

Wastewater Solutions

Novozymes BioRemove™ 4200

Application Sheet

BioRemove 4200 contains a combination of beneficial microorganisms that is specially blended for municipal waste treatment system applications with high fats, oils, and grease (FOG). BioRemove 4200 is used in municipal wastewaters to improve plant efficiency, increase the FOG degradation capacity, lower FOG removal costs, and decrease the presence of prevalent FOG filamentous bacteria.

Benefits

The large diversity of influent constituents and flow seen in a municipal wastewater treatment plant can be challenging and expensive to treat. Often municipal plants will receive wastewater with a high FOG content from residential, commercial, and industrial sources, which introduces a unique set of problems in the treatment process. Excess untreated FOG can cause permit violations, decrease dewatering capabilities, promote growth of FOG filamentous bacteria which can cause foaming), and increase operating time and costs from skimming. As regulations for water treatment have grown increasingly stricter and penalties for permit violations have increased, it has become important to be able to efficiently remove FOG from the wastewater effluent.

FOG is primarily composed of large water-insoluble triglyceride molecules. These triglycerides are made up of a glycerol and three fatty acids (most commonly palmitic, stearic, and oleic acids). While many naturally occurring microorganisms have the ability to produce extracellular enzymes to cleave the fatty acids from the triglyceride, not many organisms have the ability to further break down these fatty acids. As a result, BOD removal efficiency can decrease, pH can drop with the acid buildup, and some of these fatty acids can become volatilized as noxious odors.

BioRemove 4200 can greatly simplify plant operations. It helps maintain a healthy microbial community and eliminates FOG-related problems.

Performance

Using Novozymes' intensive screening process, microorganisms in BioRemove 4200 were carefully selected and patented for their ability to cleave the fatty acids from the triglycerides and degrade them. Novozymes' patented strains have been demonstrated to metabolize a range of both long- and short-chain fatty acids.

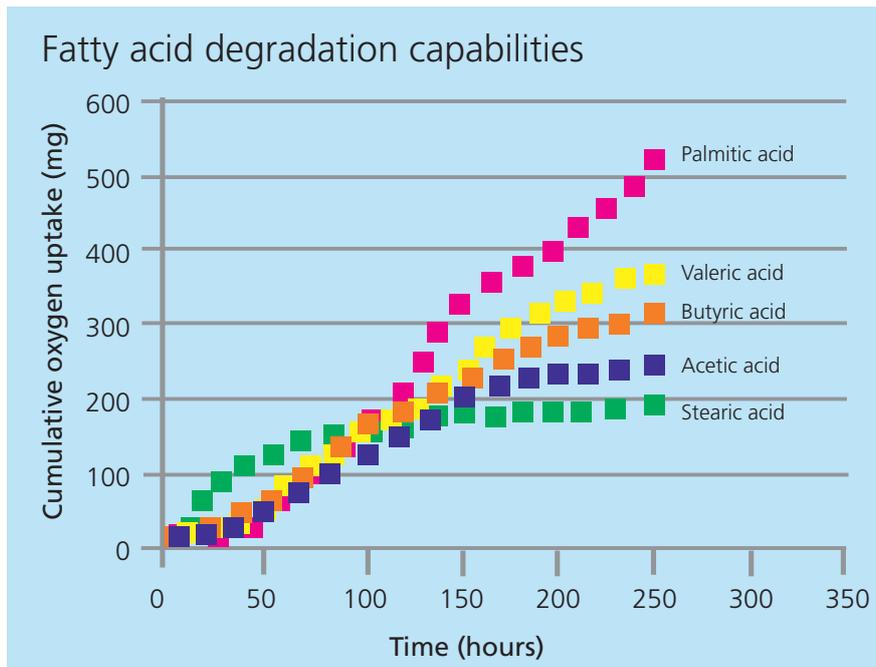


Fig. 1. Respirometry results showing growth of a variety of short- and long-chain fatty acids.

BioRemove 4200 is an effective solution for degrading FOG in municipal wastewater. A plant was experiencing heavy grease loading, which covered most of the surface area of the aeration tank with a greasy foam. The plant began a program with BioRemove 4200 that was designed to enhance the microbial community's ability to degrade FOG. With regular use over several weeks, BioRemove 4200 degraded the FOG and eliminated all buildup on the surface.



Fig. 2. Before treatment, with heavy FOG.



Fig. 3. During treatment, with reduced FOG.



Fig. 4. Ongoing treatment, with FOG control.

Recommended use

BioRemove 4200 can be used for multiple applications, including daily dosing to maintain FOG degradation capabilities, increased dosing during upsets caused by high FOG loading and flows, and seeding during plant start-ups.

BioRemove 4200 is added daily directly to the aerobic treatment unit. The microorganisms in BioRemove 4200 perform within the pH range 4.5–8.5, with an optimum near 7.0. Wastewater temperature affects activity, with an approximate doubling in maximum growth rate for each 10 °C (18 °F) increase in temperature to an approximate upper limit of 45 °C (113 °F). Very low activity can be expected below 10 °C (45 °F). Specific dosing recommendations are determined based on plant-specific conditions.

The dosage rate for BioRemove 4200 is dependent upon the wastewater constituents, average daily wastewater flow, volume of the biological reactor, and COD load. During the initial seeding period, an increased dosage is used to quickly establish the microorganisms in the system. When the microbial community is properly grown, regular dosing is necessary to maintain an accelerated level of biological activity.

Product characteristics

BioRemove 4200 is available as a dry tan powder.

Safety, handling, and storage

Store in a cool, dry place. Avoid inhalation of dusts. Wash hands thoroughly with soap and water after handling. Avoid contact with eyes.

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