Leptothrix discophora

Resembles: *S. natans*, see characteristics
Probes: class specific: BET-42a [4] and species specific: LDI-23a [6]
Frequency occurrence (200 samples; 175WTPs):

- observed with a FI ≥ 1 in 1 sample
- observed with a FI ≥ 3 in 0 samples

Characteristics

See *Sphaerotilus natans*. *S. natans* and *Leptothrix discophora* resemble each other very much, which means that probes are indispensable to distinguish these species from each other in activated sludge.

Remark

L. discophora belongs to the *Betaproteobacteria.*

Physiology

L. discophora derives energy from the oxidation of iron and manganese compounds. Growth in pure cultures is only slightly stimulated by the addition of organic compounds. These features do not explain growth of L. discophora in activated sludge, which means that essential information is missing.

Occurrence in activated sludge

L. discophora was occasionally observed in WTPs treating wastewater from the pulp and paper industry. However, due to the limited number of observations, it is not possible to draw final conclusions concerning a possible correlation of this species with a specific wastewater.

Control options

The common possibilities aimed at solving a bulking problem are listed below (1-7). Full scale experience with controlling this filamentous species is not available. It is always recommended to start with a pilot scale experiment before a selected control method is applied on a full scale.
References for further reading about process control: 1, 2, 3 and 5.

1. Good 'House-keeping'.
2. Remove deficiencies: O_2 > 2 mg/l and BOD:N:P =100:5:1.
3. Two step configuration (aerobic/aerobic or anaerobic/aerobic), in order to remove most of the easily degradable influent fraction before this enters the aeration tank.
4. Aerobic selector.
5. Anoxic zone if sufficient nitrite/nitrate is available for removal of the dissolved fraction from the influent through denitrification.
6. Anaerobic zone if a combination with a Bio-P process is an option.
7. Controlling symptoms, viz. applying physical or chemical methods aimed at destroying the filaments or at improving the settling velocity of the flocs by increasing their weight.

References

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3. Lemmer, H und G. Lind (2000) *Blähschlamm, Schaum und Schwimmschlamm – Mikrobiologie und Gegenmassnahmen.* F. Hirthammer Verlag, München, Germany.
4. Manz, W., R. Amann, W. Ludwig, M. Wagner and K. H. Schleifer (1992) Phylogenetic oligodeoxynucleotide probes for the major subclasses of Proteobacteria: problems and solutions. *Sys. Appl. Microbiol*. **15**, 593-600.
5. Tandoi, V., D. Jenkins and J. Wanner (2005) *Activated sludge separation problems – Theory, Control Measures, Practical Experiences*. IWA Publishing, London, UK.

6. Wagner, M., P. Amann, P. Kämpfer, B. Assmus, A. Hartmann, P. Hultzler, N. Springer and K. Schleifer (1994) Identification and *in situ* detection of Gram-negative filamentous bacteria in activated sludge. *System. Appl. Microbiol.* **17**, 405-417.

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