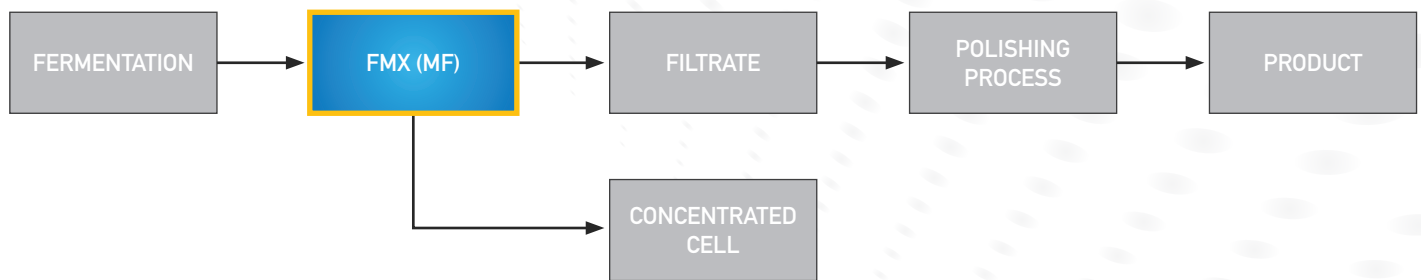


2,3-Butanediol (BDO) Separate & Concentrate More

The conventional cell separation process used filter press with hollow fiber membrane, but it had low recovery rate and operating the facility proved difficult. In addition, when ED process was added after the separation process, the treatment efficiency was low due to impurities.

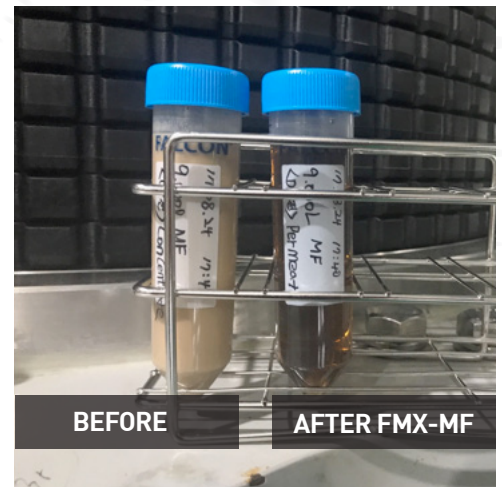
In order to solve this problem, FMX(MF) was applied to the culture broth and FMX (UF) was applied to protein and impurity removal.



Integrating FMX with MF Membranes

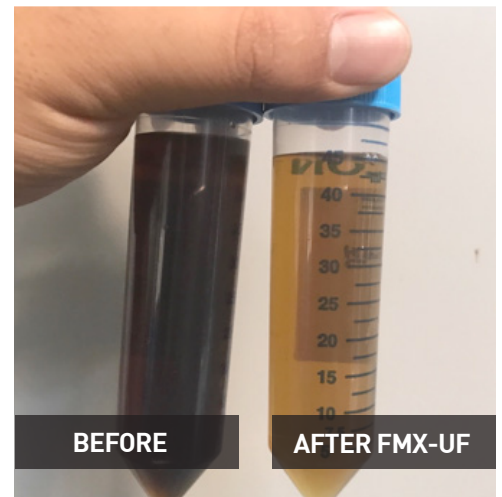
FMX-E (MF) can reduce the facility costs by simplifying the existing filter press and hollow fiber membrane process. FMX process can also increase the recovery rate to 95% from the current recovery rate of 90%, increasing our client's total production value by \$300,000 USD per year. In the production of 2,3-BDO using bio-process, raw materials such as sugar, cassava, woody raw material, sugarcane are used.

The conventional filter presses' recovery rate and process efficiency were affected by the type of raw material used in the process. On the other hand, FMX can achieve a recovery rate of 95% regardless of the type of material and 100% of the cells can be removed.



