
Extraction and detection of microplastics from agriculture soil near industrial area of kapurthala (Punjab)

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Abstract

Microplastics in soil have been found in large quantities and MPs cause adverse effects on agricultural soil fauna. Microplastic pollution in the soil has become a major global issue. Understanding the occurrence, fate, and impacts of microplastic requires reliable methods for their extraction and identification. The study aims to evaluate the extraction and detection of microplastics from agricultural soil by using density floatation and filtration method employing NaCl and including the pre-digestion of soil with hydrogen peroxide to remove all the organic matter present in the soil. High-density salt solutions were more efficient in separating small microplastic particles in the soil. The first approach to identify microplastics is naked eye or microscopy. Another technique to identify microplastics is the ATR-FTIR spectrophotometer, such as fibres, fragments, and film identified by using ATR- FTIR spectrophotometer. The extracted microplastics were polypropylene, polybutylene tetraphthalate; polyethylene, polystyrene and polyethylene tetraphthalate and the size of particles was determined by using microscope. Several analytical techniques used for characterization of MPS, such as SEM and XRD. This study concludes that the size range of extracted microplastics is $< 5\mu\text{m}$ -1mm. Pre-digestion with hydrogen peroxide before flotation significantly increases the extraction rate of MPs.

Keywords: Microplastics, Extraction, Agriculture, Polypropylene, Hydrogen peroxide

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