

# SEASONAL VARIATION, DISTRIBUTION AND CHARACTERISTICS OF MICROPLASTIC IN SEWAGE SLUDGE

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## MICROPLASTICS IN SOILS

Microplastic particles (MPs) pollution is widespread in the oceans, atmosphere, and soils due to the diverse applications and origins of plastic. The distribution of microplastic particles in wastewater treatment plants (WWTP) and their entry into the environment is a critical area of microplastic particle research (Figure 1). When MPs are mixed with the soil matrix, the additives contained in the

microplastic particles can be released and participate in the chemical and biological processes in the terrestrial environment, especially in the cycling of soil elements. **MPs from soils can be transferred to air or water and remain in soils for decades.**

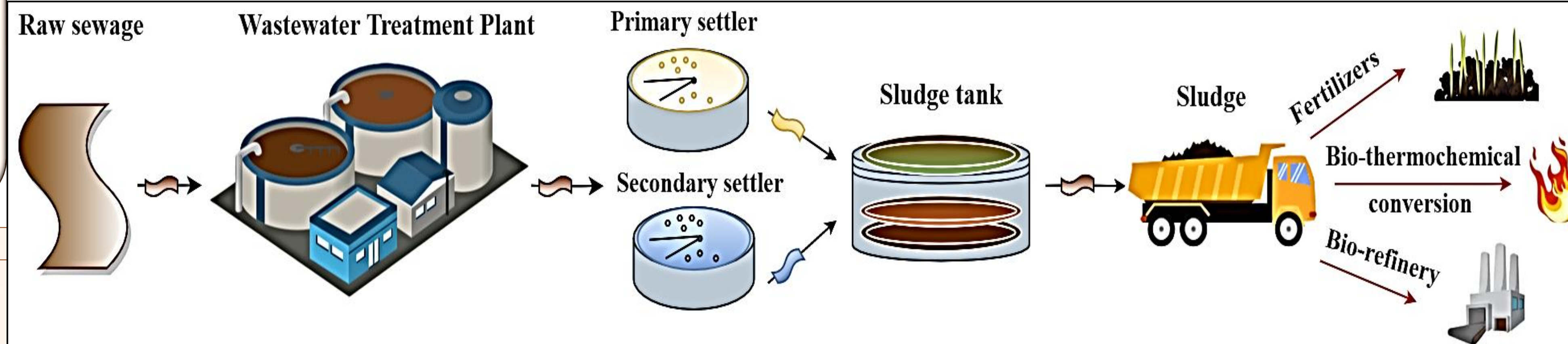


Figure 1. Sewage sludge pathways in WWTP and application facilities.

## THE AIM OF THIS RESEARCH WORK

This work presents the identification and characterization of MPs in sewage sludge collected from the WWTP in each season. Results review the abundance of microplastic particles in size range from 20 μm to 1000 μm and analyze concentration, classification, morphological properties, and chemical composition of MPs extracted from sewage sludge.

