The effect of UV treatment on highly polluted and normal operated swimming pools

Water samples from 2 indoor public swimming pool facilities with significantly different organic matter concentrations in the recirculation were tested to evaluate UV-induced effects on water chemistry. The aim of the study was to investigate the impact of poor water quality due to increased organic carbon (TOC) and the potential effect of increased nitrate concentration on disinfection by-product (DBP) formation in pool water. Concentration change on total trihalomethanes (TTHM) was investigated utilising medium pressure UV treatment in conjunction with chlorine. Post-UV chlorine consumption increased, UV dose-dependently. The post-UV chlorination clearly induced TTHM formation in both polluted and normal operated pools. However, elevated TOC concentration did not increase significantly the DBP formation. Regarding the brominated fraction of the halogens in the formed TTHMs, it appeared to decrease when the sample was subjected to post-UV chlorination in the normal operated pool, having the opposite result in the highly polluted pool. The addition of nitrate (when subjected to irradiation it forms radicals) and the subsequent post-UV chlorination were contradicting with the radical mechanisms; nitrite shielded the water surface inhibiting the UV penetration and therefore less TTHMs were formed.

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