FOCUS ON: SEPTICITY

Septicity is a condition characterised by odours, dark coloured wastewater and corrosivity. Common causes of septicity include high concentrations of soluble organics (BOD$_5$), volatile fatty acids (VFAs) and/or low DO and nitrate conditions. This results in the use of sulphate as an electron acceptor under anaerobic conditions which produces hydrogen sulphide and the conversion of soluble organics to volatile organics which also release odour.

Common sources of septicity at the treatment plant include poorly aerated aeration basics, long retention times in final clarifiers, solids processing side streams and strong influent streams containing high levels of organic acids.

Problems associated with septicity include the release of hydrogen sulphide causing corrosion and odour and poor wastewater treatment, i.e. poor floc growth, filamentous bulking and poor settling and inadequate treatment performance.

The risk of septicity can be tested for by analysing influent and effluent organic acid and hydrogen sulphide concentrations. Organic acid content greater than 100mg/L and hydrogen sulphide concentrations greater than 1 to 2mg/L encourage filamentous growth, particularly of filaments Type 021N and Thiothrix.

Indications of septic conditions can also be spotted through microbiological analysis. Some typical indicators of septicity include: poor floc formation, small numbers of and inactive protozoa, excessive filamentous growth.

Septicity can be controlled by ensuring dissolved oxygen levels are maintained to at least 2mg/L and by avoiding the onset of anaerobic conditions. Measures can include: increased aeration, reducing primary clarifier solids residence time, rapidly thickening/dewatering solids streams, pre-aerating potentially septic recycle streams, pre-aeration of influent before treatment, dosing anoxic areas with nitrate to prevent anaerobic onset.

Being aware of the limits of your process is also invaluable; measuring raw influent and primary effluent wastewater for BOD and nutrient levels as well as regular microscopic examination of MLSS can be useful for early notification of any changes that may be occurring to the system.

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Septicity indicating filaments are typically those that thrive on high concentrations of VFAs regardless of the oxygen content of the system. This allows some filaments to dominate despite aerobic conditions. These filaments include (as shown Figure 1 and 2):

- Beggiatoa
- N. limicola I and II
- Thiothrix spp.
- Type 0092
- Type 021N
- Type 0961
- Type 0914/0803

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