

Wastewater Solutions

Novozymes BioRemove™ 3200

## Application Sheet

BioRemove 3200 is a biological formulation of beneficial microorganisms selectively adapted for application to food processing wastewaters which contain fats, oils, and grease (FOG). BioRemove 3200 contains microorganisms which have been patented for their superior ability to degrade FOG. BioRemove 3200 is effective in a wide variety of food processing applications, including meat, dairy, baking, beverage, rendering, vegetable processing, and others that experience elevated FOG levels in the wastewater system.

### Benefits

FOG is problematic in many wastewater systems. Due to its slow natural degradation, high BOD, and insolubility in water, FOG has a tendency to build up in collection systems as well as in the treatment units within the wastewater system. The buildup of FOG can block wastewater flows, reduce treatment efficiency, promote filamentous bulking, promote foaming, and cause malodors.

FOG is primarily composed of large water-insoluble triglyceride molecules (Fig. 1). 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.

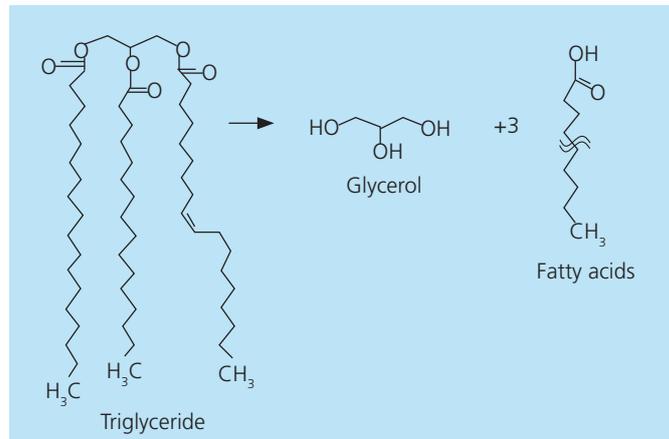


Fig. 1. Structure of a triglyceride.

BioRemove 3200 contains patented microorganisms for enhancing FOG and fatty acid degradation (US patent no. 6818211 B2). BioRemove 3200 simplifies operations by preventing grease buildup and minimizing the cost and effort of FOG removal. BioRemove 3200 can also reduce effluent FOG concentration and prevent outbreaks of *Nocardia* or *Microthrix* filamentous bacteria. Complete degradation of volatile fatty acids reduces the risk of noxious odors related to the breakdown of food wastes.

## Performance

Using Novozymes' intensive screening process, microorganisms in BioRemove 3200 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.

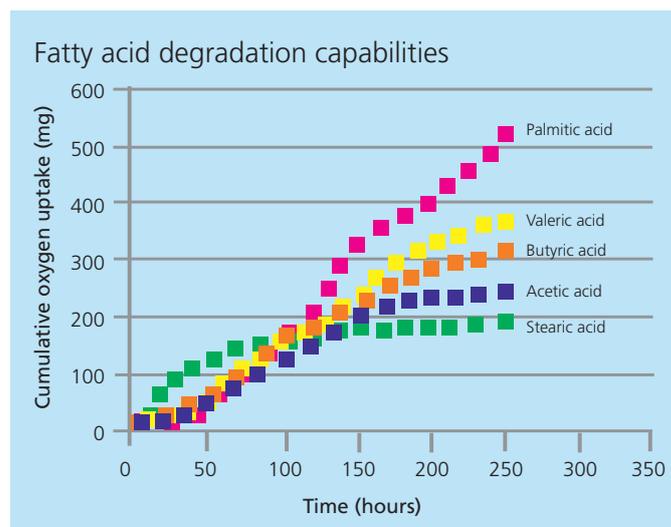


Fig. 2. Respirometry results showing growth on a variety of short- and long-chain fatty acids.

BioRemove 3200 is an effective solution for degrading FOG in food processing wastewater. A food processor was experiencing grease-related foaming in the aeration basin. A thick greasy foam covered 70–80% of the surface of the aeration basin, leading to high defoamer costs and settling problems in the secondary clarifier. Novozymes' evaluation of the site concluded that the indigenous microbial community was unable to handle the grease load. The plant began a program with BioRemove 3200 that was designed to enhance the microbial community's ability to degrade FOG. Within one sludge age, BioRemove 3200 led to FOG degradation such that only 10–15% of the surface area was covered with foam. With continued treatment and improved FOG degradation efficiency, settling improved, and the need for defoamer and FOG removal activities was eliminated.



**Fig. 3.** Before using Novozymes BioRemove™ 3200.



**Fig. 4.** FOG and foam reduction using Novozymes BioRemove™ 3200.

### **Recommended use**

BioRemove 3200 can be used for multiple applications, including daily dosing in the aeration basin to maintain the health of the microbial community, dosing to minimize FOG buildup in areas such as the headworks, DAF, or primary clarifier, increased dosing during high FOG loadings, and seeding during plant start-ups.

The microorganisms in BioRemove 3200 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).

The dosage rate for BioRemove 3200 is dependent upon the volume of the biological reactor, the FOG loading, and the amount of grease buildup in the system. 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 3200 is available as a dry tan powder. A liquid alternative is also available.

## 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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