

# A New Membrane - Immune to Irreversible Organic Fouling



## Overview

Industry and agriculture consume over 500 billion gallons per day of freshwater withdrawals globally. Accelerated depletion of our groundwaters and aquifers as well as protracted droughts are worsening water scarcity and threatening food production. Reuse is necessary.

Historically, membranes have been unable to treat the toughest industrial wastewaters. ZwitterCo's patented zwitterionic membranes are changing things for industrial water reuse.

In extended pilot studies of various difficult-to-treat wastewaters, ZwitterCo superfiltration membranes aced the test and produced impressive results.

## Wastewater Challenges

### Dairy Wastewater

Dairy processing wastewater contains significant concentrations of fats, proteins, and other organics, which are typically too high for municipal wastewater treatment plants to handle directly. It must either be treated or hauled away - at great expense.

### Manure Digestate

Manure is often treated by anaerobic digestion for methane production. The digestate effluent is often hauled away and land-applied. However, the land application of this wastewater can cause nutrient runoff and contamination of surface and drinking waters.

## Challenges



Inability to reuse water consistently



Expensive hauling, chemicals, & surcharges



Loss of valuable byproducts



## Types of Wastewater (Cont.)

### Thin Stillage

Thin stillage from corn-based ethanol production can be reused for subsequent fermentation cycles; however, the fluid contains “non-fermentable” solids that take up space in the fermentation reactor, which decreases the plant productivity.

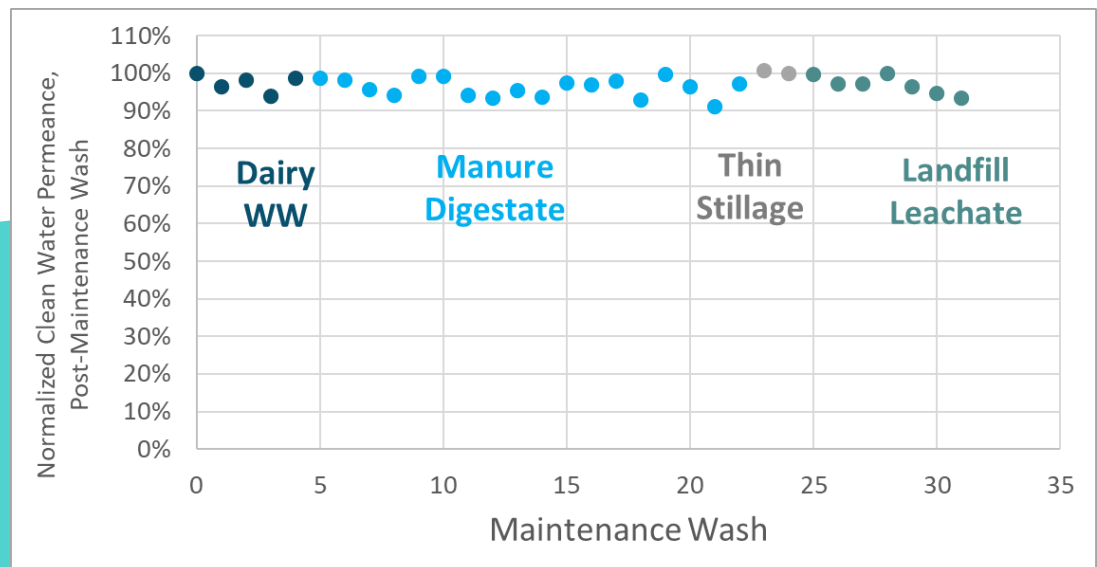
### Landfill Leachate

Landfill leachate contains organic chemicals that must be removed before the wastewater can be discharged. These chemicals can be captured and returned to the landfill while the purified leachate water is discharged. However, the current best method of capturing these chemicals is expensive and inefficient.

## Solution

ZwitterCo’s zwitterionic superfiltration (SF) membranes unlock reuse opportunities by resisting irreversible organic fouling. Unlike standard membranes, our SF membranes can operate and consistently recover full performance with short maintenance washes (**Figure 1**) in the most difficult-to-treat wastewaters.

They operate at up to 99% water recovery and can handle high levels of fats, oils, grease (FOG) and total suspended solids (TSS). The membranes are the cornerstone technology that makes industrial water reuse possible and affordable.



**Figure 1:** Four back-to-back pilot studies using a single membrane element on various wastewaters demonstrated consistent cleanability of the zwitterionic SF membrane.

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