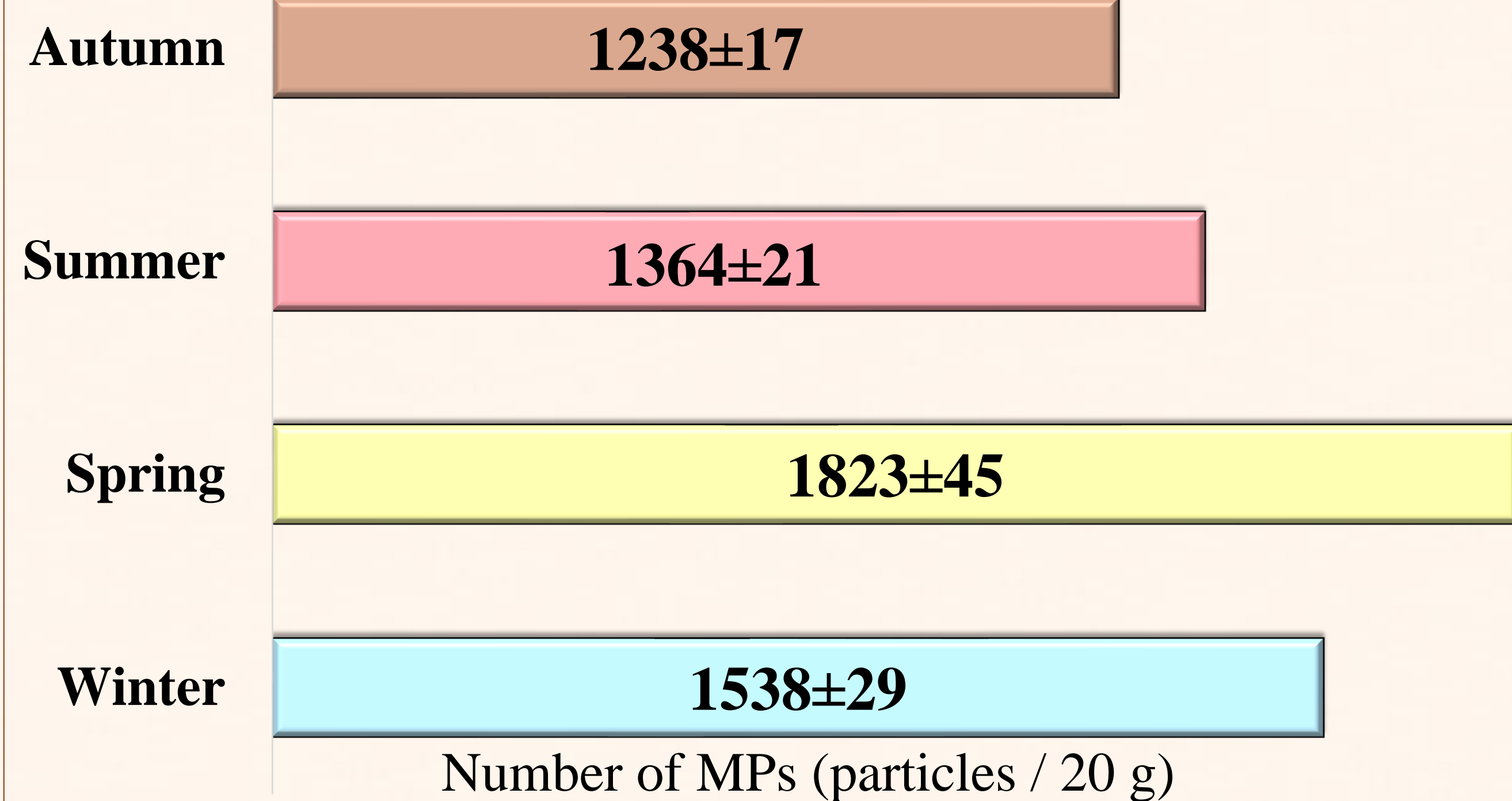


Figure 2. Seasonal distribution of MPs in sewage sludge.

