



Biological wastewater treatment serves to break down excess nutrients such as nitrogen, carbon and phosphorus with the help of micro-organisms (activated sludge), thereby protecting water bodies from pollution. The nitrogen contained in the wastewater is eliminated in a multi-stage process.

Nitrate and Nitrite - important online parameter

Nitrate plays an important role in the targeted control of processes – whether for regulating aeration, managing sludge and water flows or dosing carbon sources – and enables:

- guaranteed N degradation performance under optimal conditions
- while maximising energy and resource savings



"Nitrite is produced during nitrification and denitrification as an intermediate stage and is usually broken down quickly."

Online monitoring of nitrite is essential:

- as an indicator of possible disruptions to biological treatment
- to prevent toxic nitrite in sewage treatment plant effluent and the resulting environmental damage (e.g. fish mortality)
- to minimise emissions of climate-damaging nitrous oxide, which, according to current research, is primarily formed via nitrite

TriOS OPUS and OPUS (aero) are powerful spectral probes for the online measurement of

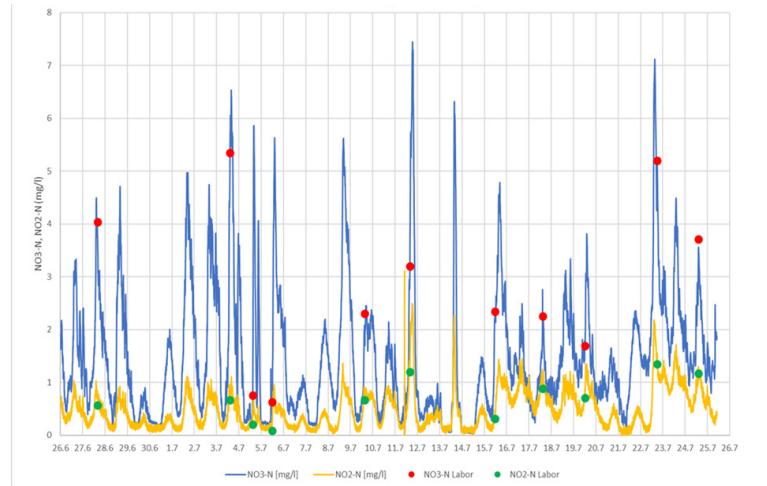
Nitrate and Nitrite in aeration tanks.

By analysing the entire UV spectrum, they provide reliable measurements – depending on the calibration – for $\text{NO}_3\text{-N}$ alone or combined for $\text{NO}_3\text{-N}$ and $\text{NO}_2\text{-N}$.



Applications:

- Waste water treatment plants
- Environmental monitoring
- Drinking water monitoring
- Industrial waste water



Additional parameter OPUS

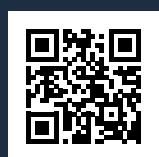


COD_{eq}
BOD_{eq}
COD_{eq} / SAC_{eq}
TSS_{eq}
SAC₂₅₄
and others

Neither conventional electrochemical ISE probes nor optical NOX-N probes can detect nitrite. This means that it is not possible to reliably determine the total N load or differentiate between nitrate and nitrite.

OPUS (aero) offers an easy-to-implement, reliable and purely optical online solution.

As a hyperspectral UV probe, it uses a special mathematical evaluation of the entire UV spectrum, enabling simultaneous and selective online measurement of NO₃-N and NO₂-N. The fast, stable and reproducible measurement results are determined completely without reagent.



Installation and operation of OPUS (aero)

TriOS OPUS (aero) can be operated directly as an immersion sensor in the process – e.g. on a chain, mounting rod or float. Alternatively, it can be installed in a flow cell after filtration. The optional automatic wiper cleaning ensures permanently stable and drift-free measurement results.

The intuitive TriBox3 controller provides on-site display of all measured values as well as control of measurement, cleaning and data transmission.



Conclusion - Hyperspectral online-sensors:

- **Linear spectral analysis (LSA)**
- **High spectral resolution**
- **Direct online measurement without sampling and sample preparation**
- **Delay-free results in real time**
- **Reagent-free and therefore low-maintenance**
- **Nano-coated optical windows for long-term stable measurements**
- **Pre-installed application calibrations for quick commissioning**

