European Biogas Association (EBA) workshop discusses valorisation of digestates as fertilisers and proposals for Fertiliser Regulation (FR), waste legislation, REACH and Animal By-Product Regulation (ABPR).

A workshop on the Circular Economy was organised by the European Biogas Association (EBA) on 6 April 2016 in Brussels. The biogas sector uses a wide variety of input bio-materials including food waste, bio-waste, manure, sludge, forestry by-products and crop residues, producing digestate which can be a bio-fertiliser or further processed to additional fertiliser products.

Jan Stambasky, EBA president, opened the workshop. Biogas is a growing industry and a crucial sector for the bio-economy producing fertilisers, bio-based materials and renewable energy. Decentralized energy and fertiliser production can function as a potential source of local income in rural areas.

Erik Meers, University of Ghent and the Biorefine network (www.biorefine.eu), explained that anaerobic digestion and production of fertiliser from digestate can address the nutrient disconnect resulting from both regional concentrations of livestock, but also from the agronomic paradox that crop requirement and nutrient release from manure are not in line along the growing season, with the release of nutrients lagging behind. Digestate can be refined by the separation into solid and liquid fractions. The solid fraction can be treated by pyrolysis, drying or biothermic treatment to products like bio-oil, biochar and organic fertiliser. The liquid fraction can be treated by ammonia stripping, microbiological N removal, membrane filtration, evaporation and precipitation to products like ammonium sulfate, K-rich effluent, clean water, mineral concentrates, struvite and calcium phosphate.

Jonathan De Mey, the Biogas-E/DIGESMART project (www.digesmart.eu), presented the DIGESMART project: DIGEState from Manure Recycling Technologies. Solar energy could be used to enhance and improve drying of the solid fraction, both direct with an inclined roof dripping system or indirectly with electric energy from solar PV panels. The liquid fraction of separated digestate is the most difficult to valorise: nitrogen stripping reduces the N content and reduces transport distances (and so costs) for application in agriculture. Nitrogen stripping and absorption can reduce 80-90% of N in the digestate and reduce more than 88% of ammonia emissions. About 240 tonnes N/year can be recovered by a full scale stripping plant with a treatment capacity of 4,000-6,000 tonnes per year. The end product (using HNO3 for stripping) is a liquid ammonium nitrate solution (c. 52% solution = c. 18%N), which is almost free from
odours, impurities, and is chemically stable making storage and transport easy. The product can be applied by fertigation or as a foliar fertiliser.

Deticon (www.detricon.eu) claims an energy footprint of about 34 MJ/kgN for this process, compared to 43 MJ/kgN for average conventional ammonia production in Europe. Challenges were discussed regarding regulation, registration, storage, transport, commercialization and distribution of the product. At present, it is difficult to establish a good value for the product because it is bio-sourced and market demand still needs to adapt to a different supply source.

**Franz Kirchmeyr, vice president of EBA** (www.european-biogas.eu), presented the potential of digestate and biogas within the Circular Economy Package (CEP). He suggested that if available bio-waste would be treated with anaerobic digestion (AD) it would bring Europe 4000 additional biogas plants each with a size of 500 kW that could deliver 100,000 additional jobs. At the same time an energy reduction of about 15 PJ could be achieved by N recovery. In that case there is a large fertiliser potential including:

- 400,000 tonnes N
- 52,800 tonnes P (= 120,000 tonnes P2O)
- 373,545 tonnes K (= 450,000 tonnes K2O)
- 3,000,000 tonnes carbon

Summer catch crops do absorb nitrogen, but can also create losses through rotting process during winter time. About 50-60% from nitrogen and carbon in summer catch crops will be lost during winter rottting. On the other hand, digestate can be a good source of nutrients for agriculture but also improve soil properties: reducing soil bulk density, increasing water holding capacity, organic matter content and microorganisms. The main nutrient concentration of digestate (n=2000) on the basis of dry matter is about 10% N, 4.2% K and 1.3% P.

The digestate can be upgraded with separation, drying, pelletising, composting and liquid upgrading. After digestate separation 65-75% of total N and 70-80% of total K is in the liquid fraction, and 55-65% of total P and 60-70% total C is in the solid fraction. The current market shares of separated digestate in Germany is 91% for agriculture, 4% for landscaping, 4% for hobby gardening, and 1% for market gardening/horticulture.

**Piotr Barczak, European Environmental Bureau (EEB, www.eeb.org)**, facilitated a discussion in favour of separate collection of biodegradable waste. EEB lobbies for a mandatory separated
collection of bio-waste within the circular economy package. In present regulation separation is only obligatory if it is practically possible. According to EEB separated bio collection has always a (technical) solution. Even in urban areas collection is possible and there are several examples of cities doing very well pre- and post-separation of bio-waste like in the city of Milan. EEB Association advocates for mandatory separated collection of bio-waste since there are clear benefits, also for better recycling of other non-bio material such as paper, plastic and glass.

The European Compost Network (ECN, [www.compostnetwork.info](http://www.compostnetwork.info)), made clear they are in favour of mandatory separated collection of bio-waste, but with a transition time for specific regions and situation to adapt. A good alternative is home composting but best practice guidelines should be communicated.

Paolo Patruno, HEILIFE ([www.heilife.bio](http://www.heilife.bio)), presented their compostable bioplastic/biocomposite product development with a focus on bio-based diapers. 25 billion diapers are used each year within the EU. HEILIFE wants to create a full bio-based and degradable material value cycle, with composting or AD via municipal bio-waste collection and centralized treatment as final end step by which resources are recycled. Biodegradable plastics from natural sources are used instead of plastics based on petrochemicals. Additionally, bio-based diapers enable recycling of the nutrients contained in babies? urine and excreta. The price of the HEILIFE bio-based diapers is at present 15% higher, but this does not take into account the lower waste disposal cost to local authorities.

