

Selco Murcia wastewater reuse

Application: Pig slurry wastewater treatment and manure handling system for water reuse

Capacity: 8,100 gpd (31 m³/d)

Location: Murcia, Spain

Commissioned: February 2002



challenge

Spain has experienced significant growth in the hog and dairy industry over the last few years. With more stringent environmental legislation from the European Union and increasing water scarcity, conventional systems for manure treatment are not meeting industry needs. Mechanical separation, lagoon spreading and irrigation are no longer sustainable.

The Farm School of Murcia University's Veterinary Science Faculty in Spain spans over 16 hectares and has the necessary infrastructure to undertake different agricultural production systems. The School decided to implement a waste management system with the potential for water reuse. With over 1,000 animals and approximately 4.5 million Euros in investment, the Farm School needed a centralized plant to treat the manures and stockbreeding by-products.

solution

The University of Murcia selected the SELCO-ECOpurín process to treat pig slurry from the Farm School. This process was developed by Selco MC a Spanish engineering company specialized in treatment systems for swine manure and other livestock waste products. There are 17 plants of this kind in Europe and the United States. An integral component of the process is the ZeeWeed* MBR (membrane bioreactor) system supplied by SUEZ.

The ZeeWeed membrane fiber has a nominal pore size of 0.04µm, which provides a physical barrier to biomass, bacteria, and viruses, retaining them in the process tank. Without the need for chemicals, the ZeeWeed membrane can handle extreme variances in feedwater, and can operate in high MLSS concentrations of up to 20,000 mg/L.

Electricity is the only power source required for the plant; its installed capacity is 65.8 kW. Energy consumption is 400 kWh/day, which is equivalent to 8.5 kWh/m³ of pig slurry. Solids from the SELCO-ECOpurín process are used for composting while the treated water from the ZeeWeed MBR process is reused for cleaning and irrigation purposes.

process overview

The plant is designed with a nominal capacity of 33,000 USgal (125 m³) of slurry and manure per day and has a footprint of 52,840 USgal (200 m³). Fresh pig slurry passes through the SELCO-ECOpurín system, which consists of an ionic transfer unit, a rotating drum filter, a dehydration unit, and a Dissolved Air Flotation (DAF) unit to further remove suspended solids. DAF effluent flows into three biological process tanks: anaerobic, anoxic, and aerobic. The biological stages are followed by an immersed ZeeWeed MBR to eliminate biomass and pathogens.

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The membrane system is designed to treat a peak flow of 8,100 gpd (31 m³/d). Filtration is achieved by drawing water from the outside to the inside of the membrane fiber under a low-pressure suction of -1 to -8 psi (-7 to -55 kPa). The treated water is then con-

veyed by the permeate pump to the main permeate collection pipes. With a nominal pore size of 0.04 μm, the ZeeWeed membranes form a positive barrier to solids, bacteria, pathogens, and certain viruses, retaining them in the process tank until rejected.

Typical Treated Water Results			
Influent Manure	After SELCO ECOpurin Process	After ZeeWeed Treatment MBR	Removal Efficiency
9,594	1,425	11.7	99.9%
16,531	6,254	361.8	97.8%
7,642	1,323	33.4	99.6%
1,496	1,025	169	88.6%
1,071	846	159	85.1%
206	31	19.8	90.4%

treatment process

