



Characterization and transformation of dissolved organic matter in a full-scale wastewater treatment plant in Harbin, China

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ABSTRACT

The removal and transformation of dissolved organic matter (DOM) in different units of a full-scale A/O wastewater treatment plant (Harbin, China) were investigated both in summer and winter. DOM in the raw wastewater (RW) and the effluents of the grit chamber, primary sedimentation tank, anaerobic tank, oxidation tank (OT), and secondary sedimentation tank (SST) were fractionated and characterized. Hydrophilic fraction (HPI) was the predominant component in RW, followed by acidic fractions. The results also showed that 89.7% of the bulk dissolved organic carbon (DOC), 52.5% of UV-254, as well as 86.4% of trihalomethanes (THMs) precursors were removed by wastewater treatment plants in summer, while the removal efficiency of DOC and THMs formation potential decreased in winter. A/O facilities were more effective in removing HPI related organics than other units, particularly in summer. Structural changes of organic fractions in different units were also characterized via spectrum analysis. All of the findings were beneficial to optimization of the operation of wastewater treatment plant and reclamation of the secondary effluent.

Keywords: Wastewater treatment plant; Dissolved organic matter; THMFP; Fractionation; Molecular weight; UV-254

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