



Technical Information

BIOFIXE Fixed-Bed Media Module to Intensify Ammonia Treatment



Technologies Ecofixe Inc.

About Technologies Ecofixe

Specializing in the biological treatment of wastewater, Technologies Ecofixe Inc. designed the ECOFIXE and BIOFIXE fixed-bed media modules to augment and upgrade capacity of aerated ponds and reactors to intensify their removal of BOD (ECOFIXE) and ammonia—even in cold water (BIOFIXE).

THE BIOFIXE SYSTEM

BIOFIXE is a modular fixed-bed media biological wastewater treatment system that intensifies the treatment capacity of ammoniacal nitrogen in aerated ponds and other biological reactors including SBR, activated sludge and oxidation ditch.

The BIOFIXE system is a major innovation in the removal of ammoniacal nitrogen in cold water (below 4°C). It achieves yields of 98% removal throughout the year and effluent discharge of less than 1 mg NH₄ + / L. This cold weather performance is achieved through a patented protective coating on the media which allow the bacteria to survive and continue treating ammonia in temperatures that would typically disable them.

The fixed-bed media provides extensive surface area for the beneficial microbes to settle and thrive, and are more easily retained when fixed to a surface. This attached-growth biomass will prevent washout, remove more BOD and/or ammonia and contribute less sludge than suspended growth free-floating bacteria. The treatment capacity is upgraded without needing to upgrade biosolids management.



THE BIOFIXE TECHNOLOGY

The BIOFIXE system is composed of modules that are installed directly in the pond/reactor where treatment intensification is desired. The enclosure contains fixed media on which the nitrifying biomass develops, even in cold water. Optimal nitrification will occur when it is installed downstream – typically just after the last aerated zone of the last pond.

The module's stainless steel enclosure is equipped with a flotation system. The media is composed of partially recycled polyethylene with a UV inhibitor. The system is anchored to either the bank of an aerated pond or the base of a reactor.

Four fine-bubble aerators under each module ensure maximum oxygen transfer to the biomass and prevent development of preferential pathways within the modules. A simple cleaning protocol is done every 4-6 weeks: 2/3 of aerators are turned off; the increased pressure in the remaining 1/3 cleans the media. This is then rotated to the other 2/3.

The modules can be installed between existing aerators (no infrastructure change required) and can be installed without stopping operations of the WWTP. The modules do not interfere with sludge removal operations which can be done with the modules in place. The intensified treatment extends SRT without increasing sludge, so there will be no increase in clarifier loading or sludge removal requirements.

The ECOFIXE system is self-sufficient and does not require an operator to be present.

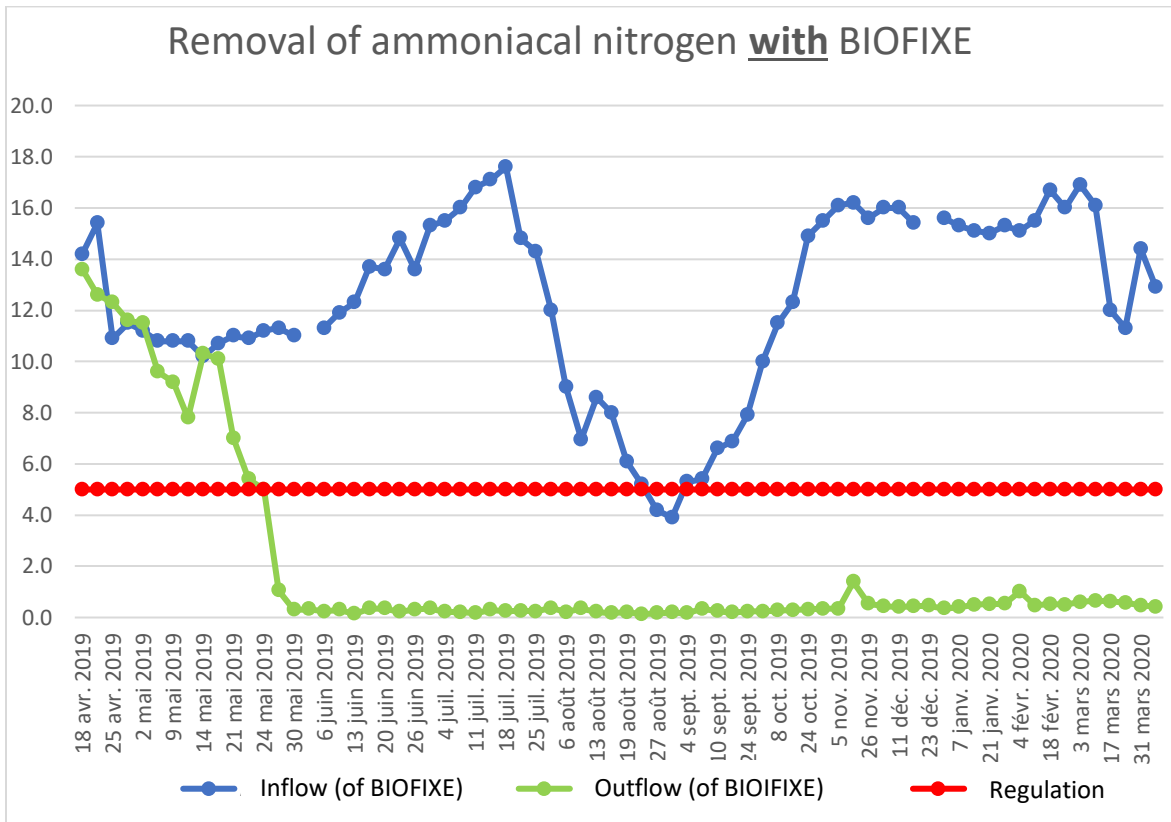
ADVANTAGES OF THE BIOFIXE SYSTEM

- No additional land or construction required;
- Easy upgrade for existing lagoon or reactor;
- No chemicals;
- Fast and simple installation;
- Modularity allows for phasing;
- Over 50% can be locally manufactured
- Sturdy;
- Energy efficient;
- Low operating cost;
- Treats 100% of the flow;
- Stable and constant performance;
- Significant GHG avoidance.

