



How Anaerobic Digestion Works:

EEC Energy

Anaerobic digestion is used to break down the starch and cellulosic components of crop residue to produce biogas for electricity generation. The decomposition of organic matter under anaerobic conditions produces amino acids, carbon dioxide, hydrogen sulfide, and methane. All these gases are either very toxic (hydrogen sulfide) or contribute to lack of sufficient oxygen (carbon and methane). Biogas under most circumstances will burn directly from the digester. For applications in internal combustion engines, the carbon dioxide and hydrogen sulfide must be removed. EEC's AD System includes methods for biogas capture, scrubbing and usage.



The aim of anaerobic digestion is to decompose as much organic matter as possible and produce as much biogas as possible. This requires a high quantity of degradable starch, and a little cellulose. Grain straw, grass, and citrus residues are not the best organic materials. Animal manure, on the other hand, contains much degradable carbohydrates, has little cellulose, and has a relatively high nutrient level. More carbohydrates may be desired depending upon the type of animal manure being used. Poultry manure is lower in organic material than crop residues and is higher in organic material than manure from swine or ruminants (cattle, sheep, and goats). Thus, crop residue alone is not desirable for the production of biogas; a mixture of animal manure and crop residue is most desirable.

Manure as a Valuable Resource:

Nitrogen plays an important role in soil conditioning and re-feeding to animals since it is a necessary nutrient for both. Nitrogen also plays an important role in aerobic and anaerobic processes; however, these processes change the form of nitrogen, which may influence its availability to plants, volatility, or leachability.

Nightsoil and manure constitute better inputs for anaerobic digestion when combined with crop residues. Even with the rigorous decomposition that occurs in the digestion process, some pathogens and parasites can survive and enter the soil. This is very dangerous as these pathogens and parasites, can eventually reinvade the human body. EEC's AD System operates in the thermophilic temperature range (55°C) ensuring the highest level of pathogenkill. Other methods include drying the effluent for an extended period of time (i.e. composting). However, since ammonia is quite volatile, nitrogen loss would be substantial and the manure's value as a fertilizer is lost. Crop residues and animal manure not only fertilize the soil, but also go along way to maintaining healthy soil, while providing nutrients to crops without chemical fertilizers.

