

In 1989, JECFA set a provisional maximum tolerable daily intake (PMTDI) for iodine of 1000 µg/day (17 µg/kg body weight per day) from all sources, based primarily on data on the effects of iodide. Various national and international organizations have also established recommended upper intake levels for iodine, ranging from 500 to 1100 µg/day. Exposure to excess iodine can lead to hypothyroidism (with or without goitre—enlargement of the thyroid), hyperthyroidism, and changes in the incidence and types of thyroid malignancies.

However, available data are inadequate to establish a dose–response relationship between iodine exposure and changes in thyroid levels, and to clearly identify a threshold associated with thyrotoxicosis. Further, a guideline value cannot be derived using the more robust toxicological dataset for iodide because the effects of iodine and iodide on thyroid hormone concentrations in the blood may differ. Because iodine is generally not recommended for long-term disinfection, lifetime exposure to iodine concentrations such as might occur from water disinfection is unlikely. For these reasons, a guideline value for iodine has not been established at this time.

Disinfection of iodide-containing water by adding chlorine or chloramine can result in the production of iodinated DBPs; most often, these are formed during chloramination when complete oxidation is prevented. Iodinated DBPs are occasionally detected in drinking-water from treatment plants located in coastal saltwater areas. As with all DBPs, their concentrations in drinking-water can be reduced at the treatment plant by removing the natural organic matter from the water before the disinfection process occurs. It is critical that any method used to control DBP levels does not compromise the effectiveness of disinfection.

Iron

Iron is one of the most abundant metals in Earth's crust. It is found in natural fresh waters at levels ranging from 0.5 to 50 mg/l. Iron may also be present in drinking-water as a result of the use of iron coagulants or the corrosion of steel and cast iron pipes during water distribution.

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) Iron in drinking-water

Iron is an essential element in human nutrition, particularly in the iron(II) oxidation state. Estimates of the minimum daily requirement for iron depend on age, sex, physiological status and iron bioavailability and range from about 10 to 50 mg/day.

As a precaution against storage in the body of excessive iron, in 1983, JECFA established a PMTDI of 0.8 mg/kg body weight, which applies to iron from all sources except for iron oxides used as colouring agents and iron supplements taken during pregnancy and lactation or for specific clinical requirements. An allocation of 10% of this PMTDI to drinking-water gives a value of about 2 mg/l, which does not present a

hazard to health. The taste and appearance of drinking-water will usually be affected below this level (see [chapter 10](#)).

No guideline value for iron in drinking-water is proposed.

Isoproturon

Isoproturon (CAS No. 34123-59-6) is a selective, systemic herbicide used in the control of annual grasses and broad-leaved weeds in cereals. It can be photodegraded, hydrolysed and biodegraded and persists for periods ranging from days to weeks. It is mobile in soil. There is evidence that exposure to this compound through food is low.

Isoproturon is of low acute toxicity and low to moderate toxicity following short-

Guideline value	0.009 mg/l (9 µg/l)
Occurrence	Has been detected in surface water and groundwater, usually at concentrations below 0.1 µg/l; levels above 0.1 µg/l have occasionally been detected in drinking-water
TDI	3 µg/kg body weight based on a NOAEL of approximately 3 mg/kg body weight in a 90-day study in dogs and a 2-year feeding study in rats, with an uncertainty factor of 1000 (100 for interspecies and intraspecies variation and 10 for evidence of non-genotoxic carcinogenicity in rats)
Limit of detection	10–100 ng/l by reversed-phase HPLC followed by UV or electrochemical detection
Treatment performance	0.1 µg/l should be achievable using ozonation
Guideline value derivation	
• allocation to water	10% of TDI
• weight	60 kg adult
• consumption	2 litres/day
Assessment date	1993
Principal reference	WHO (2003) <i>Isoproturon in drinking-water</i>

term and long-term exposures. It does not possess significant genotoxic activity, but it causes marked enzyme induction and liver enlargement. Isoproturon caused an increase in hepatocellular tumours in male and female rats, but this was apparent only at doses that also caused liver toxicity. Isoproturon appears to be a tumour promoter rather than a complete carcinogen.

Lead

Lead is used principally in the production of lead-acid batteries, solder and alloys. The organolead compounds tetraethyl and tetramethyl lead have also been used extensively as antiknock and lubricating agents in petrol, although their use for these purposes in many countries has largely been phased out. Owing to the decreasing use of lead-containing additives in petrol and of lead-containing solder in the food processing industry, concentrations in air and food are declining; in most countries, lead levels in blood are also declining unless there are specific sources, such as dust from leaded paint or occupational/household recycling of lead-containing materials. Lead is rarely