Sodium dichloroisocyanurate

Sodium dichloroisocyanurate is the sodium salt of a chlorinated hydroxytriazine and is used as a source of free available chlorine, in the form of hypochlorous acid, for the disinfection of water. It is widely used as a stable source of chlorine for the disinfection of swimming pools and in the food industry. It is also used as a means of disinfecting drinking-water, primarily in emergencies, when it provides an easy-to-use source of free chlorine, and, more recently, as the form of chlorine for household point-of-use water treatment.

Guideline values	50 mg/litre (as sodium dichloroisocyanurate) 40 mg/litre (as cyanuric acid)
Occurrence	Where sodium dichloroisocyanurate is used for the disinfection of drinking-water, exposure will be to both the chlorinated species and residual cyanuric acid. The concentrations will relate directly to the quantities added to achieve adequate disinfection.
TDI	2.2 mg/kg of body weight for anhydrous sodium dichloroisocyanurate and 1.54 mg/kg of body weight for cyanuric acid, based on a NOEL of 154 mg/kg of body weight per day (equivalent to 220 mg/kg of body weight per day as anhydrous sodium dichloroisocyanurate) for urinary tract and cardiac lesions from a 2-year study on exposure of rats to sodium cyanurate and using an uncertainty factor of 100
Limit of detection	0.001 mg/litre by GC with flame thermionic specific detection; 0.05 mg/litre by reverse-phase LC with UV detection; 0.09 mg/litre by GC with MS selective ion monitoring
Treatment achievability	At very high chlorine doses (up to 10 mg/litre), the sodium cyanurate concentration would be below 11 mg/litre. In emergency situations, “topping up” might be done in an attempt to maintain a free chlorine residual, but this practice should be discouraged. In this case, it would be possible for the sodium cyanurate concentration to build up to undesirable levels. In such cases, it would be very desirable to monitor the concentration of sodium cyanurate.
Guideline derivation	
• allocation to water	80% of TDI
• weight	60-kg adult
• consumption	2 litres/day
Additional considerations	• The controlling factors are the level of free chlorine and the residue of cyanuric acid, particularly if there is topping up of chlorine in a static system under emergency conditions. The concentration of free chlorine should normally be such that it should not give rise to unacceptable tastes and should not normally exceed the guideline value of 5 mg/litre for free chlorine. • Sodium dichloroisocyanurate used for disinfecting drinking-water should be of adequate purity so that there is no increase in any inorganic or organic contaminants in the drinking-water. The amounts of sodium dichloroisocyanurate used should be the lowest consistent with adequate disinfection, and the concentrations of cyanuric acid should be managed to be kept as low as is reasonably possible.

Toxicological review

Studies of the toxicity of sodium cyanurate are appropriate for assessing the safety of sodium dichloroisocyanurate, because any residues of intact sodium dichloroisocyanurate in drinking-water would be rapidly converted to cyanuric acid on contact with saliva. Both sodium dichloroisocyanurate and sodium cyanurate have low acute oral toxicity. Sodium cyanurate does not induce any genotoxic, carcinogenic or teratogenic effects. The NOEL from which the

guideline value was derived was based on multiple lesions of the urinary tract (calculi and hyperplasia, bleeding and inflammation of the bladder epithelium, dilated and inflamed ureters and renal tubular nephrosis) and cardiac lesions (acute myocarditis, necrosis and vascular mineralization) in male rats exposed at the next higher dose.

History of guideline development

Sodium dichloroisocyanurate was not considered in the WHO *International Standards for Drinking-water* or in the first or second editions of the WHO *Guidelines for Drinking-water Quality.*

Assessment date

The risk assessment was conducted in 2007.

Principal references

WHO (2004) *Evaluation of certain food additives and contaminants*. Sixty-first report of the Joint FAO/WHO Committee on Food Additives. Geneva, World Health Organization (WHO Technical Report Series No. 922; http://whqlibdoc.who.int/trs/WHO_TRS_922.pdf).

WHO (2008) *Sodium dichloroisocyanurate in drinking-water. Background document for preparation of WHO Guidelines for drinking-water quality*. Geneva, World Health Organization (WHO/HSE/AMR/08.03/3).