

Influence of Ozonation Conditions on Aldehyde and Carboxylic Acid Formation.

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Abstract:

The influence of ozonation conditions (i.e. ozone dose and contact time) on the aldehyde and carboxylic acids formation was studied on a pilot scale. The data derived from changes in the molecular weight distribution of natural organic matter (NOM) and the concentration of residual ozone can be applied to a selection of the optimum ozonation conditions. The results confirm the relative ease with which ozone reacts with the organic matter. The short contact time (4-6 min) appeared to be sufficient for the reaction. The higher molecular weight (1600 D) fraction of NOM seems to be slightly more reactive to ozone than the lower molecular weight fraction (500 D). It was also observed that carboxylic acids had been formed at much higher quantities than aldehydes. Two differently acting groups of aldehydes were identified. The concentration of the first one (i.e. formaldehyde, acetaldehyde) strongly depends on ozone dose, while the concentration of the second group of aldehydes (i.e. glyoxal, methylglyoxal) seems to be relatively independent of the ozone dose.

Keywords:

Ozone, Carboxylic Acids, Aldehydes, Ketones, Residual Ozone, Natural Organic Matter, Size Exclusion Chromatography