The Anaerobic Digestion Process

Anaerobic digestion is a process in which bacteria break down organic matter, such as animal or food waste, without oxygen to produce biogas and digestate which is a nitrogen rich fertiliser. This process takes place in a sealed, oxygen free tank called an anaerobic digester (AD). As the bacteria consume the organic waste, they give off biogas (typically around 60% methane (the primary component of natural gas) and 40% carbon dioxide) which rises to the top of the digester. The solid content of the food waste falls to the bottom of the digester and this is extracted to make a nutrient-rich organic fertiliser.

In simple terms, the system is much like a huge stomach, and, like all stomachs, it requires regular feeding and a healthy balanced diet. To provide just the right recipe for the bacteria, the food must be prepared and have any packaging removed.

All packaging including plastic, foil, cartons and composites should not go into the digester and so have to be mechanically separated from the organic material by de-packaging. This process is part of the pretreatment stage of AD together with blending, screening and removal of contaminants such as grit.

The biogas produced in the digesters during the process can be used as a fuel in a combined heat and power unit to generate renewable energy such as electricity and heat or upgraded through cleaning and subsequently fed into the national grid. The digestate (biofertiliser) is pasteurised to kill any pathogens before being used on farms instead of chemical fertilisers.

The Government, Defra, Welsh Assembly, Scottish Parliament, Friends of the Earth and National Farmers Union recognise AD as one of the best methods for food waste recycling and dealing with farm waste and sewage sludge.

The AD process is presented below.

Slurry and manure
Food and amenity waste
Crops and residues
Anaerobic digester
Biogas
Digestate
Power
Heat
Biomethane
Gas grid
Transport fuel