NOVEL APPROACHES FOR NANO-MICROPLASTICS (NMPS) CHARACTERIZATION IN WATER SYSTEMS IN SINGAPORE - NMPWATERSG

Abstract:

Water pollution from nano-microplastics (NMPs) has emerged as a critical global environmental issue. Studies worldwide confirm their widespread presence in diverse water sources, from wastewater and marine systems to freshwater and even drinking water. Their persistence, combined with documented ecological and human health risks, highlights the urgent need for effective monitoring and control. Although microplastics have been extensively studied, NMP analysis remains hampered by inconsistent methodologies, data processing practices, and reporting standards—differences that can span several orders of magnitude, making trend identification difficult. Moreover, research on the extraction and characterization of nanoplastics and small-sized microplastics (1–20 µm) is still scarce.

This project aims to refine and implement advanced methodologies for NMP detection, focusing on improving the accuracy of sample preparation, quantification, and size distribution analysis. We will conduct a systematic assessment of NMPs in various water matrices across Singapore and evaluate the performance of current water treatment processes. By establishing standardized protocols, the study will close key methodological gaps, providing a robust basis for long-term environmental monitoring. The findings are expected to inform policy decisions and remediation strategies, contributing to international efforts to address NMP pollution in aquatic environments.

Size classification of plastic particles
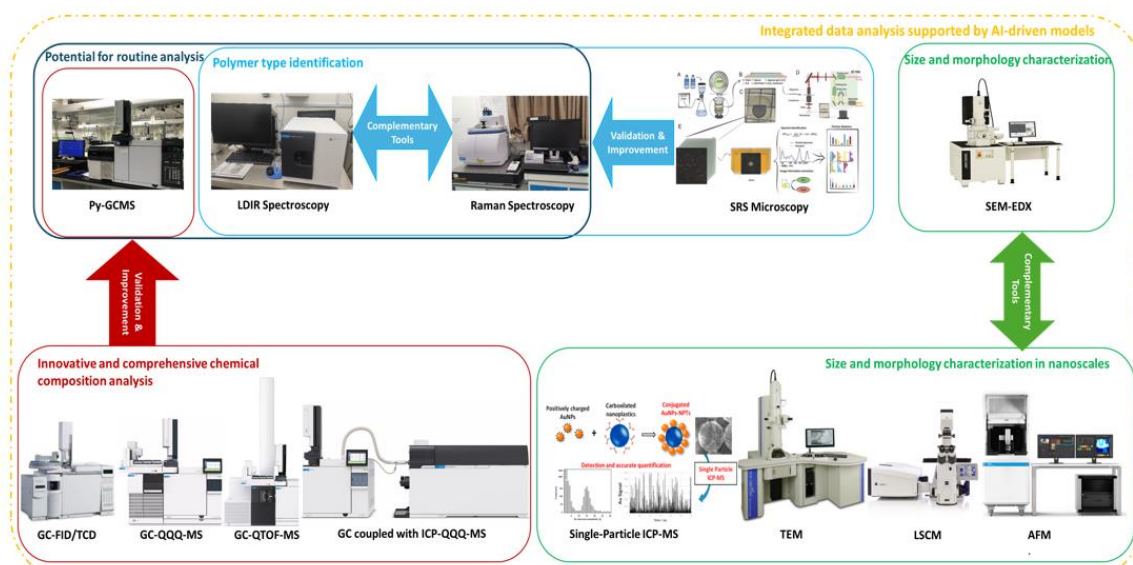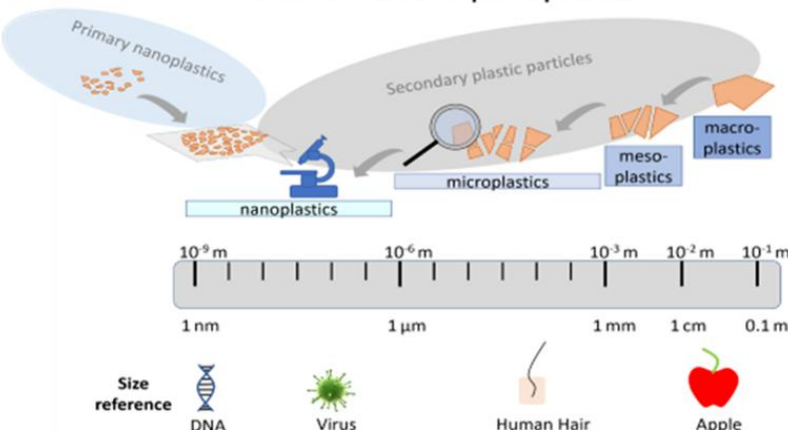
Novel approaches for NMPs characterization in Singapore's water systems:
- First standardized workflow for NMP characterization in Singapore.
- Mobile sampling platform with plastic-free filtration materials.
- Multi-technique validation for enhanced NMP detection accuracy.
- Potential to influence policy & industry standards in water safety.

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