. Although polyethylene is highly resistant to microbial biodegradation, it is one of the most environmentally friendly methods to manage this menace. Among various microorganisms with the ability to degrade synthetic polymers, fungi have been reported to play a key role. The main objective of this study was to assess the polyethylene degradation ability of hardwood decaying fungi isolated from a dry zone forest of Sri Lanka. Fungi were isolated into pure cultures using semi selective media consisted of potato dextrose agar and their ability to utilize wood as the sole carbon source and laccase and manganese peroxidase production abilities were determined. Selected high enzyme producers were identified using rDNA-ITS sequence analysis. Isolates were incubated with 20-micron Low Density Polyethylene (LDPE) sheets at room temperature for 60 days in Czapek-Dox broth statically. Biodegradation was assessed using percent reduction of tensile stress, Fourier transform infrared spectroscopy (FTIR) and scanning electron microscopy (SEM). Two fungal isolates with ligninase producing abilities were selected and identified as *Phlebiopsis flavidoalba* and *Schizophyllum commune*. The percent reduction of maximum tensile stress of *P. flavidoalba* and *S. commune* treated LDPE strips were 12.74% and 10.51%, respectively. The disappearance of some peaks that originally appeared in FTIR spectrum of the untreated sample and appearance of new functional groups attributed to hydrocarbon degradation after treatment with *P. flavidoalba* further confirmed the biodegradation of LDPE. Moreover, SEM analysis indicated the presence of cracks, holes and splits in *P. flavidoalba* and *S. commune* treated sheets compared to untreated controls. Findings of this study revealed that *P. flavidoalba* and *S. commune* have the potential to degrade 20 micron LDPE sheets.

Keywords: Biodegradation, Low density polyethylene, Polyethylene degradation, White rot fungi

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