**Title :** Microplastics in Chiang Mai University wastewater treatment plant: distribution and removal efficiencies

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# ABSTRACT

Microplastics (MPs) are emerging contaminants widely found in wastewater due to the contamination from plastic product uses and wastes. Since wastewater treatment plants (WWTPs) are not specifically designed for MPs removal, this can lead to MPs contamination from the effluent discharge into the environment. Furthermore, questions still exist on how MPs are distributed and removed across different treatment stages. Therefore, this research aimed to determine the distribution and removal efficiencies of MPs in a WWTP, using the Chiang Mai University wastewater treatment plant (CMU-WWTP) as the study site. Wastewater, sludge, and mixed liquor samples were collected from the sampling points along the treatment train (influent, grit chamber, aeration tanks, sedimentation tanks, chlorine tank, polishing pond, final effluent, and belt press machine). Samples containing MPs were processed through sieving (water only), organic digestion, density separation, and filtration to remove unwanted materials. Then, MPs were subsequently analyzed by using a digital microscope. Results showed that MPs were detected at all treatment stages and partially removed, resulting in 41.4~82.7 % overall removal efficiency. Highest MPs removal was observed in the secondary treatment, while preliminary and tertiary stages contribute limited removal. Therefore, the WWTP might not effectively prevent MPs from being released in the

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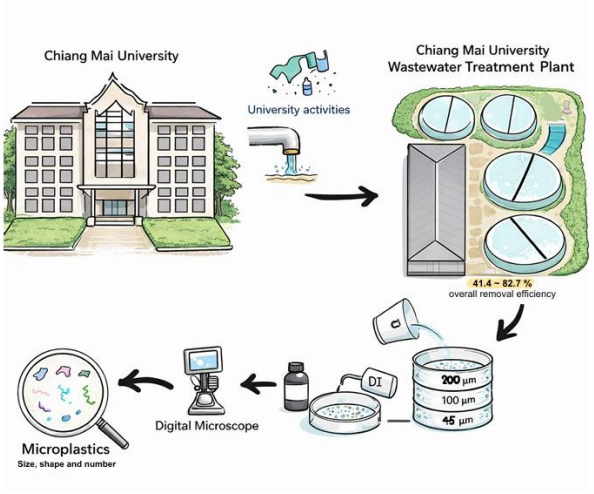
final effluent, indicating a need for improved treatment strategies to control MPs emissions.




Keywords: Microplastics; microplastic removal; wastewater treatment plant; wastewater treatment systems

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