17α-ethinylestradiol

(CAS numbers: e.g. 57-63-6, EC number: 200-342-2
/ Entry number in HELCOM list of priority substances: 2)

General sectors:
Pharmaceutical

DRIVERS | ACTIVITIES | PRESSURES | STATE | IMPACTS

Why a HELCOM priority?

Main evidence

S Concentrations of 17α-ethinylestradiol exceed the applied threshold value in all the **4** examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**3**/3 assessed off-shore areas). In these 4 areas, **100%*** of the assessible samples in **water** exceed the threshold value. This is based on monitoring data for the 17α-ethinylestradiol period 2015-2023 as reported by Contracting Parties (CPs) as response to a data call organized by HELCOM. A total number of 24 data points were possible to evaluate for 17α-ethinylestradiol.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, 17α-ethinylestradiol scores **9.0/10** (confidence range: **8.2 – 9.1**) in the scale established when assessing the criticality/significance of current levels in the Baltic Sea pose, where 5 indicates concern and 10 extreme risk, and the range reflects the level of reliability and representativeness of concentrations and the thresholds.

The threshold value for 17α-ethinylestradiol, for water, was acquired from the EC proposed Directive amending WFD and EQSD[2].

I Current levels in the Baltic Sea indicate potential negative impacts on pelagic biota.

Supporting evidence

P Approximately **2-23 kg of 17α-ethinylestradiol** are estimated to enter the Baltic Sea every year, via Wastewater Treatment Plants (WWTPs) / rivers (WATERBASE[1]; Undeman et al, 2022[2]). Given that the substance is **persistent** and **extremely toxic**[3], current inputs are likely significant, in terms of risk they pose for the Baltic Sea and its ecosystem services. As mentioned above, levels in Baltic Sea have already exceeded thresholds, due not only to current but also historical inputs.

A With sales in CPs of ≥1.1 - 1.4 kg/y (2015-2022[4]), the predicted (conservative) river concentration at the proximity of WWTP effluents by using the guidelines of Phase I ERA is about 1.5 times the threshold value for freshwater.

I 17α-ethinylestradiol is considered to have an **especially concerning mode of toxicity**. It is an endocrine disruptor[5] and carcinogen[6]. Endocrine disruptors mimic or interfere with hormones and can cause developmental abnormalities, reproductive dysfunction, and population effects.

Overall assessment

When assessing current levels in the Baltic Sea (no relevant measurement data), current inputs, and the severity of the relevant toxicity mechanism, 17α-ethinylestradiol scores **86-91/100** in the scale established for assessing the overall risk for impacts/threat for the Baltic Sea, where 50 indicates concern, 100 extreme risk, and the width of the span outlines the uncertainty in the assessment.

Facts relevant for management considerations

Causal chain and pathways

A 17α-ethinylestradiol is a synthetic estrogen[7]. The amount of sales has a somewhat decreasing trend.

Relevant policies (existing or planned measures)

P 17α-ethinylestradiol is expected to enter the Baltic Sea via wastewater effluents.

M (on A/P)

- Listed in the first and second **EQSD Watch Lists**. And also as priority substance in the **EU WFD** update proposal.

References:

1. 2. 3. 4. 5. 6.7.

[Note: Listing of detailed references will be provided in an upcoming update of the fact sheet – for a listing of the most common references among the different substances see the section at the end of the consolidated document which includes all the fact sheets]

* considering that there were also inconclusive non-detections (in terms of exceedance, due to a relatively high limit of detection), it is possible that the actual average frequency of exceedance in these areas is somewhat lower, but in any case >40%.