BIOFIXE Performance

Municipal Lagoon

The following results were measured during a 52-week period from April 2019 to April 2020, with a total of 72 analyses conducted in an accredited laboratory. During the validation period (after the biomass growth period) the average nitrogen reduction was **98%**. Between May 2019 and April 2020, the effluent was maintained between 0.13 and 1.4 mgNH4 + / L. (see next page for corresponding temperatures)



Ammoniacal Nitrogen Measurements

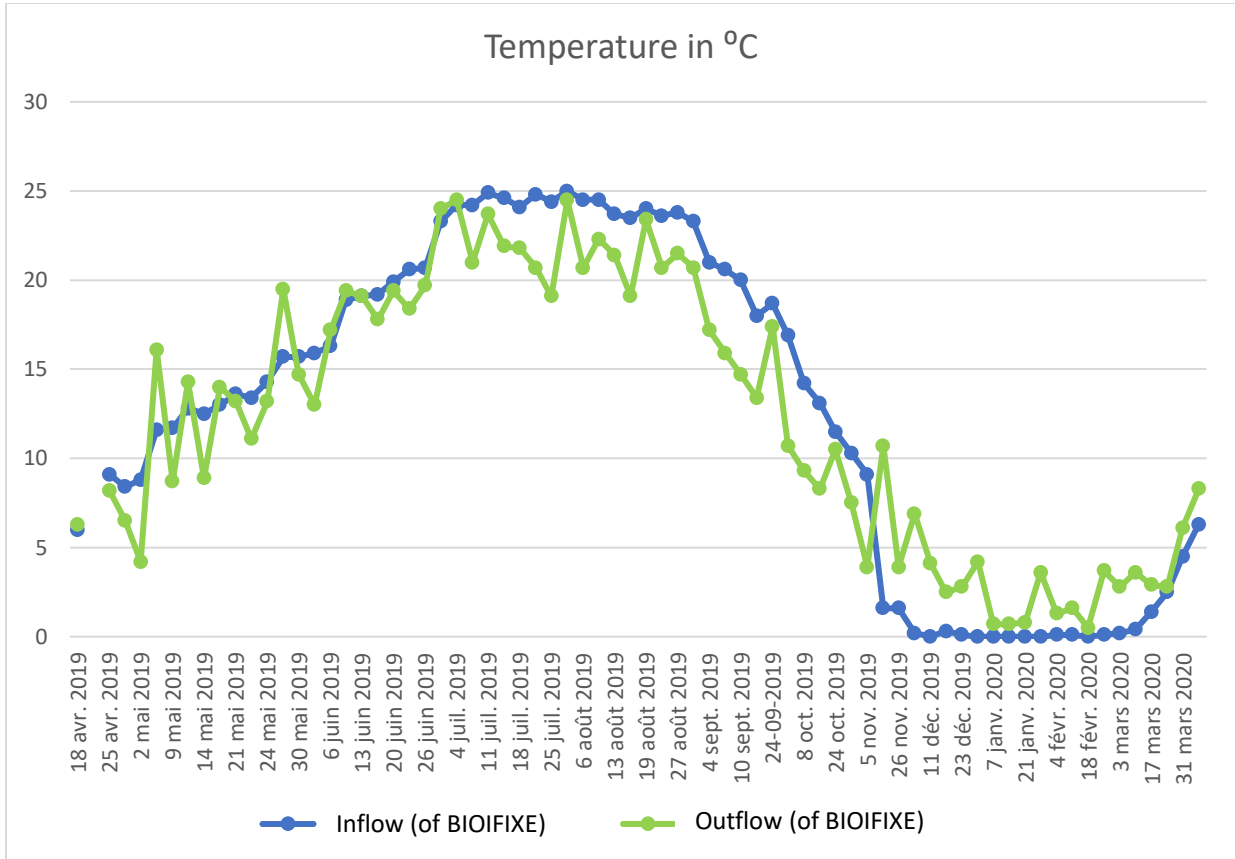
Average inflow: 12.6 mg/L

Average outflow: 0.37 mg/L

Average inflow winter: 15.28 mg/L

Average outflow winter: 0.56 mg/L

BIOFIXE COLD WATER PERFORMANCE



Between the period of November 2019 and March 2020, the temperature at the influent varied between 0 and 4.5°C. Even with a temperature below 4 degrees Celsius, when bacteria typically stop working, the nitrification, shown on the previous page, remains steady and ammonia effluent is below 1 mg/l. This is due to the patented coating on the Biofixe media which creates a protective environment for the bacteria.

All data presented was measured by a third party. The system was operated independently and without intervention by Technologies Ecofixe.

Temperature Measurements

Average inflow: 13.3°C

Average in BIOFIXE: 12.6°C

Average inflow winter: 1.3°C

Average in BIOFIXE winter: 3.3°C



Our Services

The Technologies Ecofixe Inc. team would be pleased to help you with your biological wastewater intensification needs. Let us prepare a proposal to demonstrate the savings in capital cost, O&M, GHG and energy for your project. Don't hesitate to contact us to offer your clients an innovative, high-performance solution.

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Sustainable development

Technologies Ecofixe is committed to promoting sustainable development and applying the principles in its policies, procedures and initiatives and business practices.