Integrating FMX with UF Membranes

FMX can be used to remove impurities such as sugar and protein, thereby reducing the load on the electro dialysis process (electrodialysis process time doubled, CIP cycle doubled). Higher recovery rates and reduced process times can increase product yield.



For more information, please contact:

CHUNWOO LEE
cwl@bkt21.com
714.578.0676 x 101

www.bkt21.com

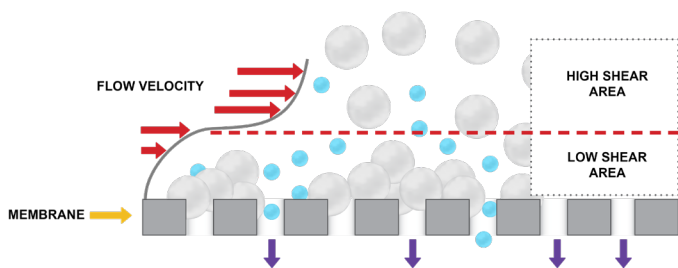
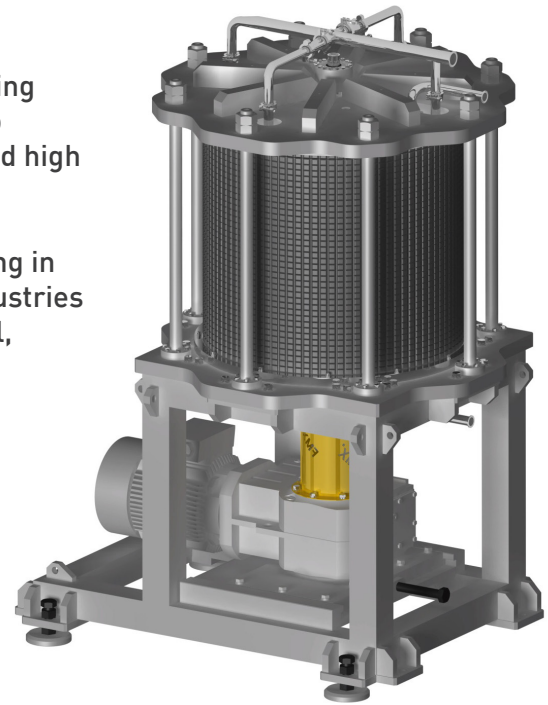
What is FMX?

FMX is a new anti-fouling membrane system for concentrating and isolating solids and bio-molecules. The innovative FMX technology uses vortices to prevent membrane fouling and can handle high density, high viscosity, and high solid applications like never before.

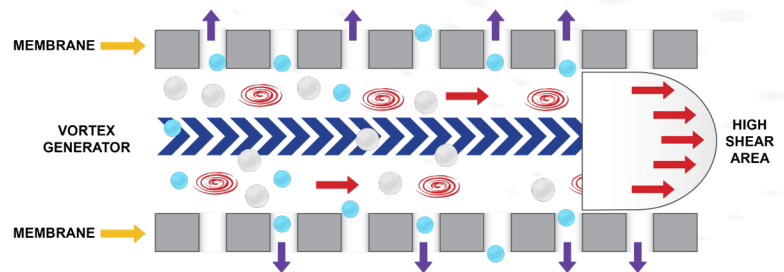
Our systems are used in wastewater treatment, separation and dewatering in manufacturing processes, and recovery (reuse, recycle) applications. Industries include digestate & livestock waste treatment, food & beverage, chemical, biotech, mining, and oil & energy.

How FMX Works

Utilizing the Karman Vortex Theory, FMX is a next-generation membrane filtration system that prevents fouling by using rotating blades to generate vortices that prevent solids from building up on the membrane surface. This prevents membrane fouling so effectively that FMX can handle high total dissolved and suspended solids over 1.5%.



Conventional High-Solids Filtration



FMX Vortex Generating Filtration

The Vortex Generator

FMX maintains the integrity of its membranes by using patented vortex-generating blades made from specially engineered lightweight plastic resistant to corrosion, chemicals, and extreme temperatures.

The resulting turbulent flow works continuously to prevent the buildup of solids on the membrane surface with minimum energy consumption.

