

Abstract

Microplastics are widespread pollutants found in aquatic, atmospheric, and soil environments. They are released directly into the soil, for example, from mulch films and textiles. Microplastics accumulate in the soil and can have a negative impact on soil microfauna and macrofauna. Earthworms, acting as ecosystem engineers, and soil and gut bacteria play a significant role in biogeochemical cycles of biogenic elements. Disruption of earthworm function, their gut bacteria, or soil bacteria could have an impact on the entire ecosystem. In the context of this thesis, earthworms of the species *Apporectodea* sp. were exposed to microplastics from polypropylene black nonwoven textile at concentrations of 1 g/kg soil and 0.0265 g/kg soil for 14, 28, and 56 days. DNA was sequenced to identify bacteria from the earthworm gut, gut contents, and rearing soil. Additionally, untargeted analysis of metabolites from the earthworm body and extraction of immune cells from earthworms using three different methods were conducted. No significant changes caused by the presence of microplastics were found in the representation of bacteria from the gut, gut contents, and soil, but statistically significant changes in the metabolome were detected. A sufficient number of immune cells could not be isolated from the earthworms for further analysis. The results do not unequivocally demonstrate whether microplastics have an impact on earthworm gut microbiota and what specific effect they have on their metabolism. However, the results suggest that microplastics are not inert particles for earthworms, and further research in this area is needed.

Key words: Microplastics, Mulching fabric, *Apporectodea*, Gut microbiota, Metabolome, Immune cells