CWPharma2
CLEAR WATERS FROM PHARMACEUTICALS

Interreg
Baltic Sea Region

EUROPEAN UNION
EUROPEAN REGIONAL DEVELOPMENT FUND

Final seminar of CW Pharma 2 Clear waters from Pharmaceuticals

23.11.2021

Program

Session 1
Moderator:
Kai Bester

8:30: **Arrival at the webinar, welcome coffee**

8:40: **Introduction to the CWPharma2 project** (Kai Bester, Aarhus University)

8:55: **Welcome from INTERRG BSR** (Marina Kislyak, INTERREG BSR MA/JS)

9:05: **Welcome from HELCOM** (Dmitry Frank-Kamenetsky, HELCOM)

9:20: **Fitness tests of WWTPs for API removal in the BSR** (Michael Stapf, KWB)

9:50: **Feasibility study of pharmaceutical removal at WWTP Helsinki** (Kuokkanen Anna, Helsinki Region Environmental services Authority)

Coffee break

10:10: **Coffee break**

Session 2
Moderator:
Ulf Miehe

10:30: **Bromate mitigation in Kalundborg** (Preben Thisgaard, Kalundborg Utility)

10:50: **Feasibility and piloting of pharmaceutical removal in Hillerød** (Kai Bester, Aarhus University & Jørgen Skaarup, Hillerød Utility)

11:35: **Awareness rising on pharmaceutical problems** (Ieva Putna-Nimane, Latvian Institute of Aquatic Ecology)

12:00: **Closing** (Kai Bester, Aarhus University)

Technical support: Michael Stapf

Things to know for this seminar

- Seminar will not be recorded, but presentations will be published afterwards
- You can leave (e.g. during breaks) and re-join the webinar at any time. Simply access again by using the same link that you used before.
- After most talks there will be time for questions from the audience, which can be asked via the question panel/chat.

CWPharma 2

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Introduction

to CW Pharma 2

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CWPharma2

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AARHUS UNIVERSITY

KOMPETENZZENTRUM Wasser Berlin

Umwelt Bundesamt

KALUNDBORG UTILITY

LATVIJAS HIDROEKOLOĢIJAS INSTITŪTS

ESTONIAN WATER-WORKS ASSOCIATION
SINCE 1995

IEP-NRI

Hillerød Forsyning
– en bæredygtig fortælling

HSY

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EU STRATEGY FOR THE BALTIC SEA REGION
FLAGSHIP

Pharmaceuticals

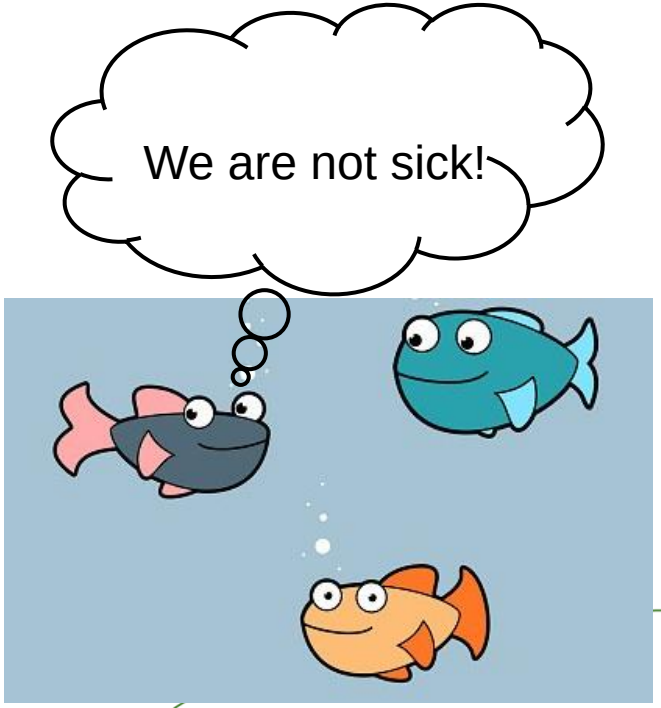
- Are emitted from each person taking medication
- 95% pharmaceuticals are taken at home -> most countries approach pharmaceuticals at municipal WWTPs
- Big hospitals are considerable emittents of pharmaceuticals and are considered as industrial point sources in Denmark

Pharmaceuticals 2

Generally:

- Are emitted via wastewater
- Do not sorb well
- Do not degrade well

- Are generally not removed by activated sludge



CW Pharma 2

- Is follow up project of the larger CW Pharma on mitigation, status and removal of pharmaceuticals to decrease input into the Baltic Sea.
- CW Pharma 2 focusses on the three guidelines/recommendations from CW Pharma and is helping municipalities to implement the solutions, as well as awareness rising.
- A) fitness check on WWTPs for pharmaceutical removal (motivation/what to be reached, preconditions, concentrations)
- B) feasibility of pharmaceutical removal in given WWTPs (exclusions of certain technologies due to border conditions, loads, uses of sludges)
- C) Awareness rising

Technologies for pharmaceuticals removal I: Oxidation

- Chemical oxidation (e.g. by ozone) usually the compound is reacted to form something else
- High removal of estrogenic compounds
- High formation rates of ozonation products (from pharmaceuticals and water matrix)
- Should always be used together with a polishing step

