



Dry anaerobic digestion as an alternative management & treatment solution for sewage sludge

With the contribution of the European financial instrument for the Environmental (LIFE+) programme (LIFE14/ENV/ES/000524).



Alguazas WWTP (Murcia, Spain)
Wastewater inflow: 3,500 m³/d
Urban area: 60,000 inhabitants



Life-ANADRY Solution

Innovative dry or high-solids anaerobic digestion technology for sludge treatment and management applicable in medium to small sized wastewater treatment plants (WWTPs)

Main results and conclusions

Objectives

- Demonstrating the technical-economic viability of dry AD technology.
- Design and construction of 20m³ the dry anaerobic prototype.
- Implementation of the prototype in thermophilic and mesophilic conditions.
- Improving the quality of the sludge produced in WWTP.
- Reducing GHG gas emissions due to the reduction sludge minimization and the dry AD.
- Promoting the inorganic fertilizers substitution due to the use of sludge recycled in agriculture.

Thermophilic (55°C)	Mesophilic (35°C)
<ul style="list-style-type: none"> • Complete higienization (E.coli and Salmonella). • Low biogas (partial inhibition /acclimatation) at HRT 40-30-20d. • High free ammonia, instability. • Control Sulphide with FeOH (H₂S<500ppm) 	<ul style="list-style-type: none"> • Complete higienization (>90% E coli and salmonella). • Stable operation at HRT of 30, 20, 15 and 12d. • High production biogas (Q≈ 25 m³/d ; CH₄ >60%). • Higher performance (higienization, stabilization, and biogas production). • Control Sulphide with FeOH (H₂S<500ppm)





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Economic study

Conclusions

Alternative 1
WWTP existing

→ The best option in mesophilic conditions is the valorization of biogas via dual engine (diesel-biogas). Undigested sludge were removed at a cost of 35 €/ton for example, an IRR of 17.3% and a return period of 7.1 years would be obtained.

Alternative 2
New construction

→ The best option Electrical valorization (CHP) is the most advantageous, since it would allow obtaining a IRR of 21.5% and an investment return time of 5.7 years if the non-digested sludge was managed.

Alternative 3
Centralized plant

→ The best option is a centralized plant to treat the sludge produced in several WWTPs, all adding a treatment capacity of 125,000 m³/d of wastewater, and valorizing the produced biogas in a cogeneration engine. That system offers a 25.2% IRR and 4.6 years of investment return time.

Alternative 4
Other sectors

→ The best performance is the 4'a, which corresponds to the DAD system with co-digestion of organic waste under mesophilic conditions and valorization of the biogas in the boiler.

Dissemination and networking



Life-ANADRY Consortium