Johanna Bernsel, European Commission DG Growth presented the EU Fertilisers Regulation revision made public on 17th March 2016, see [SCOPE Newsletter n° 120](https://www.scope-network.eu/newsletter.php). The regulation proposal includes:

- Compliant products cease being waste
- Limit values for known contaminants
- An extension of the scope, notably to organic fertilisers
- A new legislative framework with generic safety and quality requirements, standards, and conformity assessment procedures
- Optional harmonization.

The objectives of the new Fertilisers Regulation are:
• Improved marketing conditions for sustainable fertilisers including levelling the playing field for primary & secondary raw materials, and the introduction of contaminant limit values
• Proportionate requirements including a main responsibility for the manufacturer, and keeping regulatory barrier as low as possible and as high as necessary
• A fertiliser with a CE mark can brought on the EU market irrespective of national fertiliser regulation
• No unnecessary market disruptions, Member States may allow other fertilisers on their markets without the CE marking.

Not yet covered, but being part of the discussion and could be implemented after adoption of the new regulation are, amongst others, processed manure and certain other animal by-products, struvite, ashes and biochar. The link with the Animal By-Product Regulation is now internally discussed with the objective of defining a point in the manufacturing chain at which animal by-products are free from ABP-Regulation and are taken over by the new Fertiliser Regulation. The interlinkages with the Nitrates Directive for processed manure and REACH for digestate are both subject to internal discussions.

Dominique Dejonckheere, Copa-Cogeca (www.copa-cogeca.be), presented their vision on the role of biogas in strengthening European agriculture. Copa represents 23 million European farmers and family members, Cogeca represents 22,000 European agricultural cooperatives. Their mission is to ensure a viable, innovative and competitive EU agricultural and agri-food sector, capable of meeting growing food demand. In promoting the views of European farmers, they are committed in developing the bioenergy/bio-economy sector. Biogas should be part of the bio-economy for alternative source of income at the farm level, better use of agricultural by-products, and better protection of the environment. As potential barriers Copa-Cogeca mentioned that the negative general public’s perception of bioenergy from biomass creates uncertain climate for investment. Additionally, they see biogas production only based on livestock manure as not efficient and realistic. In relation to the revision of the EU Fertiliser Regulation and organic waste valorisation, they advocate that:

• Farmers still predominately rely on organic matter of agricultural origin
• Exporting organic matter from regions with a surplus to those with a deficit must be facilitated
• Further incentives and investments to recycle nutrients in manure as a response to the
increasing scarcity of phosphorus are necessary

- Problems with organic fertilisers are linked to contaminants, heavy metals and microbiological organisms
- Farmers need high-quality fertilisers, and safe and appropriate labelling
- The cadmium level below 60 mg/kg P2O5 puts pressure on fertiliser prices, which further strengthens Copa-Cogeca’s proposal to cut import duties to zero
- End-of-waste criteria for digestate must provide a solid basis for their safe use
- Soil quality and consumer confidence must not be endangered in order to get rid of municipal waste
- EU end-of-waste criteria must not be less stringent than stricter criteria already in place at national level.

**Discussion and conclusions**

Concerning the proposed EU Fertilisers Regulation, participants made clear that “Digestate from bio-energy crops” is seen as strange category, and suggest a generic category for plant based digestates.

Sustainability in sourcing of recycled fertilisers is important, but is not taken into account as such in the present Fertiliser Regulation proposals: in the future sustainable labelling could fill this gap. See ISO 13065:2015 “Sustainability Criteria for Bioenergy” in [SCOPE Newsletter n° 117](#).

Participants underlined the need for an exemption for digestates from registration under REACH through (Annex V entry 12, see [SCOPE Newsletter n° 10](#)) and possibility for digestates to no longer be subject to ABPR (Animal By-Products Regulation, c.f. EU Fertiliser Regulation revision above)

Within the Waste Framework Directive, EBA proposes:

- Clear classification of AD as recycling (R3) technique and R1 (energy recovery)
- End of Waste status for digestate (c.f. Fertiliser Regulation revision above)
- AD treated manure via digestion shall not be considered waste
- AD treated by-products shall not be considered waste
- Ban on landfilling and incineration of bio-waste
- Obligation for separate collection of municipal bio-wastes
 Possibility to obtain product status (under revised EU Fertiliser Regulation and Waste Framework Directive) for further products from digestate which are at the moment under development.

Participants discussed difficulties with data for flows of organic carbon and nutrients in anaerobic digestion in Europe, both for integrated AD? (e.g. on-site digestion of sewage sludge in many municipal waste water treatment plants) and separately operated AD plants, taking either mixed or specific wastes and by-products. Often, flow data does not clarify whether it is upstream or downstream of AD, which is often an intermediate treatment step, possibly resulting in double accounting and confusion of data. Clear data is important to support decision making both on policy and on commercial investment in AD plant and in digestate processing to fertilisers. See for more discussion about the need for better nutrient flow data quality the DONUTSS work of ESPP (www.phosphorusplatform.eu/DONUTSS).

An ESPP summary of the draft Fertiliser Regulation proposal can be found in SCOPE Newsletter n° 120 www.phosphorusplatform.eu/SCOPE120


Information on further EBA workshops which are organised regularly: peon@european-biogas.eu

Return to the SCOPE In Press section.