

P3 EKOLOGIA ECOLOGY

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DEGRADATION OF DIFFERENT COMMERCIAL POLYMER PACKAGING BAGS IN VARIOUS ENVIRONMENTS

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Nowadays there is a big progress in applying new polymer packaging materials in the market. Some of them are claimed to be oxy-degradable another ones are known as biodegradable or compostable. They are overspread especially by supermarkets under particular trade names or words "I am biodegradable" without any special description or information about their degradation degree and time depending on the environment type.

In the paper authors compared degradation degree of three different polymer bags in three different environments. The oxy-degradable packages (made from HDPE with TDPA and d₂w additive) and compostable ones were analyzed (made from corn starch and potato starch - natural renewable raw materials).

The samples were cut from the bags into strips and were set for 3 weeks in Baltic Sea (weather dependent conditions, summer time), sea water (laboratory conditions) and compost environments for a comparison. Weight loss analysis, microscopic observations of polymer surfaces and tensile strength tests were used to determine the progress of polymer degradation.

The experimental results obtained indicated, that in each of the experiments with polymeric samples made of natural materials, degradation occurred. Contrary to this degradation was not stated in case of oxy-biodegradable bags. However, the most preferable conditions were in compost environment (especially for the bag made from renewable raw materials), where pH was 5–8, temperature 60 °C and the presence of thermophilic bacteria, actinomycetes and fungi was stated. Contrary to these results, bags' materials indicated by the producer as HDPE with TDPA or HDPE with d₂w were not prone to degradation in any of those environments. The additives (TDPA or d₂w) causing polymer matrix disintegration in the open sunny environment appeared not so active in sea water in sunny days like it was expected. For the future, more information should be provided to the consumer regarding oxy-biodegradable bags to use them in the proper and safety way.