

The Characteristic of Natural Organic Matter and Its Removal by Conventional Water Treatment Processes with Prechlorination

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Abstract

In this study several water treatment plants in southern Taiwan were selected. The water purification processes employed by these plants were mainly conventional ones, i.e. prechlorination, coagulation, sedimentation, filtration and disinfection. The raw water, finished water, and water from major treatment units were collected. The water quality parameters including NPDOC, UV_{254} , COD, THM, and HAA5 were analyzed. The dissolved organic contents in the raw water were further concentrated by XAD-8 resin and fractionated into hydrophobic and hydrophilic fractions. The objective of this study is to look into the relationships between characteristic operational parameters of source water and removal efficiency of dissolved organics.

The results show that: although the NPDOC and COD values of all raw waters could meet water quality standards for drinking water in Taiwan nowadays, some parameters, e.g. high percentage of NPDOC contributed by hydrophilic fraction, and low SUVA (specific uv absorbance) value probably indicated the existence of anthropogenic pollutants. Nevertheless, a good correlation between DOC and UV_{254} was found.

Comparing the quality of raw and finished water, it is found that COD removal could reach about 50%, however, NPDOC removal was minor. This indicated that organic removal by conventional treatment processes was mainly due to the removal of particulate and colloid type organics, while the removal of dissolved organics was limited. This may be explained by high percentage of hydrophilic organics in the NPDOC of source waters, the practice of prechlorination, and the fact that current coagulation process of these plants still emphasized only turbidity removal.

As far as disinfection by-products (DBPs) is concerned, it was found that TTHM content in the drinking water could meet the water quality standards in Taiwan. Because DBP concentration limitation of regulation will legislate critically in the future, the study on lowering the formation of DBPs is more significant

