

ATMOSPHERIC EXPOSURE TO CHLORAMINES IN INDOOR SWIMMING POOLS

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Chloramines are disinfection by-products resulting from chlorination of pool water. They are responsible of eye irritation and respiratory symptoms explaining complaints from lifeguards and swimmers. The purpose was to measure the concentrations of chloramines in the atmosphere of 40 municipal indoor swimming pools and to highlight the preponderant factors which govern their levels. Air sampling took place between February and November 2003, in connection with the monthly survey. Chloramines were collected on a filter impregnated with a reagent solution (As₂O₃) and analysed, as chloride, by capillary electrophoresis method. In each swimming pool, temperature and humidity measurements were conducted during the air-sampling period. A pool water sampling was also collected in order to determine the concentration of free and total chlorine (DPD colorimetric method). In addition, hour profiles related to air and water quality indicators were followed in two swimming pools, under controlled operating conditions. The chloramines concentrations expressed in NCl₃ are in the range of 50 to 600 µg.m⁻³. There is no correlation between the atmospheric chloramines levels and the combined chlorine water concentrations. Generally, the highest air levels are in connection with the lowest absolute humidity values (gram of water vapour per kilogram of dry air) that correspond to the lowest air flow values, calculated using a simplified mass-balance model applied to water vapour. Among the factors studied, the fresh air-flow rate seems to be preponderant to limit the chloramines levels in indoor swimming pools.