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Attachment 8 - Human health risks from EOCs

Consumption of drinking water or aquatic species containing EOCs are the two main potential sources of human health risk in this case.

Drinking water standards in New Zealand are regulated by Taumata Arowai. These standards contain a multitude of organic determinands (see **Appendix**). Internationally, the World Health Organization (WHO) guidelines for drinking water quality (2022) include a section on chemicals of emerging concern which exclusively covers pharmaceuticals. WHO provide the following statement: *“The concentrations of pharmaceuticals found in drinking-water are typically orders of magnitude less than the lowest therapeutic doses. Therefore, exposure to individual compounds in drinking-water is unlikely to have appreciable adverse impacts on human health. Formal guideline values are therefore not proposed in these Guidelines.”* This suggests that pharmaceuticals are not a high-risk class of EOCs in drinking water.

There have been a recent review report in New Zealand on human health effects from untreated wastewater and stormwater (Coxon and Eaton, 2023). Coxon and Eaton (2023) provided an overview of contaminants in municipal wastewater and urban stormwater that have the potential to pose a risk to human health and focused on untreated wastewater and stormwater (hence highest risk). Contaminants were grouped into nine broad classes: microbial pathogens, heavy metals, per- and polyfluoroalkyl substances (PFAS), polycyclic aromatic hydrocarbons (PAHs), pesticides, pharmaceutical and personal care products (PPCPs), endocrine-disrupting compounds (EDCs), brominated flame retardants (BFRs), and microplastics. The authors concluded that, due to significant knowledge gaps, the potential impacts on human health are unclear. This conclusion is consistent with our current understanding.

In terms of human health risks from EOCs through the consumption of aquatic species, bioaccumulation is the key concern. A complication of assessing bioaccumulation of EOCs is that there is even less known about the distribution of EOCs in biota than in water or sediment.

Bioconcentration factors (BCF) may be used to estimate potential bioaccumulation of EOCs in biota. The US EPA define a chemical with a BCF <1000 as having a low bioconcentration potential (US EPA, 2012), while ECHA defines a chemical as fulfilling the bioconcentration

criterion when BCF >2000 (European Chemicals Agency, 2017). BCF may be calculated from the physico-chemical properties of any chemical.

References

Coxon, S., Eaton, C., 2023. Review of contaminants of potential human health concern in wastewater and stormwater. Prepared for Ministry of Health. 232 pp.

European Chemicals Agency, 2017. Guidance on Information Requirements and Chemical Safety Assessment Part C: PBT/vPvB assessment Version 3.0 June 2017.

Parliamentary Counsel Office, 2022. Water Services (Drinking Water Standards for New Zealand) Regulations 2022.

US EPA, 2012. Sustainable Futures / P2 Framework Manual 2012 EPA-748-B12-001 5. Estimating Physical / Chemical and Environmental Fate Properties with EPI Suite™.

World Health Organization, 2022. Guidelines for drinking-water quality: fourth edition incorporating the first and second addenda.

Appendix : MAV for pesticides and EOCs in 2018 and 2022 (Parliamentary Counsel Office, 2022).

Table A1. MAV for 2018 and 2022. Changes in MAV between 2018 and 2022 are bolded.

Name	MAV 2018 (mg/L)	MAV 2022 (mg/L)
alachlor	0.02	0.02
aldicarb	0.01	0.01
aldrin + dieldrin	0.00004	0.00004
atrazine	0.002	0.1
azinphos methyl	0.004	0.1
bromacil	0.4	0.4
carbofuran	0.008	0.008
chlordane	0.0002	0.0002
chlorotoluron	0.04	0.04
chlorpyrifos	0.04	0.04
cyanazine	0.0007	0.0007
2,4-D	0.04	0.04
2,4-DB	0.1	0.1
DDT + isomers	0.001	0.001
di(2-ethylhexyl)phthalate	0.009	0.009
1,2-dibromo-3-chloropropane	0.001	0.001
1,2-dibromoethane	0.0004	0.0004
1,2-dichloropropane	0.05	0.05
1,3-dichloropropene	0.02	0.02

Name	MAV 2018 (mg/L)	MAV 2022 (mg/L)
dichlorprop	0.1	0.1
dimethoate	0.008	0.008
diuron	0.02	0.02
endrin	0.001	0.001
fenoprop	0.01	0.01
hexazinone	0.4	0.4
isoproturon	0.01	0.01
lindane	0.002	0.002
MCPA	0.002	0.8
mecoprop	0.01	0.01
metalaxyl	0.1	0.3
methoxychlor	0.02	0.02
metolachlor	0.01	0.01
metribuzin	0.07	0.07
molinate	0.007	0.007
oryzalin	0.4	0.4
oxadiazon	0.2	0.2
pendimethalin	0.02	0.02
pentachlorophenol	0.009	0.009
PFHxS + PFOS	No value	0.00007
PFOA	No value	0.00056
picloram	0.2	0.2
pirimiphos methyl	0.1	0.1
primisulfuron methyl	0.9	0.9
procymidone	0.7	0.7
propazine	0.07	0.07
pyriproxifen	0.4	0.4
simazine	0.002	0.002
2,4,5-T	0.01	0.01
terbacil	0.04	0.04
terbutylazine	0.008	0.008
thiabendazole	0.4	0.4
triclopyr	0.1	0.1
trifluralin	0.03	0.03
MFA (1080)	0.0035	0.0035