

# Manure treatment

## Application . . . . .

Colsen has developed a cost effective and sustainable methodology for treatment of manure originating from intensive farming.

This manure treatment consists of a combination of technologies, such as thermophilic digestion equipped with DIGESTMIX<sup>®</sup>, ammonia stripping using AMFER<sup>®</sup>, phosphate production using ANPHOS<sup>®</sup> and post-treatment of the liquid fraction using a NAS<sup>®</sup> system.

During thermophilic digestion biomass (the manure) is converted into biogas. The residue is called digestate. Ammonia present in the digestate can be reclaimed in the form of ammonium sulphate after stripping with AMFER<sup>®</sup>. Both processes operate at temperatures between 50 – 60 °C. The air used for stripping can be extracted from the stables thus facilitating a simultaneous air treatment.

This digestate is separated in a solid and a liquid fraction. The liquid fraction can be further purified using a NAS<sup>®</sup>-MBR system. The purified water can be further treated with ANPHOS<sup>®</sup> to produce 'struvite'. The residual water can be discharged to a WWTP.

A fraction of the solids is circulated to the digester, thus increasing the production of biogas. The actual amount of solid residue is reduced to ca. 10% of the original influent and can be further dried to generate compost. In case the biogas is further desulphurised using BIDOX<sup>®</sup> the bio-sulphuric acid produced can be deployed for the production of ammonium sulphate using AMFER<sup>®</sup>.

## Results . . . . .

The economic feasibility of manure digestion is supported by energy production from the digester with potential co-digestion of other organic substrates. The high yield of thermophilic fermentation results in enhanced biogas production and thus maximizes the revenues.

During overall manure treatment not only energy is produced but also useful nutrients can be reclaimed, e.g. ammonium sulphate ((NH<sub>4</sub>)<sub>2</sub>SO<sub>4</sub>), struvite (MgNH<sub>4</sub>PO<sub>4</sub>·6H<sub>2</sub>O) and compost.

The energy consumption of the overall installation including water purification is limited to about 15 - 20% of the total electrical energy generated (it must be noted however that this figure depends on the design and size of the installation).

An interesting side effect of this sustainable approach in manure treatment is the fact that it allows for extension of intensive farming.



*Biogas engines for energy production*

EN-2015