NORMAN WG5 Activities - 2016

Title: NORMAN WG-5 Wastewater reuse and CECs
Leader: Nireas-IWRC, UCY

Background / Justification for the proposed activity:

WG-5 works towards the development of knowledge and understanding on the presence and fate of microcontaminants, including resistance genes, in urban wastewater treatment plants effluents before their disposal or further during reuse practices.

Rome meeting, 3+4 December 2015

Reuse water for recharge

★ It was agreed to consider all **groundwater** bodies in Europe as '**potable**' and thus look at them as a source of **drinking water**.

★ However they decided to treat irrigation with a different view. The concern is that **there is no hard evidence** that substances/ARB can cause **health effect** problems (food crops).

They can reconsider if we can provide hard evidence…

So this is the first question we need to answer ! ! !
To work for both reuse practices !

When we are irrigating with treated wastewater

from what we currently know

We do not only create conditions for crop uptake !!

But we also disseminate contaminants of emerging concern

- **Soil, agro-ecosystem and surrounding natural environment**
- **Terrestrial organisms / species / e.g. microorganisms, insects, snails etc etc**
- **Parent compounds and transformation products (biotic/abiotic)**
- **Leaching / transfer to groundwater**
- **Runoff to surface water**

*Abnormal operation of UWTPS

The starting point / baseline should be the Water Framework Directive

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Plant uptake of pharmaceutical and personal care products from recycled water and biosolids: a review

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Certain vegetables, fruits

Mixture of compounds

Various physicochemical properties of compounds

Influence of soil conditions

root-edible, leaf-edible and fruit-bearing plants

7. Conclusions and future research needs

Studies to date have provided clear evidence to suggest that PPCPs can transfer from soil to plants when treated wastewater or biosolids are used in agriculture. For PPCPs that have relatively high bioaccumulation factors in roots, e.g., triclocarban, triclosan, metformin, and carbamazepine, high residues may be found in tuber vegetables such as carrot and radish. On the other hand, PPCPs with high translocation potential and accumulation tendency in leaves/stems, e.g., carbamazepine, dilantin, diclofenac, propranolol, triclosan, and chloramphenicol, may result in relatively high levels in leafy vegetables such as lettuce, spinach and cabbage, and may further transfer to fruits.

Although the human health and ecological risks of plants contaminated with low levels of PPCPs are still far from clear, based on the adverse effects of PPCPs observed on non-target organisms such as aquatic organisms, potential risks still exist through dietary intake of PPCP-contaminated crops by human or animals, and therefore uptake of PPCPs by plants should be explored more thoroughly.

Recommended Actions

The **NEREUS COST Action**, in collaboration with **NORMAN WG-5**, would like to provide recommendations to the Commission for drafting the **Water Reuse policy instrument**.

Credits go to Jaroslav Slobodnik

Text/Table

1

Modes of action/ recommended bioassays with human health based trigger values

Text/Table

2

'Reuse water' substances (with or without threshold values) with a mechanism for update (Watch List)

Text/Table

3

ARB relying strongly on input from NEREUS and NORMAN WG5

4

Monitoring schemes (types of reuse water, frequencies, location of samplings, etc.)

Task 1

Validation of the results of the **2014** and **2015** screening campaigns on antibiotic resistance determinants and mobile genetic elements the aim being to design and agree on a **harmonised method** for antibiotic resistance detection and quantification.

This decision will affect the work undertaken in **NORMAN/NEREUS**, and will also influence results that will be used as basis for the **development of recommendations and guidelines**.

Task 2

Drafting of minimum quality criteria for **reuse of treated wastewater for groundwater aquifer recharge and agriculture irrigation**, based on the complementary use of:

- biological tests and associated health-related trigger values
- priority contaminants
- characterisation of antibiotic resistance

This task can be performed in collaboration / linked with the **Groundwater Sub-group** (and WG-1 Prioritisation) and the preparation of an **EU Watch List for Groundwater** (Task leader: BRGM, France)

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Task 2

Task 2a
draft a proposal/table with recommended modes of action and associated bioassays, accompanied by human health-related trigger values. — 1

Task 2b
draft a proposal/table with relevant micropollutants to be monitored (with or without threshold values), based on current knowledge, and a mechanism for definition of a Watch List of substances to support regular periodic review of the minimum criteria. — 2

Task 2c
draft a proposal/table with relevant ARB to be monitored, based on input/contribution from NEREUS and NORMAN WG5 results. — 3

Task 2d — 4 — Monitoring Scheme