Research Proposal Summary Paper – 2023

Proposal 1: *Alternative control growing media for REAL CCS plant response tests*

Scope: The current CCS Plant Response Test method compares the growth of plants (tomato and optionally field bean) in a 'control' peat medium against a mixed medium of peat and 'test' compost sample. Considering growing regulatory restrictions on peat extraction/sale and the environmental importance of peatlands as a carbon sink and natural habitat, this project aims to evaluate and test alternative control growing media for use in the PRT method.

Objectives:

- To evaluate different growing media (including those made from mixed materials) as potential alternatives to Irish Sphagnum moss peat for use in CCS PRTs
- To identify preferred alternative control growing media for the CCS PRTs
- To advise changes to the CCS PRT methods and quality control criteria

Scheme Relevance: CCS

Proposal 2: *Evaluating antibiotic and azole resistant microorganisms in waste and organics recycling pathways*

Scope: Antibiotic resistant bacteria and azole-resistant fungi have been identified in food wastes. Yet, much remains unclear about these microorganisms in waste and organics recycling pathways (e.g., presence in feedstocks, whether they can survive treatment, presence in liquid vs solids, whether they can be aerosolised and travel downwind of sites, and their presence in products). As organic wastes recycle in the environment and may be a pathway to resistance, this raises concerns about the potential impacts on the environment, certification, and the marketing of products of such sites.

Objectives:

- To understand presence/absence of resistant microorganisms in organic waste feedstocks from commercial/domestic sources
- To determine if such microorganisms survive current treatment processes at a range of sites (e.g., AD, in vessel and open windrow)
- To measure if the sites are impacting their local environments
- To determine whether such microorganisms are found in the distributed product.

Scheme Relevance: CCS and BCS

Proposal 3: *Identify the benefits to compost by blending it with a biochar derived from compost oversized material*

Scope: This project would assess the effects of adding biochar produced from the oversize fraction of the composting process to compost. The project aims to investigate the effects of the biochar-compost mixture on plant growth, nutrient uptake, soil biota activity and crop yield, and to establish any benefits over using standard PAS100 compost. It also aims to evaluate the economic feasibility of using biochar in agriculture.

Objective: To investigate the effects of adding biochar to compost on soil and plant health, as well as the potential financial benefits for farmers.

Scheme Relevance: CCS

Proposal 4: *Monitoring the quality of organic waste arriving at Composting and AD sites and fed into the process*

Scope: This project would sample AD and composting sites for physical contaminants (PCs) in wastes delivered—food wastes (FW) and co-mingled food and garden waste (FW+GW)—*and* after pre-treatment step(s) to remove PCs. The aim of the project is to have a proven, tested methodology for measuring PCs in FW and FW+GW delivered to AD and composting sites and PCs in such wastes after pre-treatment.

Objectives:

- To ensure PC sampling is valid
- To understand challenges operators face in managing physically contaminated FW and FW+GW deliveries and the efficacy of current on-site waste pre-treatment technologies/step
- To calculate the costs of managing PCs so operators and industry have visibility of such costs and improved capacity to negotiate PC reductions with waste suppliers
- To propose, if needed, recommendations relevant to regulations, legislation and/or guidelines on contract clauses that control or influence FW and FW+GW waste collection

Scheme Relevance: CCS and BCS

Proposal 5: *Update the risk assessments for compost and digestate to inform Quality Protocol revision*

Scope: Revision of the risk assessments (RAs) for compost and digestate to inform the quality protocol revision. The project would focus on three areas:

1. Are the risk scenarios that underpin the existing QPs still valid?
2. Are the exposure assumptions and parameter choices still valid?
3. Are the assessment criteria still valid?

Objectives: To produce revised RAs for compost and digestate that have also considered latest available research and additional markets that can be submitted to the EA in time for the Quality Protocol revision work. In addition, individual operators will be able to use the RAs as part of considering and/or making a relevant, case-specific application to the EA's End of Waste Panel.

Scheme Relevance: CCS and BCS

Proposal 6: *End of waste case information for digestate derived products*

Scope: Building on the previous Research Hub project on digestate processing and valorisation, this project would look at high commercial readiness products. A final report would bring together:

- How the material will be used and in what market(s)
- Whether market or demand exists for such a material
- Whether the material fulfils the technical requirements for the specific purposes and meets the existing legislation and standards applicable to products
- The overall environmental or human health impacts from use of the material

Further, the project would identify a relevant comparator(s), for each digestate-derived product. The digestate derived products would be compared to the non-waste comparators.

Objectives: To research and put together information on digestate derived products, how they can be used, the demand for them and how they compare to a non-waste comparator, that could be used to submit for an end of waste decision from the Environment Agency or to inform the revision of the AD Quality Protocol.

Scheme Relevance: BCS