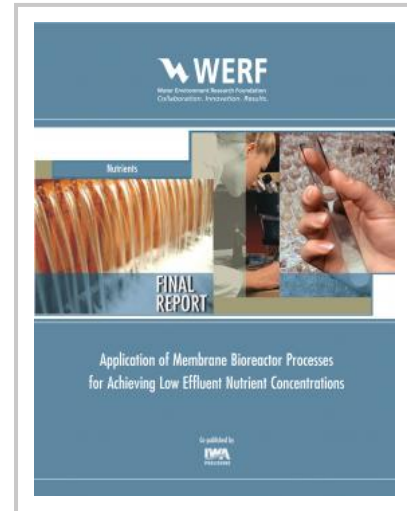


Application of Membrane Bioreactor Processes for Achieving Low Effluent Nutrient Concentrations

The overall aim of this research was to evaluate membrane bioreactor (MBR) process designs to meet low effluent nitrogen and/or phosphorus concentrations from municipal wastewater treatment plants (WWTPs) and to identify design and operating issues that are unique to the application of MBR technology for achieving a high level of nutrient removal, such as effluent concentrations for total nitrogen (TN) below 3 to 6 mg/L and for total phosphorus (TP) below 0.1 to 1.0 mg/L. The application of membrane bioreactors has increased rapidly over the past two decades, expanding knowledge and experience with the technology. Textbooks and other publications are available that provide fundamental information on membrane separation, terminology specific to MBRs, as well as information on the process and detailed design of MBR systems. The fundamentals and design considerations of biological nutrient removal systems have also been documented. This document does not provide the above mentioned details on the MBR technology or nutrient removal, and the reader is referred to the texts below for such information. However, key definitions of process terminology are defined where it is important to provide clarity for the reader.



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