

Effects of medium-pressure UV lamps radiation on water quality in a chlorinated indoor swimming pool

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Abstract

The aim of our study was to determine the impact of medium-pressure UV lamps radiation on water quality in a chlorinated indoor swimming pool. An indoor swimming pool was equipped with two medium-pressure UV lamps. We collected eight samples of water daily over a four-weeks period and measured total and free chlorine, pH, water temperature, bacteriological parameters, total organic carbon and trihalomethanes. During the first week, which served as control, medium-pressure UV lamps were turned off. During the next three weeks, medium-pressure UV lamps were kept on 24 h per day. The third week, we reduced the level of the injected chlorine into water, and the last week we also reduced the water renewal volume by 27%. Our results showed that bacteriological parameters remained within allowable french limits. When medium-pressure UV lamps were kept on, total, free and active chlorine levels were significantly increased ($P < 0.001$), whereas combined chlorine level were significantly decreased ($P < 0.001$ and $P < 0.05$, respectively). The levels of chloroform and bromodichloromethane were significantly increased when medium-pressure UV lamps were kept on ($P < 0.001$), whereas chlorodibromomethane and bromoform levels significantly decreased ($P < 0.05$ and $P < 0.001$, respectively). The additional formation of chloroform and bromodichloromethane may be explained by the increase in active chlorine and by radicalizing mechanisms initiated by UV radiation.