

Innovation Workshop

Fertiliser products from nutrients recovered by domestic wastewater treatment

EkoBalans

- Sustainable solutions for the handling of organic residues and the recycling of plant nutrients and carbon from food industry, biogas production, WWTPs, and other sources
- Recycled nutrients and carbon are refined into fertilizers and soil improvement products that can be used to promote soil health and be handled with existing equipment in agriculture



EkoBalans solutions for sustainable nutrient and carbon recycling

- eco:P - Phosphorus extraction as struvite ($\text{MgNH}_4\text{PO}_4 \cdot 6\text{H}_2\text{O}$)
- eco:N – Nitrogen extraction as solid ammonium sulfate ($(\text{NH}_4)_2\text{SO}_4$)
- eco:S – Drying and pyrolysis of sludge and other organic residues with cadmium removal
- Digestate refining concepts
- Production of fertilizers and soil improvement products from extracted nutrients and organic fractions



Solutions are adapted to

- *residue properties*
- *market options*
- *local circumstances*

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EkoBalans' roles in the case study in Helsingborg

- Supplier of plant for P and N extraction with our eco:P and eco:N technologies
- Demonstration of how extracted nutrient fractions can be productified together with other fractions



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The eco:P process

- Batch-based struvite precipitation with very short retention time *and* high recovery = small footprint
- 90 % P removal at <30 min retention time and pH 8
- Separation of micro crystals: suitable as raw material for fertilizer production



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eco:P-extracted struvite



- Microcrystalline powder
- Raw material for fertilizer production
- 12,5 % P; 5,5 % N; 9,5 % Mg
- High nutrient availability
- Organic content usually <1 %
- Cd usually below detection limit
- Other heavy metals in lower concentrations than in artificial fertilizers

The eco:N process

- Combines ammonium stripping and crystallisation of ammonium sulfate
- Removal to >98 % of NH₄-N possible
- Production of solid ammonium sulfate



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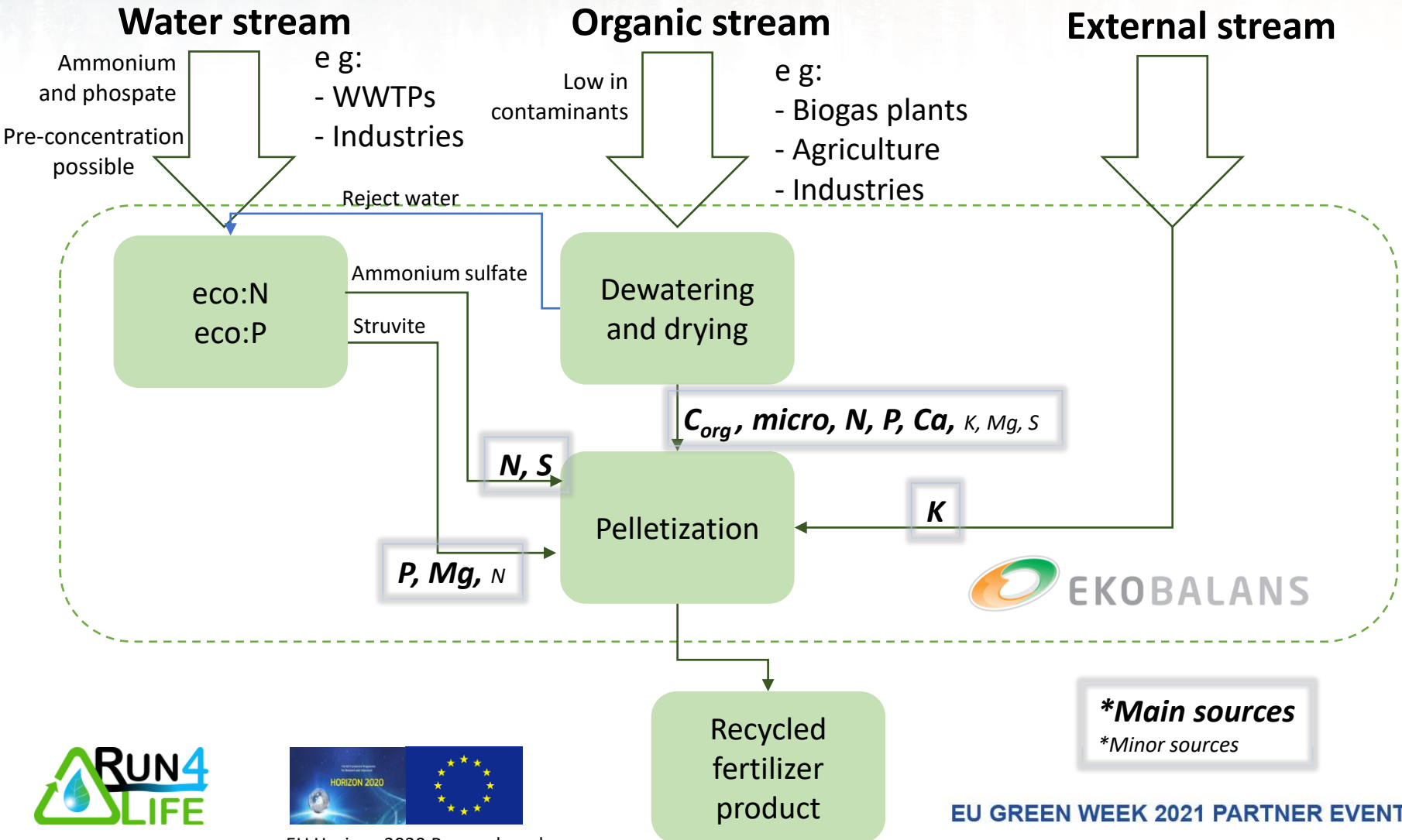


eco:N-extracted ammonium sulphate

- Approx 1 mm crystals
- Spreadable as is or raw material for fertilizer production
- 21 % N; 24 % S
- High nutrient availability
- Organic content usually <0,1 %
- Separation of N as gas => very clean N fraction



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***Main sources**

***Minor sources**



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Why pelletization?

- + Suitable when mixing organics and salts
- + Desired physical properties for efficient usage
- + Cost efficient in relatively small scale
- + Flexible



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EkoBalans' fertilizer products

- Complete and balanced nutrient content adapted to plant production requirements in the short and long term
- The organic matrix improves nutrient use efficiency and promotes soil health
- Carbon sink
- Can be spread with existing farming equipment



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Ekobalans offers

- eco:N and eco:P
- Complete plants for digestate refining
- eco:S – complete plants
- Repurchase of dried digestate, struvite, ammonium sulfate, biochar, and other fractions for productification
- Recycled fertilizer and soil improvement products



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