Session Cross-cutting: April 11th 15.45 hrs

5s2: The environmental and economic consequences of adoptig circularity at different spatial scales

A CONCEPTUAL FRAMEWORK TO EVALUATE SAFETY OF ORGANIC FERTILIZERS

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Closing nutrient cycles is one of the basic pillars supporting the circular economy. To ensure food production over time the recycling of crucial nutrients into agro-food complex is most relevant. In today western lifestyle human excreta are considered as waste and treated accordingly. As a result approximately 30 % of the phosphorus input in food production is leaving the agro-food circle, either ending up in the ash after incineration or finding its way towards the oceans. It is expected that recycling will result into new organic and organo-mineral fertilizers becoming available in the near future. These products should meet criteria on nutrients, but should also be checked for the presence of unwanted substances. A limited number of substances are (inter)nationally regulated (either banned or allowed up to a certain level), but still a large number of substances is not and this number is still increasing due to the production of new chemicals for human and animal medicines, plant and weed protection and a wide range of industrial use. In order to evaluate the risks related to these (new) substances there is a need for a conceptual framework for the evaluation of the soil, plant, environmental and human safety. Current evaluation approaches of fertilizing products are largely based on static assessments based on levels of priority substances in products, partly based on –scientifically- outdated risk assessment principles. A much needed improvement therefore would be a systems approach that is able to focus on where (soil/water/product), to what extent and when (time) risks occur.

In the current knowledge-base (KB) project, a wide variety of chemical and microbial substances are listed and prioritized based on expert judgment. The prioritized substances for which knowledge is lacking are antibiotics. Therefore in the first study, lab-experiments are performed in order to evaluate mobility and stability of 10 different antibiotics in 41 well-characterized Dutch soil types. From this experiment, adsorption coefficients (K-OC) and half-times (DT-50) could be derived. Correlations between these parameters and soil characteristics are being evaluated. In the current phase, an

incubation experiment is executed with the same 10 antibiotics in sand and clay soil. Results will become available on a short term. The mobility and stability characteristics found in this study can be added in existing transmission models in order to improve the evaluation of the new organic and organo-mineral fertilizers.

The second prioritized substance is PFAS on which the project will focus next year.

Keywords: Risk evaluation, organic fertilizers, conceptual framework