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| Additional comments | Similar guideline values were derived using the TDI approach (assuming 1,4-dioxane is not genotoxic in humans at low doses) and linear multistage modelling (because the compound clearly induces multiple tumours in various organs). |
| Assessment date | 2004 |
| Principal reference | WHO (2005) <i>1,4-Dioxane in drinking-water</i> |

1,4-Dioxane caused hepatic and nasal cavity tumours in rodents in most long-term oral studies conducted. Tumours in peritoneum, skin and mammary gland were also observed in rats given a high dose. Lung tumours were specifically detected after intraperitoneal injection. Although cohort studies of workers did not reveal any elevation in the incidence of death by cancer, a significant increase in the incidence of liver cancer was found in a comparative mortality study. However, the evidence is inadequate for human carcinogenicity assessment because of small samples or lack of exposure data. A possibly weak genotoxic potential of 1,4-dioxane has been suggested. IARC has classified 1,4-dioxane in Group 2B (possibly carcinogenic to humans).

Diquat

Diquat (CAS No. 85-00-7; CAS No. 2764-72-9 for diquat ion) is a non-selective, quick-acting contact herbicide that is used for weed control on several food crops, for residential weed control on lawns and ornamental plants, and as an aquatic herbicide for the control of free-floating and submerged aquatic weeds in ponds and irrigation ditches. It is highly soluble in water but is strongly adsorbed to soil and is resistant to degradation in the sorbed state. Photochemical degradation in soil and water occurs in the presence of sunlight. Exposure from food is likely to be low.

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| Reason for not establishing a guideline value | Occurs in drinking-water or drinking-water sources at concentrations well below those of health concern |
| Health-based value* | 0.03 mg/l |
| Acute health-based value** | 20 mg/l |
| Occurrence | Rarely detected in surface water |
| ADI | 0–0.006 mg/kg bw (expressed as the diquat ion), based on a NOAEL of 0.58 mg/kg bw per day for cataracts in a 2-year toxicity and carcinogenicity study in rats and application of a safety factor of 100 |
| ARfD | 0.8 mg/kg bw (expressed as the diquat ion), based on a NOAEL of 75 mg/kg bw for clinical signs and decreased body weight gain in the 1st week and decreased feed consumption in a neurotoxicity study in rats and application of a safety factor of 100 |
| Limit of detection | 1 µg/l using HPLC with UV absorbance detection after solid sorbent cartridge extraction; practical quantification limit of 1 µg/l using LC-MS analysis after solid-phase extraction |
| Treatment performance | Conventional treatment, including coagulation and filtration, not effective; activated carbon may be effective |

Health-based value derivation

- allocation to water 20% of upper bound of unrounded ADI (0.0058 mg/kg bw)
- weight 60 kg adult
- consumption 2 litres/day

Acute health-based value derivation

- allocation to water 100% of unrounded ARfD (0.75 mg/kg bw)
- weight 60 kg adult
- consumption 2 litres/day

Additional comments

The default allocation factor of 20% has been used to account for the fact that the available food exposure data, , which suggest that exposure via this route is low, do not generally include information from developing countries, where exposure via this route may be higher

Guidance on interpreting the health-based value and deciding when to monitor can be found in [section 8.5.3](#)

Assessment date

2016

Principal references

WHO (2014). *Pesticide residues in food – 2013 evaluations*
 WHO (2016). *Diquat in drinking-water*

* When a formal guideline value is not established, a “health-based value” may be determined in order to provide guidance to Member States when there is reason for local concern. Establishing a formal guideline value for such substances may encourage Member States to incorporate a value into their national standards when this may be unnecessary.

** For more information on acute health-based values, see [section 8.7.5](#).

The eye is the main target organ following short-term repeated exposure in rats and dogs. Effects on kidney, liver and haematological parameters are also observed. Diquat is not carcinogenic in mice or rats. In tests for genotoxicity, diquat gave equivocal or positive responses in the mammalian cell cytogenetic assay, but was negative in the in vivo mouse micronucleus assay and dominant lethal assay. No reproductive effects were observed in a two-generation reproductive toxicity study in rats, and diquat was not teratogenic in rats or rabbits.

Edetic acid

Human exposure to edetic acid, also known as ethylenediaminetetraacetic acid or EDTA, arises directly from its use in food additives, medicines and personal care and