ATBEST: Synergies from co-digestion of grass silage with other feedstocks (RMIS 6473)

Biogas production is a mature technology but is not uniformly well understood, broadly exploited or evenly distributed across Europe. There are significant technical challenges facing interested parties in the optimisation of the production and utilisation of biogas which must be overcome to enable minimum sustainability thresholds of the European Commission be met. There is a need for greater scientific consensus and technical standardisation within the European biogas sector. This requires comprehensive interaction between researchers with cross-disciplinary skills and expertise. Through industrial exposure and focussed network training, ATBEST is developing the skills base of its participants to meet these needs.

The Teagasc Grange input to ATBEST aims to bring enhanced scientific understanding of the biological mechanisms ongoing during the anaerobic digestion of silages, slurries and their mixtures. It will also calculate financial values for each feedstock and assess the impact of alternative feedstock production prices on their inclusion in biogas production. Guidelines will be established for optimal matching of silages and animal slurries as feedstocks for biogas production.

The specific aims of this research are to:

1. Quantify the methanogenesis interactions between contrasting silages and cattle slurry during anaerobic digestion.
2. Quantify the methanogenesis interactions between grass silages and contrasting slurries.
3. Define criteria for identifying optimal mixtures of silage and slurry for co-digesting when producing biogas.
4. Undertake a cost analysis of alternative options when digesting silage, slurry or their mixtures for biogas production.
5. Undertake a full technical, biological, energetic, labour and financial quantification of a farm-scale anaerobic digester using silage and slurry for biogas production.

The components of this research involve:

a) Refinement of methodologies required for studying anaerobic digestion at laboratory or farm scale.
b) Operation of a small-scale laboratory-based biogas system to monitor digestion dynamics during biogas production.
c) Running feedstock costing models to assess the impacts of contrasting scenarios relating to co-digestion of silages and slurries (or, alternatively, the monodigestion of these feedstocks).
d) Operation of a farm-scale anaerobic digestion facility and undertaking a full technical, biological, energetic, labour and financial inventory.

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