22 % more MPs have been found in sewage sludge during spring

✓ **Fragment:** 81 – 88 %  
✓ **Fiber:** 9 – 15 %  
✓ **Pellet:** 2 – 4 %

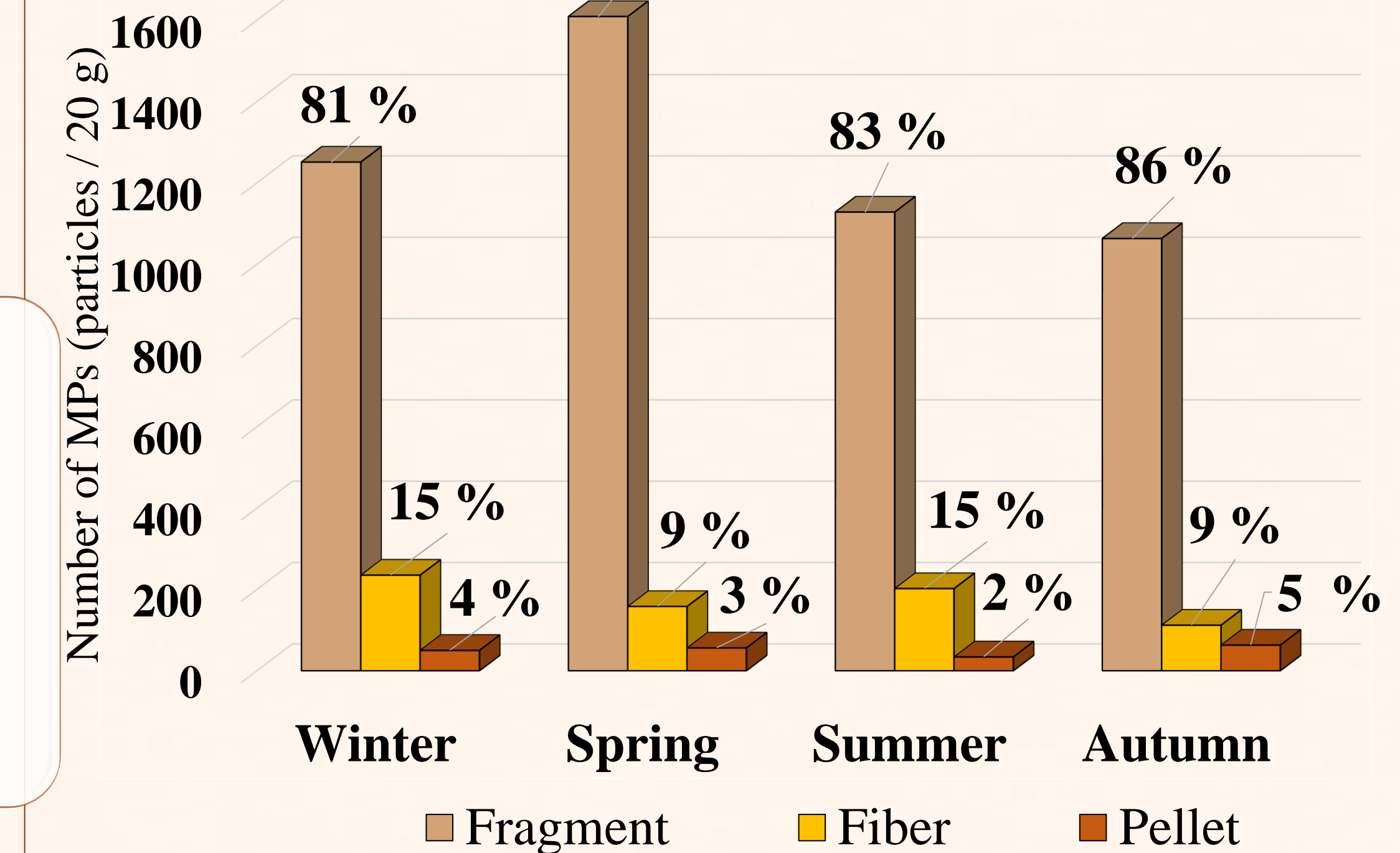
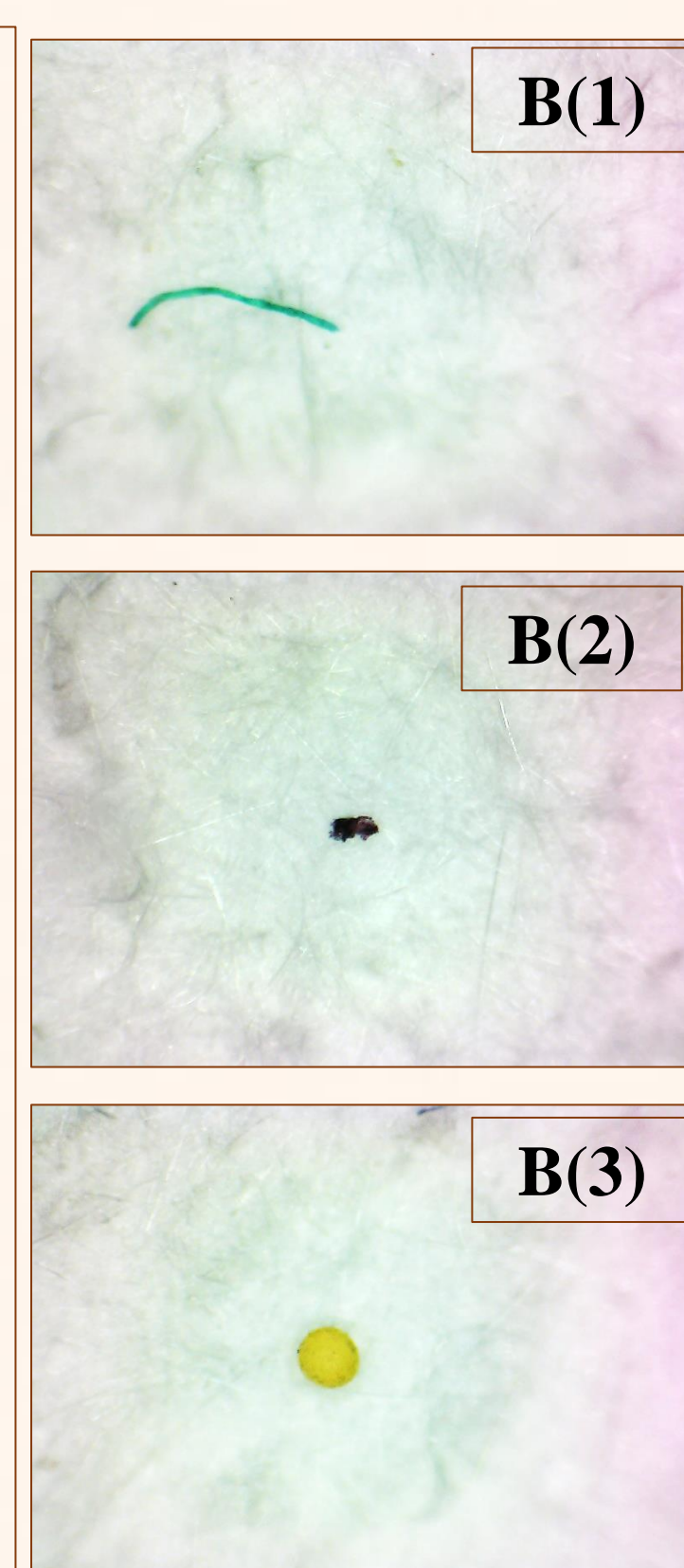


