



Strategic approaches to pollution of water by pharmaceutical substances from Luxembourg

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DU GRAND-DUCHÉ DE LUXEMBOURG
Ministère du Développement durable
et des Infrastructures

Administration de la gestion de l'eau

Background Information



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- Surface water in Luxembourg:
 - Water divide between Rhine and Meuse catchment areas
 - Small surface waters with rather small flows
 - => Dilution factors of emissions from waste water treatment plants systematically < 10
- Water Management Authority:
 - Lean organisation
 - Active at local up to international level
 - We invest a lot in international cooperation
 - International river basin commissions
 - Working groups at european level
 - Setting our own standards would not make sense !
 - Depend on feedback from research projects



Pharmaceuticals in surface waters



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- Results form a test phase in preparation of the implementation of a watch list carried out by the Joint Research Centre de la CE (2012).
- Determination of a set of 20 organic micropollutants in EU surface water bodies
- 4 sampling stations in Luxembourg
 - 6 substances could not be detected
 - 2 substances were only detected in 1 sample
 - 12 substances were detected in all samples.

	Substance	Utilisation	Concentration [ng/L]	
			Minimum	Maximum
Usages ménagers	Acesulfame	Edulcorant	970	4400
	Sulfamethoxazole	Médicament	8	51
	Carbamazepine	Médicament	38	226
	Carbamazepine (métabolisé)	Médicament (métabolite)	41	306
Usages industriels et ménagers	Glyphosate	Herbicide	44	298
	AMPA	Herbicide (métabolite)	721	2240
	1H-Benzotriazole	Complexant	70	2300
	4-Tolyltriazole	Complexant	100	1900
	TCPP	Rétardateur de flamme	158	1022
	PFPPrA	Agent tensioactif	2	20





- Special monitoring program carried out by the International Commission for the Protection of the Rhine (2013)
 - HPLC-MS/MS Screening
 - Pharmaceuticals are an important part of the permanent micropollutant loads (pesticides with exception of few metabolites are found seasonally and locally)
 - Compounds with concentrations > 0.3 µg/L

Pharmaceuticals

Furosemide (4.37 µg/L)

Metformin (1.87 µg/L)

Hydrochlorothiacide (0.35 µg/L)

Gabapentine (0,87 µg/L)

Valsartan (0,31 µg/L)

X-ray contrast media

Iopromide (0.54 µg/L)

Metabolites

Valsartanic acid (0.55 µg/L)

Metazachlor-OXA (0.41 µg/L)

Metazachlor-ESA (0.54 µg/L)

4-Formylaminoantipyrin (0.40 µg/L)

N-Acetyl-4-aminoantipyrin (0.38 µg/L)

Atenolol-acid (0.32 µg/L)

Potential measures



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- **Measures at the source:**
 - Information campaigns for professionals and patients
 - Collection systems

Data from National Waste Study 2015

87 out of 95 pharmacies participate in the national collection initiative for expired pharmaceuticals.

	2014
Pharmacies	32'250 kg
Recycling & Service Centers	99'250 kg
Cooperating private industries	670 kg

6.1% increase

- Prioritizing prescription vs over the counter drugs
- Adapted quantities

Medikamenter - Wouhin ?



**Secherheet & Zukunft
Ech maache mat!**



- Medikamenter gehéieren net an Hausoffall, Toilett oder Lavabo !
- Ne pas jeter les médicaments dans la poubelle, toilette ou lavabo !
- Medikamente gehören nicht in Abfall, Toilette oder Waschbecken !
- Não descarte medicamentos no balde do lixo, sanitário ou lavatório !
- Medicines - don't dispose them in dustbin, toilet or sink !





CLEVER!








Info - Internet
med1.sd k.lu





➤ « End of Pipe » measures

- Decentralized treatment plants
 - » Waste water treatment for waste water from hospitals and care homes – depending on the potential impact
 - feasibility should be studied for new projects
 - » Emission permitting (« approche combinée » in national legislation)
- Etape de traitement supplémentaire au niveau des stations d'épuration communales
 - » Impact study for the identification of the most vulnerable water bodies
 - » Permits for new large municipal waste water treatment plants demand space reservation for potential 4th treatment step.





- Directive 2013/39/UE **does not** oblige Member States to take measures
- This obligation comes through the Water Framework Directive (WFD). Measures have to be defined within the **River Basin Management Plans**.
- WFD allows for exemptions based on article 4.4 (later achievement) or article 4.5 (less strict environmental objectives)
- A compound (pharmaceutical or not) that constitutes an ecotoxicological risk and whose presence is shown by several Member States, **has to be considered as a priority substance and an environmental quality standard has to be respected**.
- **A substance can not be eliminated from the list because its treatment would constitute a too important cost.** This has to be dealt through an exception procedure as defined by the WFD.

Thank you !



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