

(159)

**Biodegradability Assessment of Bio-based Film Products (Lunch Sheets) in the Marine Environment**

**Jayasooriya J.K.B.P.<sup>1</sup>, Jayaweera C.D.<sup>1\*</sup>, Gamage N.S.<sup>2</sup>**

<sup>1</sup>*Department of Chemistry, University of Sri Jayewardenepura, Nugegoda, Sri Lanka*

<sup>2</sup>*Central Environmental Authority, Battaramulla, Sri Lanka*

*\*dangolle@sjp.ac.lk*

**Abstract**

Plastic pollution is a current common problem and it causes a serious impact on the marine environment. Micro debris of plastics have accumulated in oceans and exhibit a natural tendency to interrelate with the ecosystem which can cause negative effects on both humans and animals. Polythene food wrappers are used worldwide as a packaging material. Considering the negative impact of polythene wrappers, biodegradable food wrappers have been produced in Sri Lanka following the Section 23 W of the National Environmental Act. The objective of the study was to determine the biodegradability of few bio-based film products (lunch sheets) available in the Sri Lankan market labeled as 100% biodegradable in the marine environment. The biodegradability of five different brands of biodegradable food wrappers were tested together with cellulose paper as the positive control and non-biodegradable food wrapper as the negative control in the marine environment. Laboratory models of three marine environments; inter tidal zone, pelagic zone and brackish water were selected and the biodegradability for a period of six months were tested using weight measurement and FT-IR analysis. Furthermore, several environmental parameters were tested for these three marine zones. Results indicated that the highest percentage weight loss was shown by brand 3 in all three marine environments. In the pelagic zone, percentage weight loss ranged from 8.60-48.92% while highest value of 48.92% was shown by brand 3. In the brackish water environment, brand 3 showed 73.51% of percentage weight loss and values ranged from 11.76-73.51%. The percentage weight loss, ranged from 68.29-89.99% in inter tidal zone and brand 3 showed the highest value as 89.99%. All the samples showed a considerable weight loss after six months duration in inter tidal zone compared to other zones and even the negative control has undergone physical disintegration. It is assumed that oxo-biodegradation leads to this disintegration in the food wrappers in this zone. The FT-IR results have shown that there is no significant degradation of the non-biodegradable food wrapper (negative control) while the cellulose paper (positive control) and the biodegradable food wrappers have undergone a considerable degradation.

**Keywords:** Biodegradability, Food wrappers, Marine environment