

The invention of bakelite by Leo Baekeland in the early twentieth century is considered as the beginning of plastic production. Thanks to this invention and the creation of subsequent types of plastics (e.g. polyethylene), the production of everyday objects using non-expensive methods on a massive scale has become possible. Plastic became an integral part of human life in the consumerism era. Clothes, smartphones, drink and food containers have one thing in common, most of them are made of plastic. Objects made of plastic have three advantages: they are cheap to produce, light and durable. Most types of plastics are not biodegradable and can remain in the environment for up to several hundred years. We see the effects of plastic production every day, e.g. plastic bags floating in the wind, or scattered plastic bottles. Plastic waste pollution is a global problem and COVID-19 (pandemic intensified the problem by usage of the laboratory objects made of plastic and surgical facial masks. This applies to both the terrestrial and aquatic environment (seas, oceans, inland waters) where it causes the biggest damage. Every day, many species of sea animals die entangled in plastic fishing nets, sea turtles starve to death mistaking floating plastic bags with jellyfish. Despite its resistance to biodegradation, plastic undergoes mechanical attrition, photo-chemo-degradation, which results in the appearance of micro particles (up to 5mm in size) and nano (below 1 μm size) plastic particles. This is another threat to both humans and animals. Annually, the average US citizen consumes up to 46,000 microplastic particles, and consuming it can contribute to tissue damage, gastrointestinal pathologies, and even cancer. For many years, scientists have been searching for methods that will reduce the plastic waste pollution. Alternative biodegradable plastics are currently available on the market. For degradation of other plastic wastes bacteria are used, however, the degradation time is long (lasting up to several months). Insects have become an alternative to using bacteria for a relatively short time. So far, several species have been identified that are able to digest plastic, mainly polystyrene. However, research is limited to observing holes formed as a result of insect activity and analysing their frass. The purpose of this research project is to study the biodegradation of different types of plastics by three selected species of beetles *Alphidobius diaperinus*, *Zophobas morio* and *Attagenus smirnovi*, analysis of the effect of gut microflora on plastic degradation and analysis of the incorporation of plastic into the tissues of the insects studied. The results of this research will allow expanding knowledge about the ability of insects to biodegrade plastic and may be used in the future to combat environmental pollution.