



Wastewater Treatment at "Quesos Alimer" Cheese Factory Using Toray MBR

INTRODUCTION

Quesos Alimer, a prestigious cheese factory in south-east Spain, specializes in crafting pure goat's cheese made with milk from over 250 local farms. The company is known for combining traditional methods with modern culinary trends and enjoys national and international popularity for its cheeses. Yet the cheese production process generates considerable amounts of wastewater, which must be treated before being discharged into the municipal sewage system. To meet the stringent water quality standards, the dairy has installed Toray's advanced membrane bioreactor (MBR) technology, which ensures both operational efficiency and environmental compliance.



Figure 1: Goat cheese manufactured copyright Quesos Alimer

PROJECT BACKGROUND, CHALLENGES, AND SOLUTION

Quesos Alimer required an efficient solution for treating the wastewater generated during cheese production. This wastewater contains high levels of organic matter, fats and suspended solids, which represented a challenge for effective treatment and compliance with strict local discharge regulations.

To overcome these challenges, Instalaciones Hergasa was contracted to implement a new wastewater treatment system and following a 5 month construction phase, the project was successfully commissioned in June 2023.

The chosen solution has been Toray's advanced membrane bioreactor (MBR) technology, in particular the NHP210-300S model. With a single train system design with two units and a total flow capacity of 156 m³ per day (peak 10 m³/h), the MBR system integrates biological treatment with membrane filtration, ensuring efficient separation of sludge and treated water. The PVDF (polyvinylidene fluoride) membranes with a nominal pore size of 0.08 μm work by gravity filtration and ensure high operational reliability and consistent flow rates (average 15.5 L/m²h, peak 23.8 L/m²h). This state-of-the-art system allows the dairy to meet local environmental standards for wastewater discharge while maintaining stable, long-term performance.

Table 1 – Quick Facts

Plant Influent	Industrial effluent from dairy (cheese) production
Start-Up	June 2023
Flow Capacity	Average 156 m ³ /d
	Peak 10 m ³ /h
Flux (Average)	Average 15.5L/m ² h
	Peak 23.8L/m ² h
Filtration Method	Gravity
Membrane Model	NHP210-300S
System Configuration	1 train with 2 units
Membrane Material	PVDF (polyvinylidene Fluoride)
Nominal Pore Size	0.08 μm

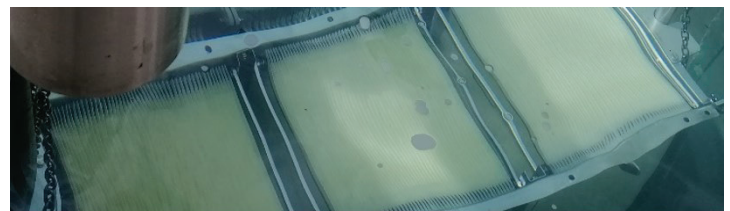
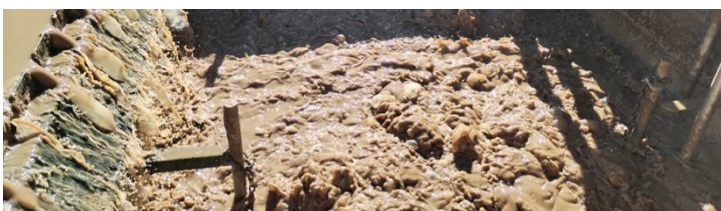


Figure 2: Left aeration zone, Right submerged NHP210-300S in the MBR Tank

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PROCESS

The waste water treatment system, developed to efficiently treat the difficult waste water generated during the cheese producing, comprises a fine screen stage in which a 2 mm sieve removes large particles and solids from the waste water. This is followed by coagulation with a DAF unit (Dissolved Air Flotation) to effectively separate fats and oils which are difficult to biodegrade.

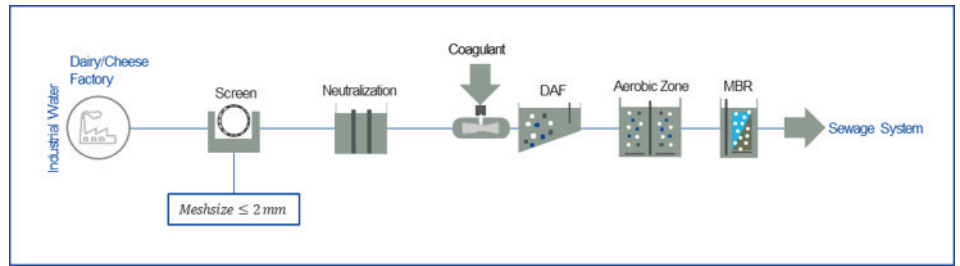


Figure 3: Wastewater Treatment Design

The wastewater then enters into an aeration tank where micro-organisms actively break down organic pollutants and significantly reduce the chemical oxygen demand (COD). The final and most critical stage of the process is the Toray's state-of-the-art MBR (Membrane Bioreactor) system. By removing practically all suspended solids, the effluent contains only dissolved solids, guaranteeing that the facility consistently complies with the strict discharge regulations.

RESULTS AND BENEFITS

The installation of the Toray MBR system at Quesos Alimer has significantly improved the quality of the effluent and ensured compliance with strict discharge regulations. The system achieved a remarkable reduction of the main pollutants. The chemical oxygen demand (COD) was reduced from 4'000 mg/L to less than 10 mg/L in the treated wastewater, while the biological oxygen demand (BOD) was reduced from 1900 mg/L to less than 2 mg/L. Total suspended solids (TSS) was reduced from 890 mg/L to less than 2 mg/L, and oils and fats from 227 mg/L to less than 5 mg/L. In addition, the system demonstrated effective nitrogen removal, with total nitrogen levels reduced from 98 mg/L to less than 12 mg/L.

These results demonstrate the efficiency of the system in delivering high quality wastewater that far exceeds regulatory standards. The advanced filtration provided by Toray's MBR technology ensures operational reliability, reduced maintenance and significant environmental benefits.



Figure 4: Installation of Toray MBR NHP Series

Table 2 – Water Quality		
Parameter	Raw Water	Effluent
Temperature [°C]	<40	<40
Chemical Oxygen Demand, COD [mg/L O2]	4000	< 10
Biological Oxygen Demand, BOD5 [mg/L]	1900	<2
Total Suspended Solids, TSS [mg/L]	890	< 2
Conductivity [mS/cm]	2.5-4	3-4.5
pH [-]	9.2	7-8
Oils and grease [mg/L]	227	< 5
Total Nitrogen [mg/L]	98	< 12
Total Phosphorus [mg/L]	24.7	N/A

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