



SOLUGEN
PIG SLURRY TREATMENT TECHNOLOGY
ECONOMICAL AND ENVIRONMENTAL BENEFITS

Table of Contents

Preamble	3
The treatment process	3
Products extracted from slurry treatment with Solugen technology	3
Technological benefits	4
Energy required for operation	4
Heat recovery	4
Products involved in the treatment process	4
Automation	5
Economic benefits	5
Environmental benefits	6
Environmental co-benefits	6
Summary of benefits	7

Preamble

The Solugen solution has been developed to provide a pragmatic response to the constraints generated by the problem of treating contaminated water and in particular, the conventional management of pig manure. Emphasis was placed on the development of a low-energy solution combining technological and economic advantages with environmental benefits.

The treatment process

There are two main steps in the processing process:

- Liquid-solid separation
- Treatment of the residual liquid mass by evapo-distillation, which enables the separation of the treated liquid into three by-products:
 - Pure water
 - Bio-liquid: ammonia nitrogen
 - Bio-liquid: potassium concentrate and phosphoric residue

Products extracted from slurry treatment with Solugen technology



Liquid fraction: 90 % of pig slurry volume

Solid fraction: 10% of slurry volume



Clean water: 84% of slurry volume

Ammoniacal nitrogen: 1,5 %

Potassium concentrate: 4,5 %

Technological benefits

Energy required for operation

The system runs on electricity. The solution is energy-efficient, 30 kWh are enough to treat one cubic metre of manure.

Heat recovery

The solution operates continuously and recovers in a closed circuit the heat initially produced to evaporate the liquid manure to heat the slurry when it arrives in the evaporator. In addition, during the compression of the vapours produced, the heat exchange carried out in the condensation tubes allows the phase change of the constituents resulting from the treatment (passage from the gaseous state to the liquid state).

Automation

The solution is fully automated, allowing the user to remotely monitor the correct operation of the process, to validate the treatment parameters and to be informed in case of malfunction.

Economic benefits

The solution proposed by Solugen is based on a continuous treatment of the slurry pumped from the pre-pit. This eliminates the need for slurry pits. This results in numerous economic advantages:

- Since the Solugen technology is housed in a small building (50x60 feet for a system that can process up to 20,000 m³ of slurry yearly), the farmer has the possibility to increase production without having to build new slurry pits. In an equivalent area, the farmer can increase his production fourfold by replacing the pits with hog production buildings.
- Making the swine industry more dynamic by increasing production creates jobs at all levels of the production chain (cooperative, farm, slaughter, processing, animal food production, etc.).
- These advantages will result in increased international competitiveness (increased production, brand image of the sector, use of clean and eco-responsible technologies).
- Competitive operation costs compared to the conventional manure management
- In addition, by reducing the number of round trips on the roads by spreading vehicles, the impact on road maintenance is also reduced, as are the related costs.
- Finally, the Solugen technology uses electricity, a clean and inexpensive energy source. The deployment of Solugen systems contributes to government expectations for regional electrification and to this impact on regional economies.

Environmental benefits

The environmental advantages offered by Solugen technology are numerous:

- Use of clean operating energy that considerably limits the constraints of spreading and in particular the use of fossil fuels to transport the slurry
- Reduction of 90 to 95% of the greenhouse gases normally emitted during the storage and spreading of manure. A Solugen system treating 10,000m³ of slurry per year results in a reduction of 572 t CO₂ per year.
- Significant reduction in the risk of eutrophication of streams and water bodies.
- Optimised phosphorus management
- Recovery of pure water up to 84% of the volume of manure treated. This water can be used for cleaning livestock facilities for example, or can be discharged into watersheds without negative impact on the environment.

Environmental co-benefits

In addition, the Solugen solution offers environmental co-benefits such as:

- Reduced risk of deterioration of drinking water sources,
- Reduction of NH₃, CO₂ and H₂S emissions,
- Alternative solution to replace some of the mineral phosphorus used in agriculture. It should be noted that sources of mineral phosphorus are limited and show a deficiency in the medium term. The end of mineral phosphorus could generate an agricultural crisis.

Prevention

- Risk of manure spills
- Reduction of high levels of phosphorus saturation in the soil reducing degradation of watercourses through eutrophication
- Revitalisation of dry & wet habitats

Respect for the carrying capacity of the ecosystem

- Reducing the risk of over-application of nitrogen and phosphorus.
- Responsible production: increased use of manure as a fertilizer in terms of timing, content and uniformity, thus reducing the need for mineral fertilizers applied to crops.
- Preservation of biodiversity

Greenhouse gases

Solugen's technology allows a significant reduction of greenhouse gases. 90 to 95% of GHG emissions associated with manure management are reduced with our system. In addition, GHG emissions associated with fossil fuels (transportation and land application) are also significantly reduced.

Summary of benefits

Benefits	Economical	Environmental	Social
Contribution to modernizing and increasing pig production	X		
Creation of jobs in the swine industry as a result of potential production growth	X		
Increasing the competitiveness of the pork industry, particularly internationally	X		
Important reduction in operating costs.	X		
Time saving and day to day process optimization	X		

Substantial reduction in the costs of maintaining manure transport vehicles	X		
Reduced impact of manure transport vehicles on roads	X		
Creation of a circular economy by revalorizing the organic fertilizers resulting from the treatment process (ammoniacal nitrogen, potassium concentrate).	X		
Optimized water management	X	X	X
Reduction of 90 to 95% of the greenhouse gases normally emitted during manure storage and spreading.		X	
Carbon credits: A Solugen system treating 10,000 m3 of manure/year generates an annual reduction of 572 tCo2.	X	X	
Significant reduction in the carbon footprint of vehicles transporting manure for spreading.		X	
Drastic reduction in the risk of eutrophication of watercourses.		X	
Optimized phosphorus management.	X	X	
Contribution to the preservation of biodiversity Significant reduction in the risk of accidental manure spills		X	
Solugen eliminates 90-95% of the foul odours emitted during the storage and spreading of manure.			X
Socio-acceptability. Better brand image of the pork industry.			X