

Introduction

Membrane Cleaning in the Pharmaceutical industry

- Essential for safety and hygiene standards.
- Resource-intensive process causing bottlenecks and environmental impact.

Study Objective

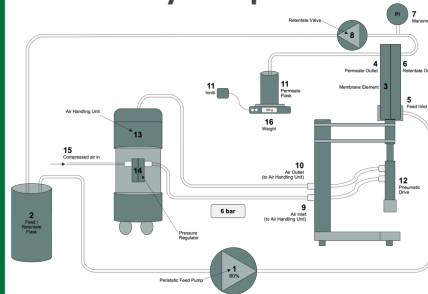
- Advance understanding of membrane fouling and cleaning kinetics.
- Estimate parameters for effective control, enhancing cleaning efficiency.

Methods

Membrane Ultrafiltration

- Membrane: 10 kDa Polyethersulfone (PES).
- Testing different process parameters.

Laboratory setup



Analytical tests

- Chemical cleanliness evaluated by UV-Vis spectroscopy and TOC analysis.

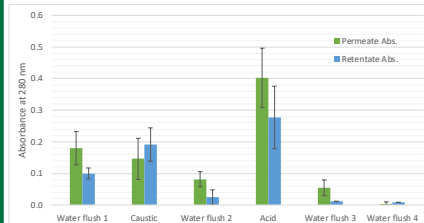
Outcome

Experimental designs

	Pure Water (min)	Fouling (hours)	First Water Rinse (min)	Caustic (min)	Second Water Rinse (min)	Acid (min)	Third Water Rinse (min)	Final Water Rinse (min)
Exp. design 1	30	4	10	30	10	15	10	10
Exp. design 2	30	4	10	30	10	5	10	10
Exp. design 3	30	9.5	10	30	10	15	10	10
Exp. design 4	30	9.5	10	30	10	5	10	10

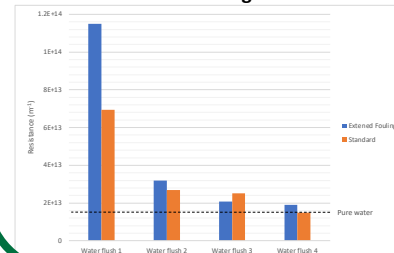
Efficient removal of protein residues.

Sample Absorbance at UV280 nm.



Proved cleanability of the membrane after extended fouling time.

Resistance throughout CIP



Perspectives

- Optimizing the operating parameters of the process.
 - E.g., cleaning parameters, such as frequencies, flows, and cleaning agents.
- Further investigations to be done at pilot and/or industrial scale.

Being a Helix Lab Fellow:



Helix Lab

- Great networking opportunities.
- Guidance and support.
- Well-equipped laboratory facility.