Figure 4. A – Seasonal shape distribution of MPs in sewage sludge; B(1) – fiber; B(2) – fragment; B(3) – pellet.



## RESULTS

The biggest number of MPs were found in size range between **50 – 100 μm**

**Dominant colors:** black, white, transparent

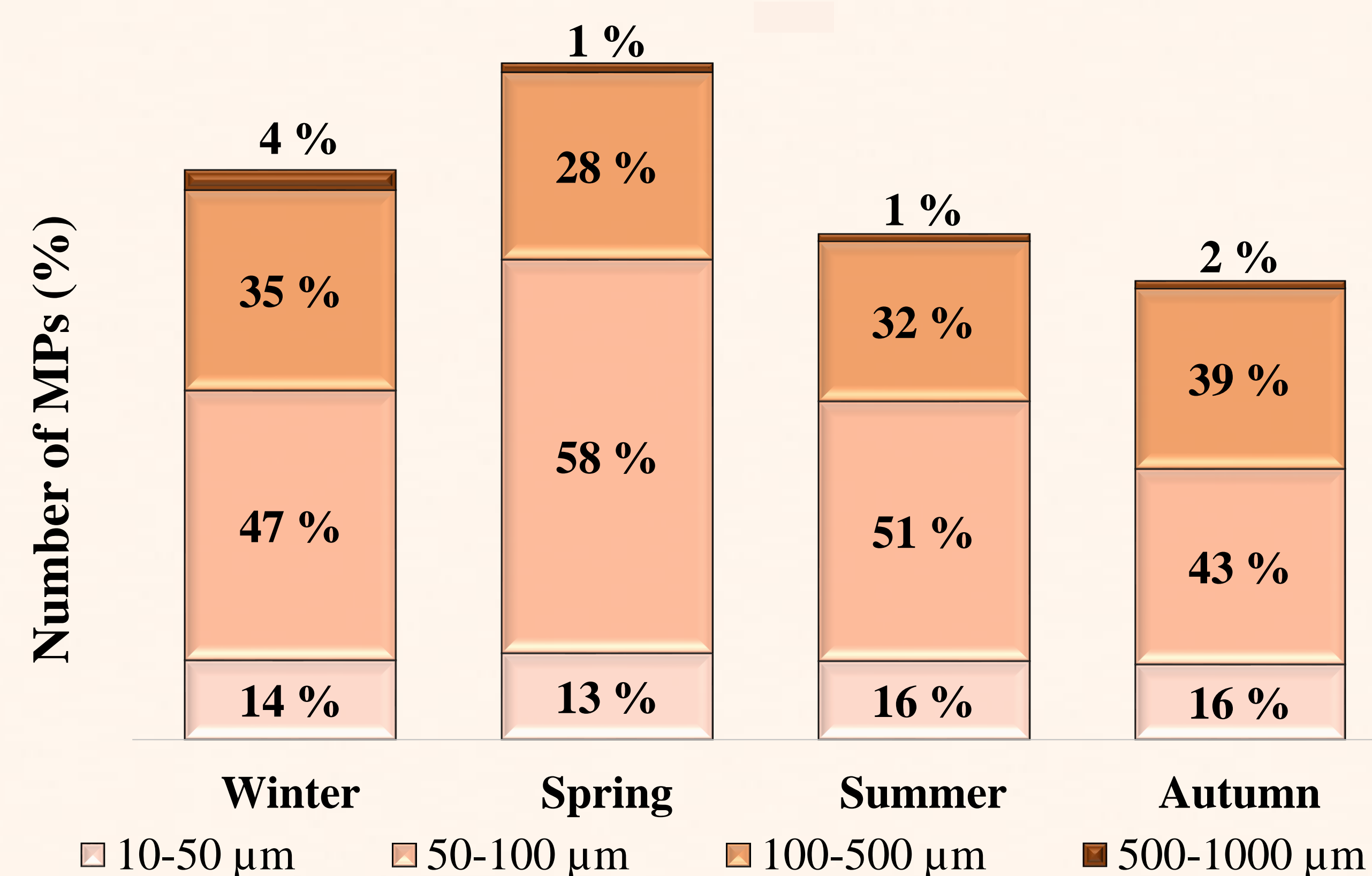


Figure 3. Seasonal size distribution of MPs in sewage sludge.

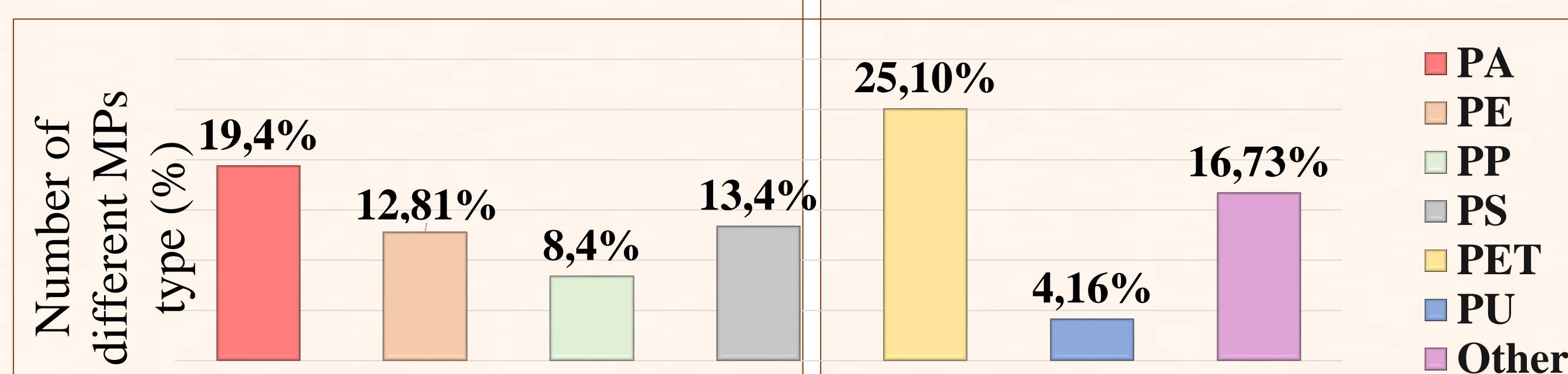


Figure 6. Chemical composition of MPs in sewage sludge.

