AN EVALUATION OF DRINKING WATER SAMPLES TREATED WITH ALTERNATIVE DISINFECTANTS

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Due to concern over potential human health risks associated with the use of chlorine (Cl_2) for disinfection of drinking water, many utilities are considering alternative disinfectants. An evaluation is thus needed of the potential risks associated with the use of alternative disinfectants relative to those posed by Cl_2.

At a pilot-scale drinking water plant in Jefferson Parish, LA., two studies were conducted in which clarified and sand filtered Mississippi River water was treated with either ozone (O_3), monochloramine (NH_2Cl), Cl_2 or was not disinfected. Ozonated water was also post-disinfected with either NH_2Cl or Cl_2, to provide a disinfectant residual. For each treatment stream total organic carbon (TOC), total organic halide (TOX) and microbiological contaminants were determined. XAD resin concentrates were also prepared for mutagenicity testing in the Ames Salmonella assay.

Water samples disinfected with O_3 alone had low levels of mutagenic activity, the same as the non-disinfected water. The level of mutagenicity observed following chlorination was approximately twice that observed following treatment with NH_2Cl. Disinfection with O_3 prior to treatment with either Cl_2 or NH_2Cl resulted in a significantly lower level of mutagenicity than when either disinfectant was used alone. The concentrations of TOX present in the water samples showed a pattern similar to that of the mutagenicity data. The levels of TOC, by contrast, were similar for all the treatment streams. No significant baterial contamination was observed in water samples treated with either Cl_2 or NH_2Cl alone or in combination with O_3, as determined by heterotrophic plate counts. However, O_3 alone did not insure an acceptable level of disinfection at the end of the treatment stream. These studies indicate that the use of ozone in conjunction with either Cl_2 or NH_2Cl may be beneficial in drinking water treatment. (This abstract does not reflect EPA policy.)

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