

RE-LIVE WASTE- Improving innovation capacities of private and public actors for sustainable and profitable REcycling of LIVEstock WASTE

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1 Introduction - The problem

The development of intensive livestock farming throughout the European Union leads to environmental problems, such as soil, water and air pollution and contributes to climate change.

The concentration of a large number of animals indoors or in confined spaces, where animals are fed mainly on commercial feed, leads to waste and animal byproducts generation, both liquid and solid. Much of the quantity generated is disposed on the ground and around the farms. Despite legal restrictions and obligations, insufficient waste storage capacity often results in uncontrolled disposal. This often leads to higher pollutants concentration in sensitive environmental receptors than permitted.

The composition of livestock waste varies depending on the animal rear and feeding but, in general, it is characterized by high organic load, high humidity (above 80%), high concentration of nutrients (nitrogen, phosphorus, potassium), high electrical conductivity and increased boron concentration.

It is considered that agricultural activities, including livestock farming, are responsible for 50% of total nitrogen discharges into surface water. The impact affects both the areas around the farms and far away from them, making it a global problem.

Livestock and agricultural activities cause, among other things, emissions of ammonia (NH_4^+), which contribute to the soil acidification process, the eutrophication of water bodies and the pollution of the lower atmosphere with ozone together with other pollutants (sulfur dioxide, nitrogen oxides, volatile organic compounds).

Furthermore, all activities related to farming and the use of fertilizers cause the release of nitrous oxide (N_2O) and methane (CH_4), as well as greenhouse gases with global warming capacity 21 times higher than carbon dioxide (CO_2).

2 European legal framework

Directive 2018/851/EC which is amending Directive 2008/98/EC on wastes, is increasing the targets for preparing for re-use and recycling of waste, to make them better reflect the Union's ambition to move to a circular economy. According to 2018/251/EC, in order to provide operators in markets for secondary raw materials with more certainty as to the waste or non-waste status of substances or objects and to promote a leveled playing field, it is important that Member States take appropriate measures to ensure that waste which has undergone recovery operations is considered to have ceased to be waste if it complies with all the conditions laid down in Article 6(1) of Directive 2008/98/EC as amended by this Directive. Such measures may include the adoption of legislation transposing those conditions supported by procedures for their implementation, such as the establishment of material and application-specific end-of-waste criteria, guidance documents, case-by-case decisions and other procedures for the ad hoc application of the harmonized conditions established at Union level. Such measures should include enforcement provisions to verify that declassified waste following a recovery process complies with Union law on waste, chemicals and mixtures, in particular prioritizing waste streams that pose a higher risk to human health and the environment due to the nature and volume of such waste streams waste subject to innovative recovery procedures or waste recovered for subsequent re-use in other Member States.

Measures may also include the setting of a requirement on the operators recovering waste or holders of recovered waste materials to demonstrate compliance with the conditions laid down in Article 6(1) of Directive 2008/98/EC as amended by this Directive. In order to prevent illegal shipments of waste and to raise awareness among Member States and economic operators, there should be greater transparency in relation to Member States' approach to the declassification of waste, in particular with regard to case-by-case decision-making and the outcome of verification by the competent authorities, as well as the specific concerns of Member States and competent authorities regarding certain categories of waste.

The final determination whether the conditions laid down in Article 5 or in Article 6 of Directive 2008/98/EC as amended by this Directive are fulfilled remains the exclusive responsibility of the Member State based on all relevant information provided by the holder of the material or waste.

Furthermore, Directive 2009/1009/EC mentions that for certain recovered wastes, such as struvite, biochar and ash-based products, within the meaning of Directive 2008/98/EC, a market demand for their use as fertilizing products has been identified. Furthermore, certain requirements are necessary for the waste used as input in the recovery operation and for the treatment processes and techniques, as well as for fertilizing products resulting from the recovery operation, in order to ensure that the use of those fertilizing products does not lead to overall adverse environmental or human health impacts. For EU fertilizing products, those requirements should be laid down in this Regulation. Therefore, as of the moment of compliance with all the requirements of this Regulation, such products should cease to be regarded as waste within the meaning of Directive 2008/98/EC, and it should, therefore, be possible for fertilizing products containing or consisting of such recovered waste materials to access the internal market. To ensure legal certainty, take advantage of technical developments, and further stimulate the incentive among producers to make more use of valuable waste streams, the scientific analyses and the setting of recovery requirements at Union level for such products should start immediately after the entry into force of this Regulation. Accordingly, the power to adopt acts in accordance with Article 290 TFEU, should be delegated to the Commission in respect of defining, without unnecessary delay, larger or additional categories of component materials eligible for use in the production of EU fertilizing products.

