# MONITORING OF REVERSE OSMOSIS MEMBRANE FOULING THROUGH PRINCIPAL COMPONENT ANALYSIS


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BACKGROUND

Chemistry & bioprocess technology, Environmental Science and technology, Environmental Technology

LANGUAGE

English


MORE INFO

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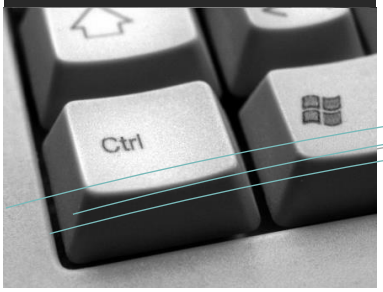


## Introduction

Reverse osmosis (RO) is a widely used water treatment technology utilized by various industries due to its ability to consistently produce high-purity water despite a broad range of influent water quality. However, being a membrane-based process, fouling remains to be one of its main challenges. Membrane fouling leads to decrease in clean water production, the need to operate at higher pressures, repeated cleaning and the associated increase in use of chemicals, and causing higher operational costs, to name a few of its drawbacks.

Numerous studies have been performed related to membrane fouling with the objectives of predicting when fouling is going to occur and thereby preventing it. With the abundance of data related to the digitalization of the water industry, a statistical procedure such as principal component analysis (PCA) can be used for monitoring fouling of a full-scale RO system.

## Methodology

In this thesis, dataset from a full-scale RO installation will be collected and used. The data will undergo PCA analysis to determine patterns and relations between the data and membrane fouling. In particular, the PCA model results will allow indication of fouling severity and distinction of the fouling type. Furthermore, it will be explored whether this model can be used to develop better fouling control strategies.

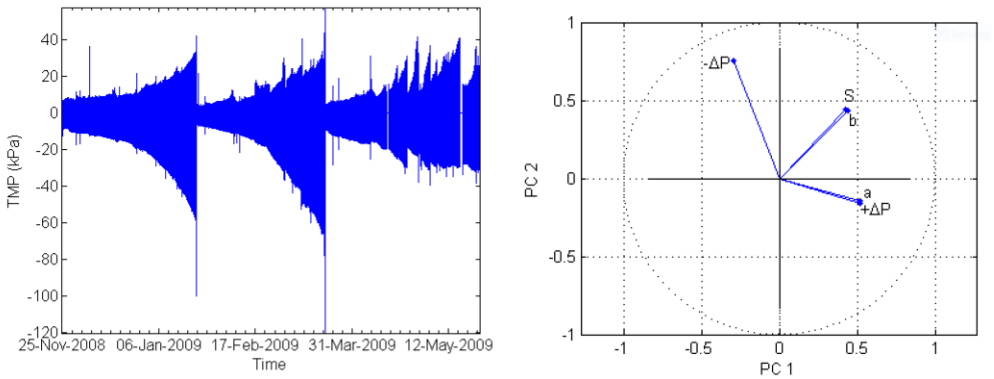


**Figure 1 – Example of a transmembrane pressure profile of an RO membrane (left) and corresponding two principal components' biplot (right).**

## Objectives of the thesis

The main objective of this thesis is to develop a PCA model for monitoring fouling of a full-scale RO system. This master thesis topic is in collaboration with an industrial partner, Ekopak.

CAPTURE BIOMATH