Synder Filtration

Membranes that perform. People who deliver.™

Amoxicillin Removal via NF Case Study

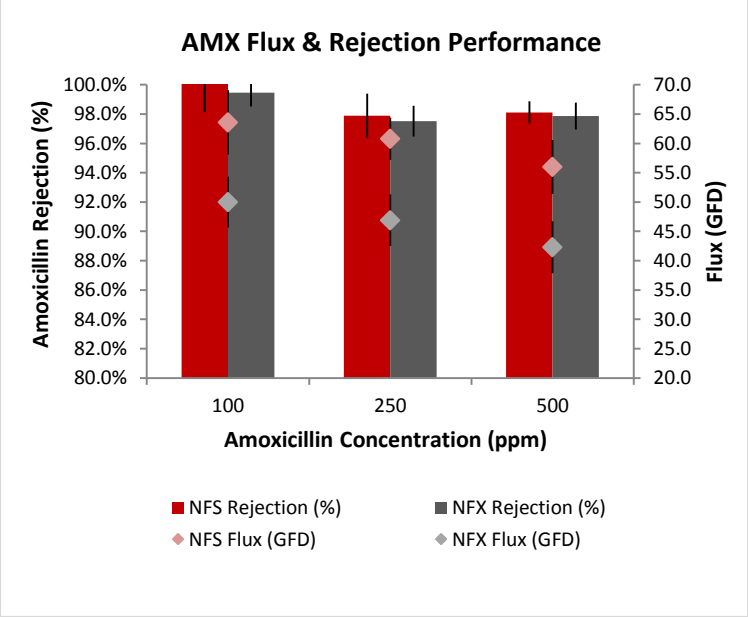
The rise in antibiotic consumption lends forth the need for new technology to remove it from wastewater and prevent further contamination in aquatic environments. The presence of antibiotics in aquatic environments is leading to adverse health effects for both animals and humans, and the removal of antibiotics is important for the reuse of wastewater. Certain strains of disease-causing bacteria are also beginning to develop resistance large doses of antibiotics. Given that the size of most antibiotics falls within the range of 200 to 1,200 Daltons, nanofiltration membranes have the potential to be widely successful for antibiotics removal in wastewater treatment.

Experimental

Synder's NFS and NFX flat sheet membranes were tested at amoxicillin concentrations ranging from 100ppm to 500ppm. The membranes were tested at 120psi with a feed flow rate of 0.5gpm at 25°C. Permeate flux and TOC rejection were measured for all samples.

Results

NFS exhibited a 21-24% increase in flux over NFX throughout the duration of the test. This membrane also performed slightly higher than NFX in terms of amoxicillin rejection at all concentrations. Figure 1 shows the flux and rejection performance from 100 to 500ppm for both membrane types.



Project Goal
Examine flux & rejection performance of Synder's NFS and NFX membranes for antibiotic removal in wastewater treatment

Feed
100, 250, and 500ppm Amoxicillin

Membranes
NFS flat sheet
NFX flat sheet

Parameters Measured
TOC rejection
Permeate flux

Testing Conditions
Pressure: 120psi
Feed flow rate: 0.5gpm
Temperature: 25°C

Conclusion

Based on the flux and rejection performance, both NFS and NFX nanofiltration membranes are viable options for antibiotic removal in wastewater treatment applications. NFS offers a significant improvement in terms of flux, in addition to the slight advantage with regards to amoxicillin rejection.

Further testing can be done to assess performance of antibiotic rejection in a wastewater feed solution.