

Case Study  
BIO-CEL® MCP MBR  
Tuna Wastewater  
Plant

# Case Study: Industrial BIO-CEL<sup>®</sup> MCP MBR Process

Enhance the tuna cannery's wastewater treatment plant to comply with regulations and reuse water at the plant.



## PROBLEM

Outdated equipment in wastewater treatment plant



## SITE

Tuna cannery in Mazatlán, Mexico



## OUTCOME

Successfully met & exceeded environmental permit requirements

## OBJECTIVE

Located in Mazatlán, Mexico, a tuna cannery needed to update their wastewater treatment plant (WWTP) to comply with new regulations.

BIO-CEL<sup>®</sup>-MCP MBR process was chosen for its small footprint and low chemical costs. Needing to treat 1150 m<sup>3</sup>/day (304,000 GPD) of wastewater from tuna processing, this waste stream has exceptionally high total nitrogen (TN), total phosphorus (TP) as well as higher organics (COD/BOD) concentrations.

## MATERIALS & METHODS

Ten BIO-CEL<sup>®</sup> 400 membrane modules were installed at the plant. Unit operations for the WWTP are as follows:

- Dissolved Air Flotation (DAF) treatment
- Equalization tank
- 1 mm Rotating mechanical screen
- 1 Anoxic basin
- 1 Aeration basin (2 dissolved oxygen zones)
- 2 Filtration basins
- Tertiary treatment



**Figure 1**

Left to right:

- Raw influent
- DAF effluent
- MBR permeate
- Tertiary effluent

## RESULTS

In operation since 2012, the plant continues to deliver excellent results in regard to effluent quality and flow (Table 2). All permit requirements are being met, virtually all solids are being removed and the MBR effluent has an SDI < 3 which allows for further tertiary treatment to treat color and odor by reverse osmosis, ozone, and carbon filters.

The BIO-CEL®-MCP MBR process allows the company to limit their maintenance cleanings (MC) quarterly and extended maintenance cleanings (EMC) annually.

About 35% of the tertiary treated water (400 m<sup>3</sup>/day or 106,000 GPD) is reused for the following applications at the plant:

- Cooling towers
- Washing docks/boats
- Bathrooms
- Cleaning the WWTP
- Preparing chemicals for the WWTP

## Tables & Data

**Table 1** Plant BIO-CEL MBR operational parameters

Parameter	Value
Module Type	BIO-CEL® 400
Number of Modules	10
Mixed Liquor Suspended Solids (MLSS)	9-12 g/L
Solids Retention Time (SRT)	21 days
Average Flux	13.9 LMH (8.2 GFD)
Avg. Transmembrane Pressure (TMP)	70 mbar (1.01 psi)
pH	7.2
Temperature	35°C (95°F)

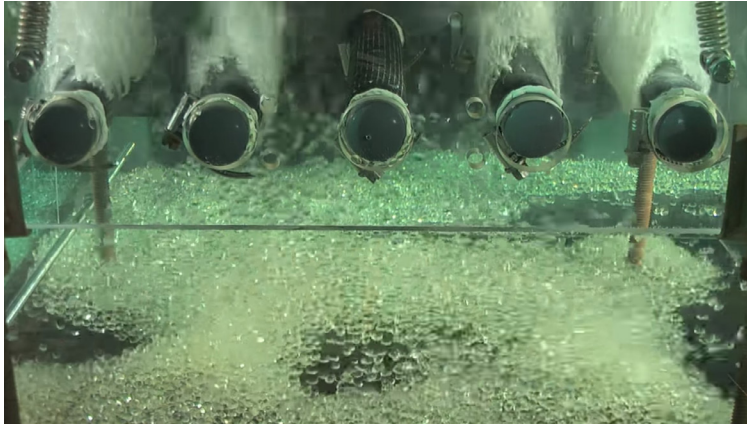
**Table 2** Water quality from different unit operations at WWTP

Sampling	Raw Influent	DAF Effluent	MBR Effluent	Tertiary Effluent
COD (ppm)	12310	3235	147	0
BOD (ppm)	5790	2100	25	0
Total Nitrogen (ppm)	785	472	15	1
Total Phosphorus (ppm)	243	25	5	0
TSS (ppm)	2580	87	2	0

# Conclusion

Utilizing the BIO-CEL®-MCP MBR process allowed the tuna plant to dramatically reduce BOD, COD, TN, TP, and TSS concentrations in their wastewater and feed a tertiary treatment system. After tertiary treatment, about 35% of the wastewater was reused in other parts of the plant and has saved them -\\$76,300 USD annually in water costs. This system allowed the plant to meet their environmental permit requirements while utilizing less space compared to a Conventional Activated Sludge (CAS) waste treatment plant. The MCP allowed the plant to reduce their annual chemical usage for system cleaning.

Note: We would like to thank SSOZ for providing data and pictures for this case study.



BIO-CEL® MCP



## Results & Conclusions

**Table 3** Cost Savings of water reuse vs. municipal water

Parameter	Value
Cost savings of tertiary treated water vs. municipal water	\$0.53 USD/m <sup>3</sup>
Volume of water reused daily	400 m <sup>3</sup>
Daily water savings	\$212
Monthly water savings	\$6,360
Annual water savings	-\$76,300

**Table 4** MBR Pollutant Removal

Indicator	Elimination Rate
BOD	98.8 %
COD	95.5 %
TN	96.8 %
TP	80.0 %
TSS	97.7 %