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EU-wide monitoring of manure supporting the development of safe processed manure criteria

In order to promote the sustainable recovery of nutrients from manure, a careful evaluation of agronomic benefit versus possible risks to the environment and health is of pivotal importance. Such an evaluation should be the basis for the development of harmonised criteria that better assess nitrogen fertilisers that are partially or entirely derived from manure.

Within this framework, the role of agricultural application of manure (processed or not) in the propagation of anti-microbial resistance (AMR), interspecies exchange and antibiotic resistant genes as well as the role of veterinary antimicrobial agents is a priority field of research of the European Commission. Indeed, there is a significant data gap on the drainage of nutrients from lands that have been irrigated with treated wastewater or that have been fertilised directly with animal manure or derived biosolids (e.g. after digestion or further processing).

The European Commission plans to undertake a preparatory monitoring exercise that will address this and related concerns. When considering the risk of contamination of surface- and groundwater adjacent to lands that have been fertilised with animal manure or biosolids, the physico-chemical characteristics of antimicrobial agents (AMA) and of the matrix (manure) of interest must be considered.

Polluted runoff, caused by rainfall, snowmelt or irrigation, moves over and through the ground and carries natural and man-made pollutants that can potentially reach surface water and underground sources of drinking water.

The pilot study does not aim to characterise the respective test site. The underlying legal basis for the present initiative is provided by the Nitrates Directive¹.

The Nitrates Directive aims at protecting water from diffuse pollution (nitrates and eutrophication) from agricultural activity. To this end, the directive establishes restrictions on the use of fertilising materials that contain nitrogen in areas identified as having nitrate pollution in waters (Nitrate Vulnerable Zones - NVZs). Manure and manure-based fertilisers are subject to more stringent restrictions than mineral/chemical fertilisers that contain nitrogen. More specifically, the Nitrates Directive restricts the use of manure, including processed manure, to 170 kg of N/hectare per year in NVZs. This maximum limit for manure-based fertilising materials in polluted areas is based on the consideration that the associated environmental risk, especially the risk of nitrogen leaching, is higher for manure than for other fertilisers.

In line with the objectives of the Circular Economy Action Plan, there is an opportunity to encourage the use of recycled nutrients instead of nutrients from

¹ Council Directive of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (91/676/EEC)

primary raw materials. The main challenge is to obtain recycled nutrient resources that have an equal or better environmental performance than the primary nutrient resources they replace.

In this context, efforts are ongoing across the EU to develop manure-processing technologies that can transform manure into a safe and valuable agronomical resource that could be more widely used in NVZs. The challenge remains as to how to apply scientifically sound criteria to ensure the agronomic and environmental performance of these new materials.

Background

Veterinary medicinal products (VMPs), many of which are administered as AMAs, are excreted by the treated animals in the form of unchanged parent substances and metabolised compounds.

The excrement from stabled animals in Europe and North America is collected and stored mainly as liquid or solid manure before it is used as fertiliser on arable land and grassland.

Biocides, which are used for the disinfection of stables, end up in the stored animal excrements.

Via manure application in agriculture, veterinary medicines and biocides are released into the environment and consequently affect soil and water quality.

Description of potential participants

The participant shall ensure the following:

- The test sites shall be located in a River Basin, thus offering interesting macro-regional information.
- The test sites shall be geographically well situated thus facilitating dispatch operations.
- The test sites shall offer access to groundwater wells and surface water bodies that receive agricultural runoff, thus allowing for a complete assessment on AMA/AMR propagation.
- Large-volume sampling shall also be possible (5 to 10 litres). This is necessary for AMR determinations.
- Cooling logistics for storage until dispatch shall be available.
- The activity can be embedded into ongoing field experiments and activities.
- The manure application schedule shall be made available thus ensuring a seasonal comparison when possible.

Terms of sampling campaign execution

Once selected, the participant will host JRC personnel for site inspection and will share relevant information on his/her own agricultural practices.

This information will serve to define the sampling campaign execution strategy and the types of samples to be collected.

Sampling shall be carried out in two different ways:

- JRC personnel shall visit the participant and execute the sampling, or
- The participant shall be provided with a sampling device for water sample collection by the JRC.

The device is a flexible, versatile, and easy-to-use system. It is portable (it weighs only 6 kg) and it is designed for the on-site extraction of environmental water samples (e.g. surface- and groundwater samples, reclaimed waters from wastewater treatment plants), ranging from 1 to 20 litres. It allows for the reduction of the volume of the storage facility, while increasing the stability of samples.

Video instructions will be provided as a training tool to the personnel involved in the sampling activity.

The JRC will bear the full costs of the sampling campaigns, analysis and scientific data evaluation.

The duration of the sampling activity and the type of samples to be collected will be defined once the enrolment phase is concluded.

The involvement of the participant will be limited to:

- providing JRC personnel with site access (in those cases where the JRC will execute the collection of samples);
- Assisting JRC personnel when present on-site;
- Collecting water samples according to the agreed sampling scheme (in those cases where the participants will undertake the sampling exercise);
- Supporting the delivery and collection of samples and sampling devices (in those cases where JRC personnel will not be on-site).

Delivery and collection of samples and sampling devices will be organised by the JRC Delivery Service at no cost to the participants.

The participants will be asked to provide a contact name for the courier service.

OUTPUT

This pilot exercise aims to assess the feasibility of the developed sampling strategy and analytical methodology to tackle the risk of contamination of surface and groundwater adjacent to lands fertilised with animal manure or biosolids.

Manure and water samples collected in the framework of the pilot study will be processed and analysed for the detection and quantification of some selected chemical compounds of interest.

The list of the compounds of interest will be compiled in advance and shared with the participants.

A dataset of concentrations in the proper matrix will be the main output of the analytical activity.

The dataset of concentrations is expected to be published on IPCHEM², the Information Platform for Chemical Monitoring, in line with Directive 2003/4/EC on public access to environmental information.

The dataset of concentrations shall be made available to European Commission services, EU agencies, EU national bodies and the general public under the conditions of free, full, open and timely access.

² <https://ipchem.jrc.ec.europa.eu/RDSIdiscovery/ipchem/index.html>

According to the IPCHEM Data Policy, exceptional accessibility regimes that restrict access to specifically identified datasets of concentrations may be implemented, if requested.

The conditions under which individual datasets shall be made accessible to IPCHEM users are stated in the Participation Form (Annex I to the present notice).

The results of this activity will be used in compliance to the Commission Decision of 12 December 2011 on the reuse of Commission documents³.

³ <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2011:330:0039:0042:EN:PDF>