HCBD is easily absorbed and metabolized via conjugation with glutathione. This conjugate can be further metabolized to a nephrotoxic derivative. Kidney tumours were observed in a long-term oral study in rats. HCBD has not been shown to be carcinogenic by other routes of exposure. IARC has placed HCBD in Group 3 (not classifiable as to its carcinogenicity to humans). Positive and negative results for HCBD have been obtained in bacterial assays for point mutation; however, several metabolites have given positive results.

Hydrogen sulfide

Hydrogen sulfide is a gas with an offensive "rotten eggs" odour that is detectable at very low concentrations, below 0.8 μg/m^3 in air. It is formed when sulfides are hydrolysed in water. However, the level of hydrogen sulfide found in drinking-water will usually be low, because sulfides are readily oxidized in well-aerated or chlorinated water.

Reason for not establishing a guideline value	Not of health concern at levels found in drinking-water
Additional comments	May affect acceptability of drinking-water
Assessment date	1993
Principal reference	WHO (2003) *Hydrogen sulfide in drinking-water*

The acute toxicity to humans of hydrogen sulfide following inhalation of the gas is high; eye irritation can be observed at concentrations of 15–30 mg/m^3. Although oral toxicity data are lacking, it is unlikely that a person could consume a harmful dose of hydrogen sulfide from drinking-water. Consequently, no guideline value is proposed. However, hydrogen sulfide can be easily detected in drinking-water by taste or odour (see chapter 10).

Inorganic tin

Tin is used principally in the production of coatings used in the food industry. Food, particularly canned food, therefore represents the major route of human exposure to tin. For the general population, drinking-water is not a significant source of tin, and levels in drinking-water greater than 1–2 μg/l are exceptional. However, there is increasing use of tin in solder, which may be used in domestic plumbing, and tin has been proposed for use as a corrosion inhibitor.

Reason for not establishing a guideline value	Occurs in drinking-water at concentrations well below those of health concern
Assessment date	2003
Principal reference	WHO (2004) *Inorganic tin in drinking-water*

Tin and inorganic tin compounds are poorly absorbed from the gastrointestinal tract, do not accumulate in tissues and are rapidly excreted, primarily in faeces.

No increased incidence of tumours was observed in long-term carcinogenicity studies conducted in mice and rats fed tin(II) chloride. Tin has not been shown to be teratogenic or fetotoxic in mice, rats or hamsters. In rats, the NOAEL in a long-term feeding study was 20 mg/kg body weight per day.

The main adverse effect on humans of excessive levels of tin in canned beverages (above 150 mg/kg) or other canned foods (above 250 mg/kg) has been acute gastric irritation. There is no evidence of adverse effects in humans associated with chronic exposure to tin.

In 1989, JECFA established a PTWI of 14 mg/kg body weight from a TDI of 2 mg/kg body weight on the basis that the problem with tin is associated with acute gastrointestinal irritancy, the threshold for which is about 200 mg/kg in food. This was reaffirmed by JECFA in 2000. In view of its low toxicity, the presence of tin in drinking-water does not, therefore, represent a hazard to human health. For this reason, the establishment of a guideline value for inorganic tin is not deemed necessary.

Iodine

Iodine occurs naturally in water in the form of iodide. Traces of iodine are produced by oxidation of iodide during water treatment. Iodine is occasionally used for water disinfection in the field or in emergency situations. The diet is the major source of exposure to iodine for the general human population; the contribution to total exposure from drinking-water is assumed to be low (around 5%).

Reason for not establishing a guideline value	Available data inadequate to permit derivation of health-based guideline value. Additionally, occurrence in drinking-water is usually low. Although higher levels of exposure may occur when iodine is used as a drinking-water disinfectant at the point of use, extended periods of exposure to iodine through water disinfection are unlikely.
Occurrence	Average concentrations have ranged from 0.5 to 20 µg/l in rivers and lakes
Limit of detection	10 µg/l by a leuco crystal violet method
Treatment performance	Not applicable as occurrence in drinking-water is usually low
Additional comments	Iodine is not recommended for use as a primary disinfectant of drinking-water but it can be used as a point-of-use disinfectant. Caution should be exercised for longer-term point-of-use disinfection in susceptible individuals (see Part II of the supporting document *Alternative drinking-water disinfectants: Bromine, iodine and silver*; Annex 1).
Assessment date	2020
Principal reference	WHO (2020) *Iodine in drinking-water*

Iodine is an essential element for the synthesis of thyroid hormones. Various national and international organizations have established recommended daily intakes, with recommendations by WHO/FAO set in 2004 at 90 µg/day for infants, 120 µg/day for children, 150 µg/day for adults and 200 µg/day for pregnant or lactating women. In many parts of the world, dietary deficiencies in iodine are a health issue, which can adversely affect neurological development.