

Spinosad DT 7.48% is specified for use as a vector control agent in drinking-water sources against *Aedes aegypti* by WHO under WHOPES. Formulations for control of vectors are specified by WHO at a dose of 0.25–0.5 mg/l. The expected duration of efficacy under field conditions is 4–6 weeks.

Three formulations of spinosad have been evaluated by WHOPES for mosquito larviciding. WHO specifications for quality control and international trade have been published for the three formulations: i.e. spinosad granules (636/GR), aqueous suspension concentrate (636/SC) and tablets for direct application (636/DT). Only the tablet formulation is used for mosquito larviciding in potable water at the dosage of 0.25–0.5 mg/l of the active ingredient.

In a 14-day study conducted by the manufacturer, a single tablet was added to a 200-litre container of water, and 10% of the water in this container was replenished each day of the study. The concentration of spinosad was found to be in the range 26.5–51.7 µg/l.

Reason for not establishing a guideline value	Not considered appropriate to set guideline values for pesticides used for vector control in drinking-water
Assessment date	2009
Principal references	FAO/WHO (2002) <i>Pesticide residues in food—2001 evaluations</i> WHO (2010) <i>Spinosad in drinking-water</i>

It is not appropriate to set a formal guideline value for spinosad DT for use to control vectors breeding in drinking-water containers; however, it is appropriate to compare the probable intakes with the ADI of 0–0.02 mg/kg body weight, with no acute reference dose set because of its low acute toxicity. The maximum concentration actually achieved with the slow-release formulation was approximately 52 µg/l. The intake would therefore be:

- 39 µg for a 5 kg bottle-fed infant assuming consumption of 0.75 litre = 7.8 µg/kg body weight
- 52 µg for a 10 kg child assuming consumption of 1 litre = 5.2 µg/kg body weight
- 104 µg for a 60 kg adult assuming consumption of 2 litres = 1.7 µg/kg body weight.

However, this could be higher if drinking-water consumption is also higher.

This means that the exposure is well below the upper limit of the ADI for all sectors of the population. Even the application of a double dose would result in exposure below the upper limit of the ADI.

The ADI is, of course, set for lifetime exposure, and the average exposure over time will be lower than the exposures indicated above.

Temephos

Temephos is an organophosphorus insecticide that is used mainly as a larvicide to control mosquitoes on ponds, marshes and swamps and midges, black flies and other insects in public health. It is also used for mosquito control in potable water in containers. It is specified for use as a vector control agent in drinking-water sources by

WHO under WHOPES. Formulations for control of vectors are specified by WHO, and only those approved by WHOPES should be used for this purpose. The recommendation for the use of temephos in potable water is that the dosage should not exceed 1 mg/l.

Reason for not establishing a guideline value	Not considered appropriate to set guideline values for pesticides used for vector control in drinking-water
Assessment date	2009
Principal references	FAO/WHO (2008) <i>Pesticide residues in food—2006 evaluations</i> WHO (2009) <i>Temephos in drinking-water</i>

The NOAEL for human risk assessment for temephos is 2.3 mg/kg body weight per day on the basis of inhibition of brain acetylcholinesterase activity in rats, as determined by JMPR in 2006. Although JMPR considered that the database was insufficiently robust to serve as the basis for establishing an ADI, for the purposes of these Guidelines, a TDI of 0.023 mg/kg body weight can be calculated from this NOAEL, using an uncertainty factor of 100. Young animals do not appear to be significantly more sensitive than adults, and exposure from food is considered to be low.

It is not appropriate to set a formal guideline value for temephos used as a vector control agent in drinking-water. Where temephos is used for vector control in potable water, this will involve less than lifetime exposure. The maximum dosage in drinking-water of 1 mg/l for a 60 kg adult drinking 2 litres of water per day would be equivalent to approximately 0.033 mg/kg body weight, compared with the TDI of 0.023 mg/kg body weight. The exposure for a 10 kg child drinking 1 litre of water would be approximately 0.1 mg/kg body weight; for a 5 kg bottle-fed infant, the exposure would be approximately 0.15 mg/kg body weight, compared with the TDI of 0.023 mg/kg body weight.

Consideration should be given to using alternative sources of water for small children and bottle-fed infants for a period after an application of temephos, where this is practical.

However, exceeding the TDI does not necessarily mean that this will result in adverse effects. Indeed, the low solubility and the high log octanol–water partition coefficient of temephos indicate that it is unlikely to remain in solution at the maximum recommended applied dose, and the use of the slow-release formulation should result in very much lower concentrations than the approved dose of 1 mg/l and actual exposures much lower than the theoretical exposures calculated above.