



FISH Handbook for Biological Wastewater Treatment: Identification and Quantification of Microorganisms in Activated Sludge and Biofilms by FISH

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The FISH Handbook for Biological Wastewater Treatment provides all the required information for the user to be able to identify and quantify important microorganisms in activated sludge and biofilms by using fluorescence in situ hybridization (FISH) and epifluorescence microscopy. It has for some years been clear that most microorganisms in biological wastewater systems cannot be reliably identified and quantified by conventional microscopy or by traditional culture-dependent methods such as plate counts. Therefore, molecular biological methods are vital and must be introduced instead of, or in addition to, conventional methods. At present, FISH is the most widely used and best tested of these methods. This handbook presents all relevant information from the literature and, based on the extensive experience of the authors, advice and recommendations are given for reliable FISH identification and quantification. The overall purpose of the book is to help scientists, consultants, students, and plant operators to get an overview of important microorganisms in biological wastewater treatment and to explain how FISH can be used for detecting and quantifying these microbes. A proper and reliable identification of dominant microorganisms is of great importance for research and new developments in the wastewater treatment industry, and it is important for optimization and troubleshooting of operational problems in present wastewater treatment plants. The book encompasses an overview of dominant microorganisms present in the wastewater treatment systems, which oligonucleotide probes (gene probes) to select for detection of these microbes by FISH, how to perform FISH (detailed protocols), how to quantify the microbes, and how to solve common problems of FISH. The book addresses several functional groups: nitrifiers, denitrifiers, polyphosphate-accumulating organisms, glycogen-accumulating organisms, bacteria involved in hydrolysis and fermentation, filamentous bacteria from bulking sludge, and scum-forming bacteria. A comprehensive collection of FISH-images showing dominant representatives of these groups helps readers to use FISH in the context of wastewater treatment.

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