

Workshop 2: Recycled nutrient product qualities and standard

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- 1. Q: Solubility vs. availability assays for P. Extended to plant availability?*
A: Could be useful for a group of products, but is up to the industries
Action: No action needed of the regulator. Industries & Research will self regulate.
- 2. Q: Dealing with uncertainty What about variability in product nutrient composition from recycled sources*
A: part of the group: Farmers deal with variability (also with manure; NPK) but others say need to know how much (e.g. local /national authorities → limitations / application standards).
Action: Determine quality and standard deviation. Improve inline measurements
- 3. Q: How to deal with (non-limitative) list of emerging pollutants? Can bioassays play a role?*
A: Organic pollutants never ending list; this is an identified issue
Action: Incineration or amend a regulation to take this risk account.



Workshop 2 “Nutrient recovery in the sewage works of the future”

Conclusions:

- New business model is necessary
- Social and legal acceptance of recovered products is necessary
- A huge range of technologies are in development and at demonstration scale, for different situations

Future actions:

- Future wastewater treatment must enable a better nutrient recycling (and also the old plants)
- Legislation must encourage and accept the recovery technologies

Workshop summary: ENRICH, RUN4Life, INCOVER, APPROVE

- Many technologies: vacuum toilets, P adsorption, Zeolites + membrane contactors, Hyper-thermophilic anaerobic digestion, constructed wetlands, evaporative systems...
- Recover not only P → PHA, N, bioplastics, bio-methane, organic acids, water...
- Technologies for centralized and decentralized treatment
- Integration the recovery of nutrients with innovative wastewater treatment systems

Workshop 3: LCA and LCC of P recovery processes

Output from discussions:

- FU unit
 - Depends on the goal and scope
 - Holistic vs. P-recovery approach (system vs. product)
 - Use both, was suggested
- Data collection
 - Plant specific vs generic
 - Pilot scale vs full-scale
 - Open source database for compilation of new and improved LCI data
 - Documentation and transparency
- System boundaries
 - Land application should be included (emissions to environment and savings, organic P comes with N)
- Data bases for background (indirect) data
 - Quality and relevance (old technologies) can be questioned

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Workshop 4: technology transfer from municipal waste to/ from manures and other waste streams

- **Research:** technology - upscaling/downscaling; Quality standards, investment, demonstration sites for techniques and products (contaminants are area of concern), simple and local solutions for rural areas
- **Investments:** marketing for new products/ convincing of farmers
- Synergy between urban and rural areas in research
- **Communication:** knowledge exchange, consumer education starting at school, transparency, convenience vs “unknowns”
- **Policy:** driver for change
- **Funding:** for demonstration sites



Recommendations from workshop 5: how to move from R&D to implementation?

Actions :

- Control Business Plan / Technical requirements : check if shift is needed
- Market analysis : market penetration
- risk analysis

Organisations

- feasible milestones
- IP : Protection of the technologies and exploitation of the results

Planification :

- Have a clear goal / clear and quantifiable KPI

Partnership

- final users
- strategic project partners : farming associations
- Investors