# Evaluation of Dominant Fouling Mechanisms Formed in Porous Membrane treating Greywater using Blocking Laws

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**Abstract:**

Greywater includes wastewater originating from all household applications other than blackwater, more specifically, from the washing machine, dishwasher, shower, bath and sinks. It takes up 30-50% of the organic load and 9-20% of the nutrient load of total wastewater produced in a household. Membrane filtration is a promising technology to reuse greywater because it can produce excellent effluent (permeate) qualities at a very small footprint. However, understanding membrane fouling through porous membrane such as MF treating greywater has not been made yet. Dead-end filtration was performed at constant pressure by using porous membrane treating a synthetic greywater. Higher applied pressure resulted in more flux decline. Dominant fouling mechanism was evaluated by performing the best-fitting technique between the results of flux decline with time and predicted by blocking laws. Complete blockage was more pronounced with lower pollution load in greywater regardless of hydrophilic or hydrophobic membrane. Intermediate blocking followed by cake layer formation played dominant role in determining fouling mechanisms as pollution load increased. Although organic rejection efficiency was very low with porous membrane (less than 30 %), severe flux decline with time was observed at all operational conditions. Our results supported that inorganic component present in greywater such as silica should be the main fouling materials.

**Keywords**: Greywater, membrane filtration, blocking law, inorganic fouling, cake formation