**MICROTHRIX PARVICELLA**

Microthrix parvicella (M. parvicella) is a cold-loving filament with a notorious reputation for foaming and sludge bulking. It is mostly observed in domestic wastewater and rarely in industrial wastewater. M. parvicella prefers cooler temperatures with its numbers peaking in winter and dying back in summer.

![Figure 1: Gram stain of M. parvicella showing spaghetti-like tangles.](image)

It is a thin, immotile, medium length (< 200 µm) and highly coiled filament that is generally found inside and surrounding flocs. M. parvicella stains Gram positive and Neisser negative but can also contain Neisser positive granules. It can be confused with Nostocoida limicola however the latter is generally bulkier.

M. parvicella enjoys long sludge ages (>10 days), low loadings (<0.2 kgBOD/kgMLSS.day), low temperatures and low dissolved oxygen.

![Figure 2: Neisser stain of M. parvicella](image)

It incorporates long chain fatty acids into its membranes for growth which allows it to survive in conditions where most floc-forming bacteria would find it difficult.

M. parvicella frequents nutrient removal processes, particularly those with incomplete nitrification as the production of nitric oxide can be toxic to floc forming bacteria. M. parvicella can use nitric oxide as a food substrate in aerobic conditions and out-compete floc formers. M. parvicella also likes oil and grease, particularly scenarios where fats and lipids in the influent can be hydrolysed before they reach the aeration tank, e.g. long retention times in sewers, primary sedimentation tanks or in anaerobic zones.

M. parvicella is notorious for foaming; it has hydrophobic cells surfaces which enable it to float. It is great at bridging between flocs which hinders compaction and settling and also traps gas and hydrophobic particles. It is important to ensure that foam isn't retained or recycled back into the process. Transport of sludge containing M. parvicella into anaerobic digesters can also produce foaming and scum in these processes. Recycling water from dewatering processes can also cause a foaming due to the concentration of reduced sulphur and nitrogen in these streams.

Control strategies include chemical dosing with aluminium salts (most effective), heavy wasting (may not be possible where extended nitrification is required), mixing raw influent into the returned sludge before treatment, intense aeration (DO > 2 mg/L), chlorination/RAS chlorination, and pre-treatment to remove FOG.

![Figure 3: M. parvicella Neisser stain with Neisser positive granules visible.](image)

**Interesting fact:**

Your tongue is germ free only if it is pink. If it is white there is a thin film of bacteria on it.

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*Sludge Bug of the Month - February 2015*

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