Materials and Methods

The biodegradable polymer used in this study is EnviPlast® which is commercially available product. The experimental test specimens were supplied from PT Inter Aneka Lestariki Kimia, Jakarta, Indonesia.

The test specimens were cut from the polymer sheets. The specimens were 50 mm by 30 mm by 0.30 mm (width * width * thickness). Totally 21 test specimens were prepared from the polymer sheets. Three specimens were subjected to each of the degradation conditions for 7 days. The degradation procedure was observed during 7 days.

Biodegradation Analysis in Soil

Soil was poured into a plastic tray (10 cm by 20 cm by 5 cm) up to a thickness of about 4 cm. The samples were weighed and then buried in the soil to a depth of 1 cm. The decomposition process of the biodegradable film was observed. The results obtained in this study revealed that the starch based biodegradable film was significantly decomposed by microorganisms in soil. It could be concluded that using the biodegradable film can help sustain protection of nature.

Results

The weight loss values obtained in the degradation analysis in indoor conditions are shown in Figure 1.

As can be seen from Figure 1, around 40% of the biodegradable polymer was degraded by the microorganisms after 7 days. There was no significant weight loss in the commercial plastic bag. In addition, no degradation was observed in the biodegradable polymer in the sterilized soil.

Figure 1 shows the biodegradable polymer's pictures during its degradation process in laboratory conditions. Figure 2 clearly indicates biodegradation process of the biodegradable polymers during 7 days. The biodegradable polymer was used as a food source by the microorganism.

As can be seen from Figure 3, the observations indicate that the degradation rate decreased as the biological activity decreased.

Conclusions

The findings obtained from this work indicated that 40% of the starch-based novel biodegradable polymer which is EnviPlast® was decomposed by the microorganisms in soil while no significant weight loss was acquired in the commercial plastic bag. It was concluded that the biopolymers could be used to produce shopping bag and food packaging so that natural resources could be protected.

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Literature Cited


