

CASE STUDY

Application of CHALK

for sludge optimization for a wastewater treatment plant with winter tourism

KEY FACTS OF THE APPLICATION

Municipal wastewater treatment plant
in winter sports region

Capacity:

19.000 PT
Actual freight ca. 8.600 PT
Strong fluctuations due to tourism

Inlet:

700 up to 3000 m³/d

Load:

5.000 up to 15.000 PT



INITIAL SITUATION

- Poor floc formation due to low water hardness
- Very high filament index due to *Microthrix parvicella*
- Very high sludge index
- Partly high ammonium levels

TASKS

- Improvement of sludge index
- Stable operation even at high load
- Reduction of filamentous bacteria

APPROACH

The **microscopical examination** showed a dominance of small, loose flocs without distinct floc cores. The very high filament index was formed by *Microthrix parvicella*, which were responsible for the poor settling behaviour.

The **analyses of water parameters** showed a low water hardness and a very low Calcium content (< 50 mg/L). The lack of Ca lead to a weak cohesion of the flocs and a very loose floc structure.

In summer 2021, the application of the chalk product **NITRILIFE®** started with a dosing quantity of 40 ppm (calculated to the inflow). Already after 4 weeks, the floc structure improved significantly. The amount of filamentous bacteria declined and more compact flocs were present.

NITRILIFE® was added in 25kg sacks during this trial period. Due to the favourable performance a dosing device with storage silo and screw conveyor was set up. Now the chalk could be delivered directly to the dosing point through a pipe with water as transport medium.

SUCCESS

- Compact flocs with very low filament index
- Stable outlet values, stable nitrification
- Stable plant operation



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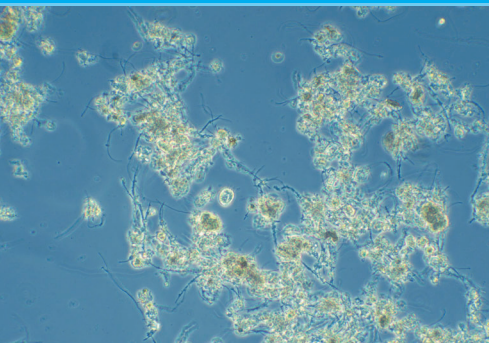
RESULT

In May 2022, the dosage of **NITRILIFE®** from the silo started. Due to the position of the silo, the chalk was dosed into the denitrification tank next to the storage silo. This dosing point turned out to be suboptimal and resulted in only slight improvements in floc structure and filament index.

Therefore, the dosing point was changed in December 2022. This adjustment turned immediately into success. Despite peak season, the filament index decreased considerably within 6 weeks from level 2-3 to level 1-2. At the same time, the floc structure improved significantly and resulted in round and dense flocs (see microscopical pictures).

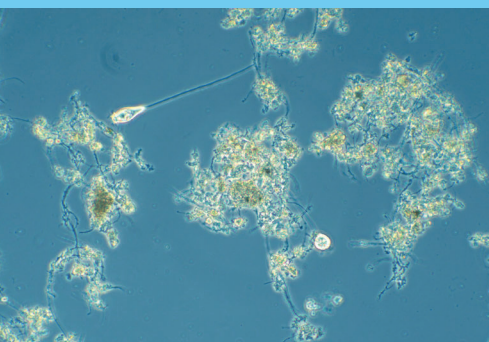
Until January 2023, the activated sludge was dominated by rounded and compact flocs with few filaments of *Microthrix parvicella*.

The ongoing success of the chalk application became evident in spring 2023. While in the previous year 2022 the sludge index had raised in March up to 400 mL/g, in 2023 the values remained constantly below 150 mL/g due to **NITRILIFE®** (see Fig. 1, blue shadowed areas).



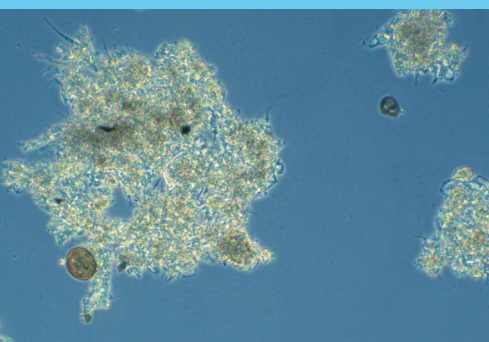
BEFORE 09.02.2022

Filament index 3-4 (*Microthrix parvicella*)
very few floc cores



AFTER 08.11.2022

Filament index 2-3 (*Microthrix parvicella*)
only few floc cores



PEAK SEASON 23.01.2023

Filament index 1-2 (*Microthrix parvicella*)
within the flocs, stable floc cores

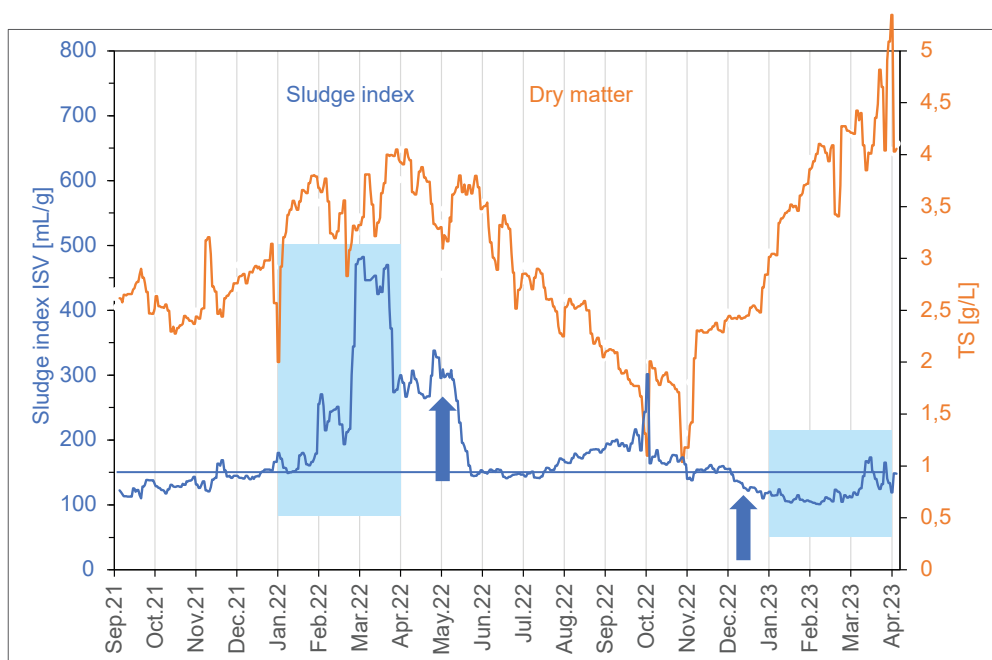


Fig. 1: Development of sludge index and MLSS Sept 2021 - Apr 2023

the blue arrows indicate the application start with **NITRILIFE®** from storage silo (May 2022) and the change of the dosing point (December 2022)