Are consumers able to differentiate chlorine dioxide from chlorine?

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Abstract

Drinking water supply companies have traditionally focused their efforts on providing a product with health guarantees, a safe and clean water. Disinfection has been the main purpose of the water treatment. A broad range of disinfectants and technologies are available. Chlorine dioxide has been increasingly used because of its ability to avoid the formation of trihalometans (THMs), the most common and well known disinfection by-products.

The origin of the present work was a taste and odour episode which occurred in the water supply system of the city of Barcelona and was attributed to the use of chlorine dioxide for final disinfection in one of the sources. Chlorine dioxide was used for the first time in this metropolitan area, where chlorine had been always the traditional disinfectant.

The sensory study comprised three types of experiments on chlorine dioxide odour: determination of the threshold concentrations (OTCs) by forced triangular test series, ASTM E679; discrimination triangular tests between chlorinated vs dioxichlorinated waters; and preference test, between chlorinated and dioxichlorinated waters. Two types of panels were used: trained (according to Flavour Profile Method, Standard Method 2170) and untrained (company volunteers).

The main conclusion of the work were: the OTC for chlorine dioxide not significantly different from chlorine; chlorine dioxide and chlorine odors can be effectively discriminated at different concentration levels (0.2, 0.4 and 0.8 mg/L); chlorine dioxide seems to present a stronger odor at supra-threshold levels, although it is not reported as more unpleasant. The results obtained permitted the odour event to be explained.