MEZT BV Response to request for consultation and feedback on the EU Renure Draft Directive dd 2024-04-19

Delft, May 3rd, 2024

MEZT welcomes the draft COMMISSION DIRECTIVE (EU) amending Council Directive 91/676/EEC as it regards the use of certain fertilizing materials from livestock manure as a major step towards mineral circularity in the agri-sector.

We support the clear formulation of the requirements for the Renure bio fertilizers as stated in the ANNEX in paragraphs (ii) and (iii). We don't understand the reason for requirement (iv) since the objective of the directive is to create the possibility to apply Renure products under similar conditions as raw manure, which can be applied without limitations to pathogens.

However, since the objective of the fertilizer regulation is to minimize emissions to air and water and to maximize mineral circularity in the agri-sector, we strongly suggest easing the limitation of production methods of fertilizing materials from livestock manure. As long as the required specs as mentioned in the ANNEX of the draft directive Annex III (c) par. (ii), (iii), (iv)) are met, further limitations in the production method of the circular fertilizer are counter-productive to obtain the objective of maximal circular use of minerals in the agriculture sector.

Paragraph (i) limits the permitted production methods of the defined Manure bio fertilizers to only three, whereas several other innovative technologies have recently emerged that can produce bio-fertilizers that meet the specs mentioned in the ANNEX III (c) in paragraphs (ii), (iii), and (iv).

Therefore we suggest to:

1: change the sentence in paragraph (i) (2)

From:

"a mineral concentrate obtained through reverse osmosis"

To:

"a mineral concentrate obtained through <u>separation techniques</u>".

Reverse osmosis is a separation technique generally used to further concentrate liquid fertiliser. But more separation techniques can provide circular fertilizers that meet the specs mentioned in the ANNEX of the draft directive.

If the EU prefers to be more specific on which other techniques to allow, we suggest adding a paragraph (i) (4):

"a mineral concentrate obtained through membrane separation techniques"

Or add a paragraph (i) (4):

"a mineral concentrate obtained through electrochemical membrane separation techniques"

Using modern membrane separation techniques and specifically electrochemical membrane separation, all of the specs mentioned in the draft directive ANNEX III (c) in paragraphs (ii), (iii), and (iv) can certainly be met (see appendix I).

If needed Prof Jules van Lier, professor in Wastewater Treatment / Environmental Engineering at Delft University of Technology is available to independently verify above facts (j.b.vanlier@tudelft.nl, +31 15 27 81615)

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About MEZT: MEZT (est. 2020) is a spin-off from the Technical University Delft, that focusses on mineral circularity and emission reduction in industry and agriculture.

Appendix I: Description of electrochemical membrane separation

Electrochemical membrane separation technique employs ion exchange membranes, facilitating the selective transport of nutrients from the liquid fraction of livestock manure and digestates. In the liquid fraction of livestock manure and digestates, nutrients are present as ions, with a low molecular weight. Clean water will be introduced on other side of the ion exchange membranes. The nutrients will, driven by an electric potential difference, be transported towards the clean water, through the ion exchange membranes. Uncharged organically bound carbon and organic nitrogen remain unaffected by this process, resulting in low to very low concentrations of both in the resultant fertilizer (quantifiable). Similarly, micro-organisms are not transported through the ion exchange membranes due to their relatively large size (larger than 20 nm), ensuring that pathogen levels in the produced stream do not surpass predefined upper limits (see reference 1).

Energy consumption of electrochemical membrane separation is relatively low compared to other techniques (definitively much lower than the widely applied traditional Haber Bosch process). No additional chemicals are needed. No unwanted waste-products are created. The possibility to selectively separate ammonia and potassium enables circular precision farming.

This technology has received endorsement as a suitable break-through technology for treating livestock manure and digestate from esteemed institutes such as TU Delft, represented by Jules van Lier, and WUR, under the guidance of Oscar Schouwmans. Furthermore, the maturity of this technology permits its implementation across a spectrum of scales, ranging from local farm applications to centralized manure treatment facilities.

1. Reference 1:

    - Authors: Jizhong Meng, Lin Shi, Shun Wang, Zhenhu Hu, Akihiko Terada, Xinmin Zhan
    - Title: Membrane fouling during nutrient recovery from digestate using electrodialysis: Impacts of the molecular size of dissolved organic matter,
    - Link: https://doi.org/10.1016/j.memsci.2023.121974
    - This paper writes that “no obvious COD was detected in the product solution” when the molecular weight of the organic matter (expressed as COD) in digestate had a molecular weight higher than 50 kDa (equivalent to approximately 2.4 nm). Furthermore, for a molecular weight of the organic matter between 1 – 5 kDa (equivalent to approximately 1-2 nm), 1.7% migrated into the product solutions.