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ESPP input to EU consultation

"Blue bioeconomy - towards a strong and sustainable EU algae sector"

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ESPP (European Sustainable Phosphorus Platform) welcomes the proposal of coherent EU actions to develop algae production and use. However, we regret that the proposed Roadmap does not actively address the important potential for recycling of secondary nutrients and CO2 to feed algae (Circular Economy), that is combining algal production with wastewater and/or offgas cleaning.

Growth and valorisation of algae offer significant potential for efficient production of a wide range of products, including fertilisers and crop biostimulants, animal feed or aquaculture feed, and this can be combined with use of algae to treat waste streams, in particular municipal wastewater.

Algae production is already used full scale to treat municipal wastewaters, **in particular for nutrient removal, thus recycling secondary nutrients to feed the algal production and enabling nutrient recovery** (review). Full scale installations are today operational, treating sewage, sewage sludge or sludge digestate (see examples Phos4You, Life-Algeacan, TL-BIOFER, UKWIR, Veolia, Severn Trent UK, SABANA… reviews here and here). Algae systems can be adapted to medium-large sewage works, and can also offer a robust solution for small sewage treatment systems, which can be significant for local Water Framework Directive quality status objectives.

Algae can also be used to treat other wastewaters, including digestate from food waste or manure (see e.g. ALG-AD) or industrial wastewaters (e.g. removal of pathogens, heavy metals, phenols, endocrine disruptors, …).

As well as nutrient removal, algae have been shown to remove and degrade antibiotics from wastewaters (Escudero et al. 2020)

Algal production from wastewaters can enable energy and resource efficient treatment, in both extensive systems reliant on sunlight or using intensive systems, whilst recycling secondary nutrients into algal biomass production. Algae production can combine wastewater treatment with e.g. biofuel production (here).

Subject to appropriate attention to possible contaminants which may be transferred to the algal biomass, the algae can then be valorised to energy or in production of fertilisers, biostimulants or other products.

Algae production can also contribute to air-cleaning and CO2 capture (e.g. Suez – Fermentalg or from cement production here …). Algal treatment of wastewaters can be combined with CO2 capture (e.g. here).

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ESPP notes that the proposed Roadmap recognises the **'regulatory gaps'** concerning algae valorisation, in particular **regulatory obstacles to the use of algae-derived materials in animal feeds, in fertilisers and in crop biostimulants**.

The **regulatory obstacles and lack of clarify are particularly important for algae grown on wastewater substrates or manure** (Animal By-Products = ABPs) and these need to be addressed, for example:

- Under what circumstances are algae grown in wastewater or in manure considered waste or subject to End-of-Waste or ABP End-Point requirements?
- Consequently, can algae grown in wastewaters be used as a CMC1 material in the new EU Fertilising Products Regulation?
- Are waste-grown algae excluded from Animal Feed by art 6(1) and Annex III of Regulation 767/2009?

We underline that the use of materials derived from algae grown using wastewaters in fertilising products or in animal feeds imperatively **must be subject to appropriate safety requirements (contaminants, pathogens).**

See the outline assessment risk assessment for a large scale microalgae facility, SABANA project report D2.2 Environmental Impacts Mitigation Guideline, May 31st 2018

The proposed Roadmap recognises that algae require nutrients to grow. A US National Academy of Sciences report concluded that 1-2 million tonnes of phosphorus and 6 – 15 million tonnes of nitrogen would be needed to grow sufficient algae to produce biofuels for 5% of US fuel demand.

For this reason, EU policy on algae should **promote recycling of nutrients from algae processing** (where nutrients are not required or not desirable in the product, e.g. biofuels) and should **prioritise production of algae using either secondary nutrients (from wastewaters) or excess nutrients from eutrophic surface waters**.

We suggest that the Commission evaluates and makes proposals for the following actions:

- Facilitate use of materials processed from algae grown on wastes as substrates, or which have themselves waste status, in production of EU Fertilising Products (Fertilising Products Regulation).
  At present, mechanically processed algae (no chemical processing or extraction) can be used under CMC2 (even if the algae is classified "waste", and so also if the algae has grown on a waste substrate).
  Algae can be used as inputs to compost CMC3 and digestate CMC5.
  Four taxa of algae are currently authorised under CMC7 (biostimulants), but only if not processed (other than drying, freeze-drying) and potentially other taxa of algae or micro-algae could be added to this list.
  Materials processed from algae can be used in CMC1, but not if the algae is classified "waste". However, the status under CMC1 of materials processed from algae which are grown on waste streams (fed by nutrients from sewage, manure, etc) is unclear.
- Similarly, clarify the possibilities of using algae which have been waste, or which are grown on wastes, in **animal feeds**.
- In both the above cases, **appropriate safety requirements** are essential (contaminants, pathogens)
- Define an EU strategy and actions to encourage the use of recycled nutrients / waste-derived nutrients to feed algae grown for different applications (rather than phosphorus derived from non-renewable phosphate-rock), e.g. algal production for energy and biofuels, CO2 capture, cosmetics, feed and food, etc. As above, safety requirements are necessary
- Develop **safety standards for algae**, application to algae grown on waste streams, algae classified as waste, and also to algae grown in polluted waters susceptible to contain contaminants, defining what contaminants or pathogens may pose risks, how to measure and monitor them, and general safety levels for different applications. In order to rationalise testing costs, identify conditions under which analysis of certain contaminants or pathogens can be considered not necessary (because they are not expected to be present).
- Identify whether EU "End-of-Waste" criteria for algae would be feasible

The European Sustainable Phosphorus Platform (ESPP) promotes the implementation of sustainable phosphorus management in Europe, in particular phosphorus recycling. ESPP is a non-profit organisation, funded by its members. The Platform has over 40 members from a range of different industries (water and waste companies, mineral and organic fertilisers, chemicals, recycling technologies), knowledge institutes and public establishments.