

Abstract

This bachelor thesis is focused on microplastics in sewage sludge. Microplastics are currently often discussed topic, but their occurrence in sewage sludge isn't still sufficiently researched. The main source of microplastics in sewage sludge is waste water. Microplastics are accumulating in sewage sludge during wastewater treatment and enter terrestrial ecosystems with multiple times higher concentration in comparison to freshwaters as a result of their use in agriculture or in restoration. In the year of 2017 sewage sludge was in Czech Republic further processed by direct land application within agriculture and restoration of 42 %, compostation of 34 %, other uses of 14 %, landfilling of 7 % and incineration of 3 %. The use of sewage sludge in agriculture demonstrates significance of microplastics issue. The tested samples were sampled from five anonymous wastewater treatment plants in Czech Republic. The samples were investigated for applicability of methodology of separation microplastics with oxidation of natural organic matter by Fe^{2+} + 30 % H_2O_2 and flotation in saline solution of 5 M NaCl. Following identification of microplastics was carried out in optical microscope with magnification of 40x. For precise optical detection of microplastics the samples were dyed with rose bengal. The efficiency/usability of chosen methodology of separation microplastics from sewage sludge was confirmed. All five tested locations of sewage sludge contained of different kinds of microbeads, including fibers, films and granules with variable sizes, shapes and colours. This thesis further discusses deficiencies of used methodology and the need of modifications in case of precise quantification of microplastics in sewage sludge.

Key words:

Sewage sludge, microplastics, separation, flotation