

CASE STUDY

Extreme (XT) UF Membranes

TurboClean® Extreme Elements for High pH / High Temperature Cleaning



MICRODYN
NADIR

ADVANCED SEPARATION TECHNOLOGIES



Project Goal

Examine performance of TRISEP® UF5XT and UF10XT membranes for systems where chlorine is not used.

Feed

- Skim milk
- Whole milk

Membranes

- TRISEP® UF5XT
- TRISEP® UF10XT
- Competitor A (5 kDa)
- Competitor B (10 kDa)

Parameters Measured

- Process Flux
- Total Solids Passage

Objective

In places where chlorine use is restricted or undesirable due to concerns with chlorinated byproducts in wastewater streams, systems are cleaned using alkaline cleaning solutions at high pH and high temperature. MICRODYN-NADIR has introduced TRISEP® UF5XT and UF10XT (5 and 10 kDa) membranes primarily of polypropylene materials capable of tolerating these extreme cleaning conditions.

Materials & Methods

TRISEP UF5XT and UF10XT membranes were tested in a plate and frame configuration using skim milk and whole milk as incoming feeds to determine each membrane's process flux and Total Solids passage. The membranes were also exposed to a high pH cleaning solution for a total of 333 hours at pH 13 (71 hours at 75-85°C and 262 hours at > 45°C) to test their ability to tolerate high pH and high temperature cleanings.

Results

Process flux and total solids passage measurements with skim and whole milk revealed that TRISEP UF10XT had higher flux and similar solids passage as the competitive 10kDa membrane (Figure 1). TRISEP UF5XT had similar process flux and incrementally less solids passage than the competitive 5kDa membrane (Figure 2).

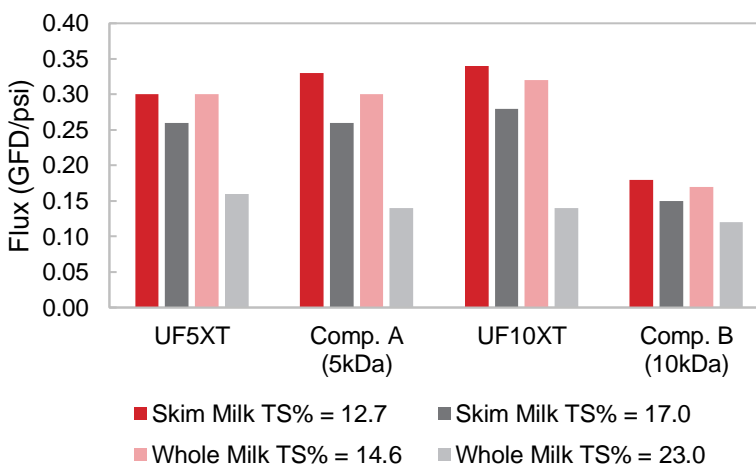


Figure 1. Average process flux with skim and whole milk at various Total Solids (TS%) feed concentrations.



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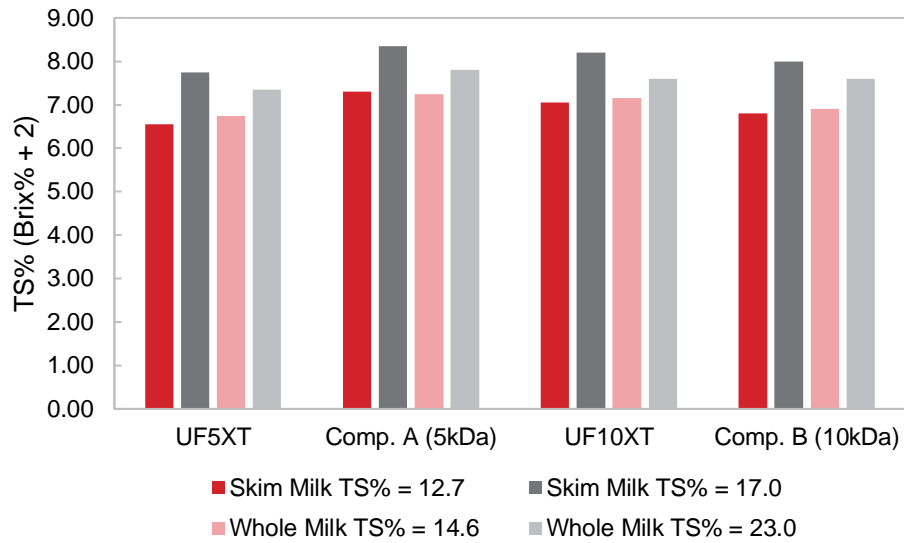


Figure 2. Average process flux with skim and whole milk at various Total Solids (TS%) feed concentrations.

Conclusion

The results of this study indicate that TRISEP® UF5XT and UF10XT membranes are able to endure the high pH, high temperature cleaning regimen used in spiral-wound membrane element systems where chlorine is not used and perform similarly, if not better, than the competitive membranes.



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