

Quality Monitoring of On-Site Electro-generated Hypochlorite for Water Disinfection

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Abstract:

The aim of this study was to better evaluate the impact of on-site electro-generated hypochlorite for water disinfection. For this venture, the daily variability of hypochlorite-generating systems and their performance to produce low disinfection by-products during the electro-generation formation of hypochlorite were observed. Seven on site electro-generated hypochlorite installations, were selected at different swimming pools facilities in Switzerland. Active chlorine (AC), the two disinfection by-products chlorate (ClO_3^-), and perchlorate (ClO_4^-), and the pH were monitored during several hours.

All monitored installations produced significant concentrations of chlorate to the measured active chlorine concentration. The median chlorate concentrations ranged between 1.4 to 76.9 $\mu\text{g ClO}_3^-/\text{mg AC}$ during daily monitoring. Perchlorate was detected only for one OSG's brand that generated up to 34.9 $\mu\text{g ClO}_4^-/\text{mg AC}$. For all installations, pH was lower than expected with a median pH of 9.6. Some samples presented even surprisingly acidic pH leading to possible degradation of sample. This study shows clearly the weakness of a one-shot sampling to evaluate the quality of on-site electro-generated hypochlorite systems, due to high daily process variations. Additionally, the study of the influence of 3 process parameters has pointed out that including chlorate aspects during the optimisation stage of on-site electro-generated hypochlorite may significantly reduce chlorate contamination during water disinfection.

Keywords: Chlorate · Water · Disinfection by-products · On-site hypochlorite generation · Swimming pool