Soil Degradability of Food Wrapping Polythene Films Manufactured from PLA, PBAT and LDPE

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Food wrapping polythene films manufactured from different virgin materials have become a major environmental concern at present as these films take much time for the complete degradation in the environment. This study assesses the soil degradability of films manufactured from *poly-L-lactic acid* (PLLA) (28%) + dimethyl ester (38%) + starch (26%) + auxiliaries (8%) (F001), poly-lactic acid (PLA) (F002), poly butylene adipate terephthalate (PBAT) (F003) and l*ow-density polyethylene (*LDPE) (F004) in natural soil. The tensile strength, elongation, moisture and water absorption of manufactured films were analyzed at the beginning of the experiment. Half of the manufactured films was immersed in food waste contaminated water and buried at 10 cm depth in soil. The other half was also buried without processing at the same depth in soil. The study was carried out for four months. Percentage degradability was calculated after 02- and 04-month intervals and by using weight losses as a representative parameter of the degradability. Results revealed the significantly highest tensile strength and elongation from manufactured F004. In addition, manufactured F004 showed the significantly lowest water absorption and moisture content ($p < 0.05$; ANOVA). Nevertheless, the highest percentage degradability (94%) in soil was observed from F003 followed by F002 contaminated with food waste. Moreover, the results showed a poor degradation (< 1%) of films manufactured from F004. The results further revealed that the films contaminated with foods degraded more than films those haven't contaminated with foods. Therefore, the present study concludes that food wrapping polythene manufactured from PLA and PBAT showed a significant degradation potential within four months whereas films manufactured from LDPE did not show a remarkable degradation within the same time duration.

Keywords: PLA; PBAT; LDPE; Soil degradability

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