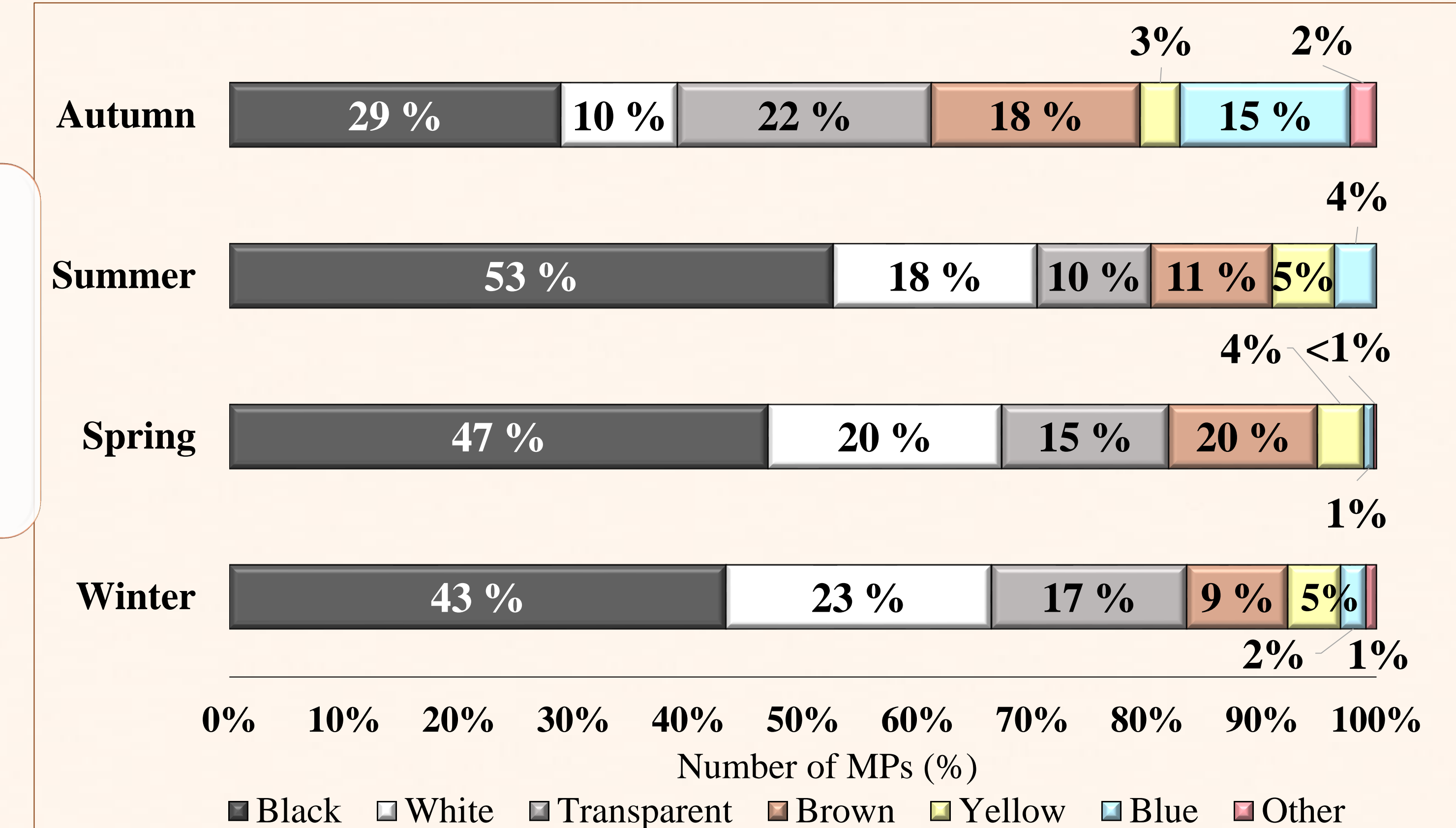


Figure 5. Seasonal color distribution of MPs in sewage sludge.