Article 42(2) of Regulation (EU) 2019/1009 requires the Commission to assess biochar without undue delay after 15 July 2019, and to include it in Annex II to that Regulation if that assessment concludes that EU fertilising products containing that material do not present a risk to human, animal or plant health, to safety or to the environment, and ensure agronomic efficiency. Such an assessment has been concluded by the Commission based on a report by the Commission's Joint Research Center ('JRC') on technical and market conditions for a possible legal framework for the manufacturing and placing on the market of specific safe and effective fertilising products derived from STRUBIAS. The report includes technical proposals on eligible input materials and process conditions for STRUBIAS production pathways, quality requirements for STRUBIAS materials, and quality management systems. The report also provides information on the added value that the STRUBIAS materials could provide for food security, food safety, environmental protection, and the EU fertilising and agricultural sector.

In a meeting held during 23 - 24 of November 2020, the scientific committee completed the evaluation of the report prepared by the Joint Research Center¹. The aforementioned report evaluated all

¹ <https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/technical-proposals-selected-new-fertilising-materials-under-fertilising-products-regulation>

STRUBIAS products (STRUvite, Blochar and AShes). The result of the meeting was the proposed amendment of the Directive 2009/1009/EC, which was expected to be approved officially in March 2021 but it did not, yet. The amendment is foreseen to be put in effect along with the rest of the Regulation on July 16, 2022.

The text of the amendment amends Annex II of the Regulation (EU) 2019/1009, which refers to the component materials and adds to the categories of component materials (Part I) precipitated phosphate salts and derivatives. It provides the materials that can be used as raw material for the production of these components, the terms of the production process as well as quality standards. Finally, it amends Annex IV of the Regulation, which sets out the procedure for checking compliance with the Regulation.

It is important to note, that when this project was initiated in February 2018, all this regulatory framework was not available, and it became available to the project partners only towards the end of the project implementation where all the pilots were constructed and were fully operated. Hence, the struvite produced herein does not fully follow all the new limitations of its quality characteristics in all cases.

3 Purpose - Object of the Road Map

The purpose of this document is to support public authorities in the formulation of policies that recognize fertilizers deriving from livestock waste and incentive the adoption of innovations tested. In addition, this road map aims to:

- Raise awareness amongst policy makers about the economic and environmental benefits of the introduction of innovative technologies tested through the divulgation of the evaluation activities results.
- Raise awareness of local, regional and national public authorities about the strengths and weaknesses of actual policies in their influencing effect on the adoption by SMEs (Small and Medium Enterprises) of innovations for livestock waste management.
- Advocate public actors on the strategic policies they can set up in order to incentive the adoption of innovations for livestock waste management through their direct involvement in the formulations of policy guidelines and organization of regional thematic round tables.
- Support decision-makers and governmental officials to be prepared for the upcoming Regulation (EU) 2019/1009 amendment.

4 The Road Map

As part of Action 4.5 of the program "Re-Live Waste - Improving the capacity of the private and public sector in innovative, sustainable and profitable use of livestock waste" on the transfer of knowledge to public and policymakers, a round table discussion was held on the promotion of the production of struvite in European Regulation 1009/2019/EC.

The first part of the discussion among stakeholders from Bosnia and Herzegovina, included the description of the current situation regarding cattle production in the country. The issues that need to be addressed by the policymakers were found to be the following:

- Low level of farmers' education/ expertise

- Low milk production per cow
- Fragmented estates
- Small farms
- Inadequate infrastructure
- Waste management

Taking under consideration the above characteristics of the local production schemes, it is obvious that several steps need to be taken in the frame of farm size and technological equipment in order to advance and help local cattle production cover local needs and be more competitive to respective productions of neighboring countries.

The aforementioned situation could be better described using the example of milk production in Bosnia and Herzegovina. The increasing milk production quality standards cannot be met by the small farms. As a result, they quit milk production a fact that reduces the total number of dairy cows of the country. On the other hand, large farms have largely modernized their production schemes by applying advanced zootechnical measures reaching the level of production of high-tech European farms.

The current management of animal waste in Bosnia and Herzegovina is not in line with EU regulations and standards. Inadequate infrastructure and uncontrolled disposal of animal wastes pose risks for the environment, human and animal health. Although the relevant legal framework in Bosnia and Herzegovina incorporates the main provisions of the Nitrates Directive, in practice the level of compliance is not sufficient. Given the aspirations to join the EU, the implementation of the Nitrates Directive will become imperative. Within the Nitrates Directive, Annex II- Code of Good Agricultural Practice, a set of minimum requirements prescribed by the Nitrates Directive which prevent nitrate pollution and which every farmer should be well acquainted with. For this reason, it is of outmost importance for policymakers to make steps, as far as reasonably practicable, towards harmonizing Bosnia and Herzegovina's relevant legal framework with EU's Regulations and Directives as well as practical implementation of actual legal provision

Taking into account the characteristics and the current situation of farming practices in Bosnia and Herzegovina, it was concluded that the establishment of plants treating animal wastes is far from being adequately implemented. A proposed solution towards dealing with the problem of treating animal wastes, could be the transfer of wastes produced in small farms, that are unable to further process them, too big, modernized farms that might afford such an investment.

Finally, the need of finding funding tools was also addressed. One of the conclusions were that administration level need to provide favorable financial resources or incentives for the establishment of the plants for animal waste treatment.