

Thiothrix-2

Resembles: -

Probes: class specific Gam42a [10], group specific: G123T [7] and TNI [16] ; species specific: EU2-845 [Macobs]

Frequency occurrence (200 samples; 175 WTPs):

- observed with a FI \geq 1 in 1 sample
- observed with a FI \geq 3 in 0 samples



Characteristics

- straight or somewhat bent filaments;
- filaments usually free in the water phase;
- tapering of the filaments not observed;
- filament length variable;
- false branching of the filaments and frequently rosettes of filaments;
- not motile;
- cell diameter ca. ca. 1.0 μm ;
- pure culture studies revealed that a sheath is present, a characteristic that was not observed in the original activated sludge sample, however;
- without attached growth;
- septa not clearly visible;
- often already *in situ* sulphur granules; fast storage of granules with the S-test;
- Gram negative;
- Neisser negative.

Remarks

All *Thiothrix* morphotypes belong to the *Gammaproteobacteria*; class specific probe: Gam42a [10]. G123T and TNI are group specific probes. A number of classified *Thiothrix* species might occur in WTPs [1, 4, 7, 8] and probes are available by which various subgroups can be distinguished [7]. However, additional FISH tests, aimed at further identification of the morphotypes observed by applying such subgroup specific *Thiothrix* probes, were not carried out during the Dynafilm project.

Morphotype *Thiothrix-2* was isolated from activated sludge and it has been established that this species represents a new species within the genus *Thiothrix*, with 96 % 16S rRNA gene sequence

similarity to *Thiothrix nivea* and 95 % 16S rRNA gene sequence similarity to *Thiothrix ramosa* [1]. Probe EU2-845 was subsequently developed during Macobs.

Physiology

Pure culture studies revealed that this *Thiothrix* morphotype is a relatively fast growing species which uses low molecular carbon sources (short chain fatty acids, alcohols) as well as reduced sulphur compounds for its growth. *Thiothrix-2* does not grow under anoxic or anaerobic conditions and substrate taken up is stored as PHA (polyhydroxyalkanoates), a common storage product in many bacteria.

References for further reading about the physiology of *Thiothrix*: 1, 5, 11, 12, 13, 14, 17 and 18.

Occurrence in activated sludge

Thiothrix-2 was observed in a WTP treating wastewater from a food industry. Due to the limited number of observations, it is not possible, however, to draw final conclusions concerning a possible correlation of this morphotype with a specific wastewater.

See *Thiothrix-1* lemma for control strategies and references.

Slide show images

- 1-2: appearance at a low magnification
- 3-4: examples sulphur storage
- 5: falsely branched
- 6: Gram stained
- 7: FISH image with probe TNI