

Characterization of organic matter in ozonation and biological treatment

Abstract

The multi-stage ozonation-biological treatment process was evaluated to compare the performance of dissolved organic carbon (DOC) removal from two water sources between the conventional single-stage and the multi-stage ozonation-biological treatment process. Characteristic changes in DOC during these treatment processes were also evaluated by biodegradability and hydrophilicity. Water sources used in this study of DOC removal were Minaga reservoir water and secondary effluent from a domestic wastewater treatment plant. DOC was fractionated into three fractions as follows: hydrophilic, hydrophobic acid and hydrophobic base/neutral. In the multi-stage ozonation-biological treatment process, more biodegradable dissolved organic carbon (BDOC) was produced in comparison with the single-stage ozonation-biological treatment process, by the removal of BDOC produced by ozonation, and consequently more DOC was removed from the raw water. The improvement in DOC removal in the multi-stage ozonation-biological treatment process was mainly attributed to the decrease in hydrophobic acid fraction in raw water. Higher DOC removal was obtained in reservoir water than the secondary effluent, both in the single-stage and the multi-stage ozonation-biological treatment process, because DOC in the secondary effluent was less susceptible to ozone.

Keywords

Biodegradable dissolved organic carbon (BDOC); Dissolved organic carbon (DOC); Hydrophilic; Hydrophobic; Multi-stage ozonation-biological treatment process