



NEWTRIENT SNAPSHOT

# BioFiltro

## Biodynamic Aerobic (BIDA®) System



### BUSINESS OVERVIEW

BioFiltro is an internationally based wastewater filtration company whose systems are specialized to filter water, promote soil health, and offset carbon footprints through the power of worms in regenerative wastewater solutions. Patented since 2009, BioFiltro began dairy wastewater treatment in 2013 (Dore et al., 2019). Collaborating with an assortment of clients to provide services in the design, build, operation, and maintenance phases of their patented vermifiltration systems, BioFiltro fosters a symbiotic relationship between people, planet, and profit.

### PROJECT

#### TECHNOLOGY OVERVIEW

BioFiltro's Biodynamic Aerobic (BIDA®) System is composed of three main layers, utilizing *Eisenia Andreii*, known as red wriggler worms, to remove commonly regulated water constituents. Wood shavings on top serve as a medium for earthworms and microbes to feed on nutrients and organic matter. Crushed rocks in the middle provide aerobic conditions and are required for nitrogen removal. The bottom drainage basin comprised of thick pallets maintains the system's air chamber. For dairy systems, influent must flow through a solids separation system before entering the equalization tank, where it is stabilized, triggering the irrigation batch process.

#### PROJECT SIZE

The scale at which BIDA systems operate may vary depending on the type and size of the operation, wastewater volume, climate, and available space. Typical U.S. dairy BIDA beds range from 50,000 to 500,000 ft<sup>2</sup>, flowing 40,000 to 1,000,000 gallons per day of wastewater, and consuming .001 to .003 kWh of electricity per gallon treated.

#### REQUIREMENTS

In a 100% manure recollection system, such as a freestall operation, the BIDA system requires 120ft<sup>2</sup> of land per milking cow. Solids should be separated from the liquid waste stream using a solids separator with a 0.02" mesh size. In addition, access to a reliable power supply and wastewater source, such as liquid manure, is essential. Proper planning, regulatory compliance, routine maintenance, monitoring, record keeping, and training for personnel are crucial.

### KEY CALL-OUTS



**Water Recycling:** Treated wastewater is fit for reuse in flush systems and agricultural irrigation practices, including drip irrigation.



**Contaminant and Nutrient Reductions:** Treated wastewater contains significant decreases in contaminants and nutrients such as nitrogen and phosphorus.



**Reduced Waste Storage Maintenance Costs:** Optimized filtration reduces the need to agitate or clean long-term storage lagoons.



**Wastewater Integration:** The BIDA system, including appropriate solid/liquid separation equipment, can be installed as a wastewater treatment solution for raw manure or after other forms of waste treatment like anaerobic digestion.

Findings are based on an evaluation conducted under a Conservation Innovation Grant awarded to Newtrient. To view a more detailed description of these results, visit the BioFiltro BIDA Evaluation Summary on the [Newtrient website](#).

## FINANCIAL OVERVIEW



### CAPITAL INVESTMENT

In a freestall operation, capital costs for the BIDA system range from \$2,000 to \$3,000 per milking cow and net operation and maintenance costs span from \$75 to \$150 per milking cow per year. It is important to recognize these costs may vary due to influential factors such as specific project requirements, scale, and market condition.



### DOWNSTREAM BENEFITS

Worm castings, generated as a by-product of the vermifiltration process, can be used on-farm or sold as a soil amendment. Treated effluent can also be reused for irrigation and flush water. Solids separation provides a secondary downstream benefit to the operations of the BIDA system for on-farm use or sale of solids as bedding, compost, or fertilizer. Reduced greenhouse gas (GHG) emissions presents an opportunity to produce and sell carbon credits.

## ENVIRONMENTAL IMPACT

### WATER QUALITY

The BioFiltro BIDA system removes a significant amount of commonly regulated wastewater contaminants and nutrients. With a reduced nutrient load, treated effluent allows for optimal reuse in agricultural irrigation, flush water, and application, preserving local waterways. Storing treated dairy wastewater helps minimize the risk of potential contaminants and nutrient overloads in surface and ground water.

### REDUCED GHG EMISSIONS

Use of the BioFiltro BIDA system has the potential to reduce GHG emissions often associated with manure management on dairy farms, specifically methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) (Dore et al., 2019). By incorporating solid separation, reducing nutrient content, and reusing wastewater, the BIDA system reduces the amount of dairy manure components being stored in anaerobic lagoons for extended periods, thereby lowering CH<sub>4</sub> emissions. In addition, reduced risks associated with surface runoff and nitrogen leaching potentially decrease indirect N<sub>2</sub>O emissions.

### BIOFILTRO BIDA SYSTEM AND LAYERS



Source: Biofiltro (2018). Case Study: Royal Dairy.

Biofiltro. (2018). Case Study: Royal Dairy. Retrieved from [https://biofiltro.com/wp-content/uploads/2023/11/Case-Study-Royal-Dairy\\_Jan2018.pdf](https://biofiltro.com/wp-content/uploads/2023/11/Case-Study-Royal-Dairy_Jan2018.pdf)  
 Dore, S., Deverel, S., Iacobelli, A., & Sjögren, M. (2019). The BioFiltro BIDA Wastewater Treatment System. *BioFiltro*. <https://biofiltro.com/wp-content/uploads/2022/06/BioFiltro-BIDA-White-Paper.pdf>

## NEWTRIENT'S 9-POINT TECHNOLOGY SCORING



### For Biofiltro BIDA System

Newtrient designates the **BioFiltro BIDA** system as an **Emerging Technology**, meaning the solution is showing positive momentum and merits watching but does not yet meet all of the criteria to achieve the Newtrient Recognized designation.

Visit the **BioFiltro BIDA** page in Newtrient's Solutions Catalog.



Each solution can earn up to nine points, one for each criterion. Colored numbers indicate fulfilled criteria.

- 1 | Operational History
- 2 | Operational Reliability
- 3 | Market Penetration
- 4 | Capital Cost
- 5 | Operations & Maintenance Cost
- 6 | Value Proposition
- 7 | Vendor Information Sharing
- 8 | Case Study
- 9 | Funding Availability

Discover Newtrient's technology evaluation process: [Learn more about Newtrient's 9-point Technology Scoring System](#)



Newtrient's mission is to reduce the environmental footprint of dairy while making it economically viable to do so.

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