

EVALUATION OF MICROPLASTIC CONTAMINATION AND THEIR EFFECT ON SOIL PROPERTIES IN POLYTHENE MULCHING PRACTICED SOILS IN SRI LANKA

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Polythene mulching has become a widespread agricultural practice in Sri Lanka, significantly impacting soil health and the ecosystem. This study was carried out to analyse the level of contamination of microplastics in soils subjected to polythene mulching. Soil samples were systematically collected from polythene-mulched agricultural fields covering 26 sites (including *Mahailuppallama*, *Nuwara Eliya*, *Dambulla*, *Rikillagaskada*, and *Seetha Eliya*) in Sri Lanka. At each site, soil samples were collected at three different depths: i.e., 0–10 cm, 10–20 cm, and 20–30 cm, respectively. Microplastic extraction was conducted using standard protocols. The soil samples were analysed for pH, electrical conductivity (EC), available phosphorus (available P), ammonium nitrogen ($\text{NH}_4^+\text{-N}$), and nitrate nitrogen ($\text{NO}_3^-\text{-N}$). Statistical analysis was conducted using two-way ANOVA at 95% confidence level, and Pearson correlation analysis was also performed to study the impact of microplastics on different soil chemical parameters. Statistical analysis of the isolated microplastics quantity, size range, and diameter was conducted using the Image J software. According to the two-way ANOVA at 95% confidence level, significant differences were observed in pH, EC, available P, $\text{NH}_4^+\text{-N}$, and $\text{NO}_3^-\text{-N}$ levels across different depths and sites. The Pearson correlation analysis revealed the significant impact of microplastic count on soil pH, EC, available P, $\text{NH}_4^+\text{-N}$, and $\text{NO}_3^-\text{-N}$ in the soil. The findings strongly indicate the substantial effect of microplastics on selected soil properties. However, further studies are required to identify the precise polymer types of extracted microplastics from soil samples.

Keywords: Microplastics, Microplastic extraction, Polythene mulching, Soil analysis