Exploring API Water Treatment Technology

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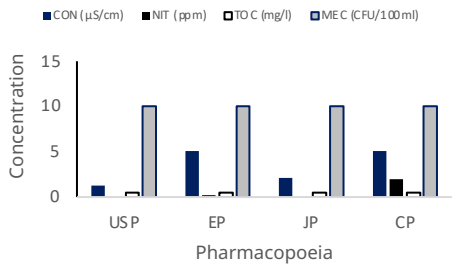
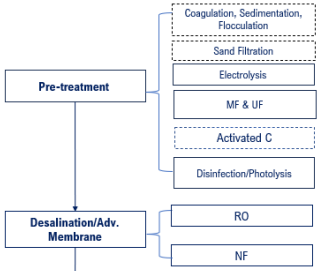
Introduction

- Water is purified for API manufacturing
- Impurity/purity constraints on pharmaceutical waters, of varying grades

PW Impurity Constraints Across Pharmacopoeias

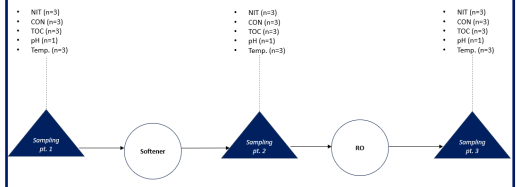


- Purification by **treatment technology**
- Technology available and optimal treatment pathways/systems



Methods

1. Literature review: legal landscape and removal statistics
2. Lab experimentation: testing hypotheses and assessing purifcation performance



3. M2 Purification (Base Case): removal data from purification

❖ **Compare performances across 3 pools of data** to make overall conclusions and recommendations

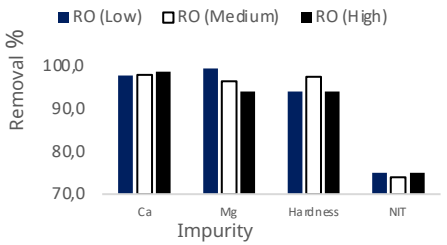
Outcome

Test the following hypotheses:

- RO purifies water sufficiently in all treatment groups
- Ultrasound degassing lowers TC signficantly
- Chemically softened water meets purity constraints for hardness

Impurity Removal Fractions from RO-Treated Water

Impurity Removal % Across Various RO Flow Rates

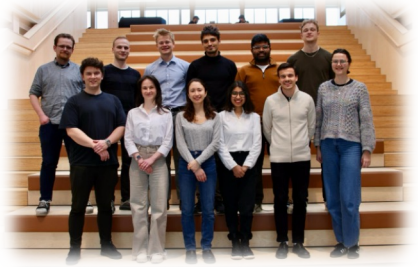


❖ Assessment & evaluation of removal performance across all treatment groups regarding efficiency, sustainability and circularity.

Perspectives

Personal

- On-the-ground experience in corporate work environment and manufacturing
- Rich with experiences surrounding symbiotic resource exchange, circular economy and sustainability
- Strive to reduce human footprint, soil and water pollution, help ensure improved water provisioning in an increasingly water-scarce world.



Related Work

- Optimising resource requirements and minimising resource consumption for forecasted production demand in pharmaceutical industry
- Future research should investigate scalable emerging technologies, EDI optimization, performance of different RO membrane types, and coupling of technology to chemistry of water to-be-treated.