CW Pharma 2 topic

Technologies for pharmaceuticals removal II: Sorption

- Sorption (e.g. to activated carbon) – powdered and granulated
- Activated carbon needs replacing
- The “loaded” activated carbon needs proper disposal (cannot be done together with sludge)

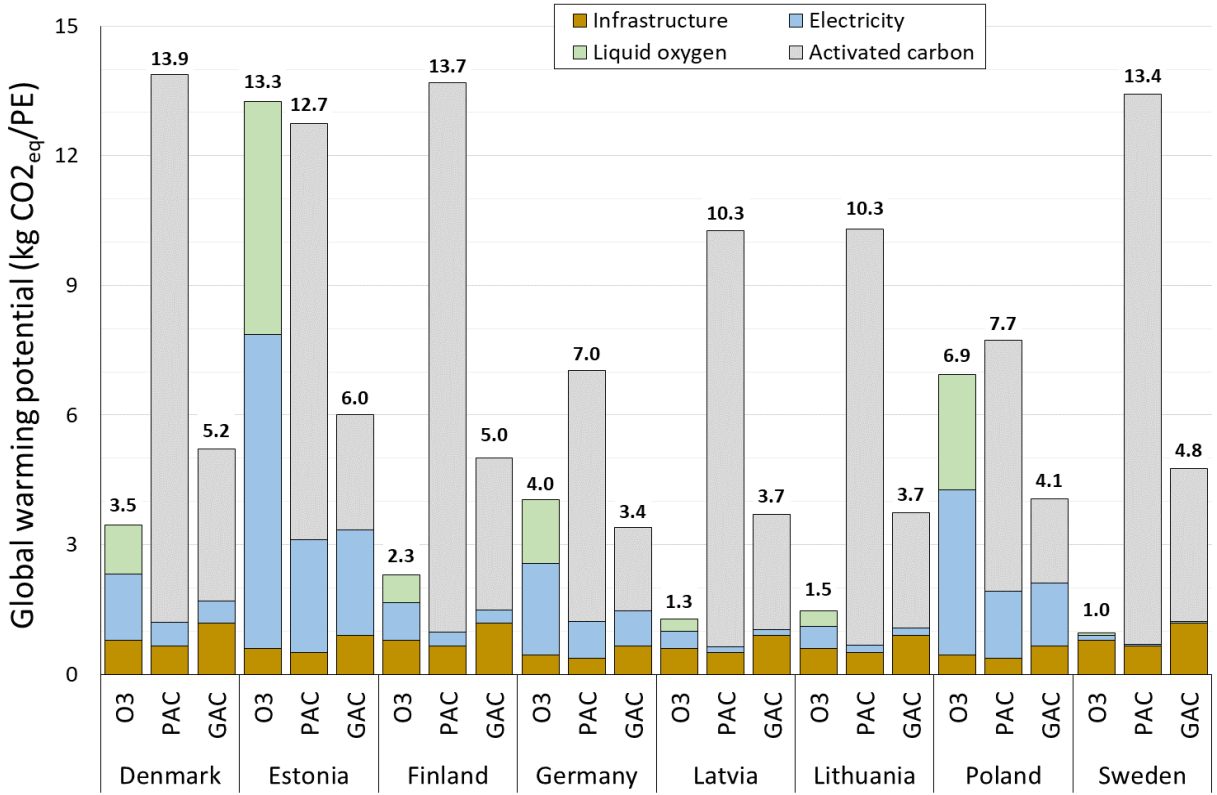
CW Pharma 2 topic

Technologies overview (from CW Pharma guideline 3.4)

Category	Ozone	GAC	PAC	MBBR
API removal	++	++	++	0 / +
Technology maturity for API elimination	++	++	++	-
Complexity of operation	+	++	0	+
Reaction products from the water matrix	-	++	++	++
Transformation products or metabolites	-	++	++	-
Costs[#]	+	+	+	0
Energy usage in operation	-	+	0 / +	+
Carbon footprint	0	0	-	+
Space requirement	++	+	- / ++	-
Compatibility to sludge usage in agriculture	++	++	-	++

https://zenodo.org/record/5069819#.YXlCIZ5BxPY

Climate change potential of the same technologies in different regions (from CW Pharma guideline 3.4)



CW Pharma materials are available

https://www.cwpharma.fi/en-US/Publications

Especially WP 3 (removal from wastewater)

Short title		Link
Experiences in full scale (Linköping)	Evaluation and experiences of full-scale ozonation followed by MBBR post-treatment and comparison with previous pilot tests.	https://zenodo.org/record/4032487#.YXlUYJ5BxPZ
Flexible use of existing infrastructure (Kalundborg)	Evaluation and experiences of full-scale ozonation followed by MBBR post-treatment at Kalundborg wastewater treatment plant.	https://zenodo.org/record/4275618#.YXlVMZ5BxPY
Comparison of post-treatment options	Impact of ozonation and post-treatment on ecotoxicological endpoints, water quality, APIs and transformation products.	https://zenodo.org/record/4003461#.YXlVYZ5BxPY
Guideline for advanced API removal	Optimization and control of advanced treatment	https://zenodo.org/record/5069819#.YXlViZ5BxPY

CW Pharma 2

Enjoy our program on achievements of CWPharma 2

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Technical support: Veronika Zhiteneva