SYSTEMIC
Fact sheet
Recovery of nutrients and resources from digestate
2021

Market opportunities for advanced bio-refinery products from digestate

Nutrient source in biological water treatment

Extract from D 3.4 Market study for biobased fertilising products from digestate within a European context

Ammonia is used in several areas of water and wastewater treatment, such as pH control, in solution form to regenerate weak anion exchange resins, in conjunction with chlorine to produce potable water and as an oxygen scavenger in boiler water treatment.
Industrial waste water treatment with activated sludge (nitrification-denitrification) sometimes has to cope with lower COD removal efficiencies and floating sludge due to shortage in nutrients (N,P, micronutrients). This is seen in pulp-and paper industry wastewater ("white water"), forest industry wastewater treatment and in sectors where a lot of process water going to the wastewater treatment. Therefore, urea (40%) and phosphoric acid (75%) are dosed as macronutrients. The amount depends on the amount of COD in the influent.
Recovered nutrients (N and P) can be cheap alternatives for these industries.
Some companies can be afraid to try these "new" recovered nutrients, because their activated sludge system can be sensitive to contaminants, chemicals, detergents or peaks in COD. Tests at lab scale with their active sludge could be necessary to persuade them that the recovered nutrient products are not toxic for their active sludge and the required permits (e.g. resource declaration) should be requested.

Examples

A beverage industry only treating relatively small amounts of wastewater (e.g. 30m³/day) and COD requires only 0,36 L of Phosphoric acid (75%) and 6,6 L of urea (40%) per day. Replacing this with ammonia water (15%) would mean 22 L ammonia water/day. If mineral concentrate (6,12 g N/kg and 0,17 g P/kg) would be used, 190 L should be supplied. This would fill in 25% of the amount of P required as a macro nutrient.

A paper industry treating 200 m³/hour uses 80m³ of urea per week and 20m³ of phosphoric acid per month. Using ammonia water to complete the N demand would require 68m³ ammonia water (15%) per week or 590m³ of mineral concentrate.
A wastewater treatment from a chemical company treating 500 m³/hour uses 0,5m³ of urea and 2L of phosphoric acid per day. Using ammonia water to complete the N demand would require 1,7m³ ammonia water (15%) per day or 14m³ of mineral concentrate.