N-Methyl-2-pyrrolidone (NMP)

(CAS numbers: e.g. 872-50-4, EC number: 212-828-1 / Entry number in HELCOM list of substances of concern: 16)

General sectors: Industry and commercial products

DRIVERS | ACTIVITIES | PRESSURES | STATE | IMPACTS

Why a HELCOM concern?

Main evidence

S Concentrations of a substance tentatively identified as NMP exceed the applied threshold value in **22** of the 23 examined areas (assessment units) of the Baltic Sea. The threshold is exceeded in both coastal and off-shore areas (**2**/2 assessed off-shore areas). In these 22 areas, on average **86%** of the assessible samples in **biota** exceed the threshold value. This is based on suspect screening data from the project PreEMPT[1]. A total number of 100 data points were possible to evaluate for this substance.

By further considering how much above or below the threshold each concentration is, and how often the substance is detected, NMP scores **8.2/10** (confidence range: **5.0 – 8.4**) 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 NMP, in biota, was acquired from the NORMAN Network ecotoxicology database[2].

I Current levels in the Baltic Sea indicate potential negative impacts on pelagic biota and/or top predators such as mammals and birds and/or humans via consumption of seafood.

Supporting evidence

I NMP is considered to have an especially **concerning mode of toxicity**. For example, it is toxic for reproduction[3].

Overall assessment

When assessing current levels in the Baltic Sea, current inputs, and the severity of the relevant toxicity mechanism, NMP scores **58-85/100** 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 The EU REACH registered volume for NMP is 10,000 - 100,000 t/y plus confidential volume registered as intermediate[4]. Registered uses include applications at industrial sites (e.g. in chemical processes, formulation and repacking, in coatings such as inks, cleaning agents, oil field drilling and production operations, as binders and release agents, as functional fluids, polymer processing, water treatment), and by professional workers (e.g. in coatings, as functional fluids, etc.)[5]. According to the European Commission's Risk Management Options Analysis document of 2018, NMP is used as solvent for the manufacture of other chemicals (pharmaceuticals, agrochemicals, etc); in the production of man-made fibers, textiles and artificial leather; coatings; paint strippers and cleaners and in electronic[6].

S ? *In order to further improve the evaluation of the risk, the first aspect to consider is identity confirmation (PreEMPT samples). If identity is confirmed, then a furhter aspect to consider is a review of the relevant toxicity threshold (biota).*

Relevant policies (existing or planned measures)

M (on A/P)

- There is a restriction under EU REACH, requiring appropriate operational conditions at use-sites, to ensure that exposure of workers to NMP is below a defined, in the restriction, level.

- NMP is **listed as SVHC (Substances of Very High Concern) under EU REACH** (due to its reprotoxic properties). It has also been recommended by ECHA for inclusion to the REACH Authorizaiton list, in 2018.

- It is covered by a **Risk Management Options Analysis prepared by the European Commission for three aprotic solvents** (NMP, DMAC, DMF), in 2018[6].

References:

1. 2. 3. 4. 5. 6.

[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]