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Rethink Tomorrow

Wastewater Solutions

Novozymes BioRemove™ 2500

Application Sheet

BioRemove 2500 is a biological formulation of beneficial microorganisms for application to wastewater containing phenols, cresols, and other aromatic hydrocarbons such as catechol and cumene. BioRemove 2500 is used in refineries and petrochemical plants to improve plant efficiency and simplify operations by improving the degradation of phenols and system stability.

Benefits

Phenols and related aromatic hydrocarbons are common in refining and petrochemical wastewater. Sour waters and spent caustics generated by the cracking processes are generally the most significant sources of phenols. The loading of phenols in the wastewater system is also dependent on sour-water stripper and desalter operations.

Phenols are extremely toxic to biological treatment systems and can significantly inhibit activity. Phenol is commonly regulated and can cause permit violations and effluent toxicity if not treated properly. Microbial communities that are subject to high phenolic loading are often unable to flocculate sufficiently, which leads to significant loss of solids.

Using Novozymes' intensive screening process, the microorganisms in BioRemove 2500 were carefully selected for their ability to degrade phenolic compounds and withstand toxic events. A healthy microbial community that not only tolerates but degrades phenols will provide a higher quality effluent and minimize the risks associated with high phenol concentrations.

Performance

BioRemove 2500 is an effective biological solution for enhancing a microbial community's ability to tolerate and degrade phenol. A refinery was experiencing chronic permit violations and spending too much money on chemical oxidizers as a result of poor wastewater system performance. Looking for a way to reduce costs and improve treatment efficiency, the refinery contacted Novozymes to see if a biological solution would help the plant meet its goals. A review of the system showed that frequent high loading of phenol was adversely affecting the microbial community such that it could not form healthy floc particles. This led to excessive solids loss and reduced treatment efficiency. At the time, the microbial community was able to remove only < 60% of the influent phenol load. Novozymes recommended BioRemove 2500 to improve the microbial community's ability to degrade phenol and form better floc particles.

Within a few weeks (one sludge age) of using BioRemove 2500, plant efficiency had improved to where it was consistently removing > 93% of the influent phenol load. This allowed the plant to significantly cut back on chemical oxidizer use, which provided significant cost savings.

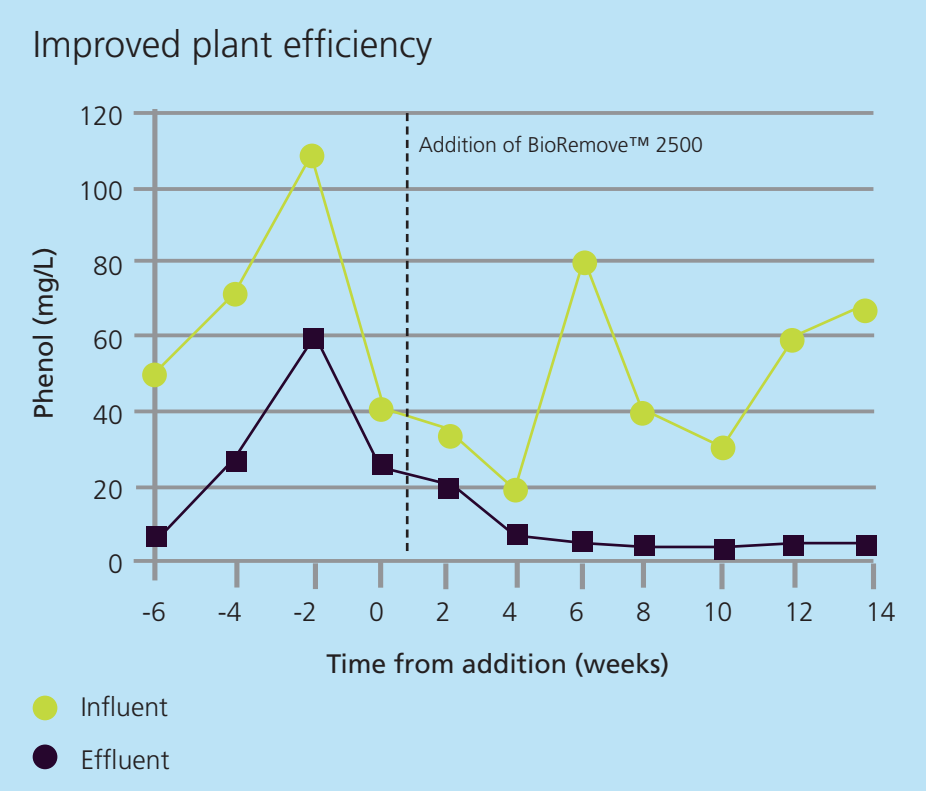

Fig. 1. This chart demonstrates phenol reduction as a result of the addition of Novozymes BioRemove™ 2500. The effluent phenol significantly drops over time enhancing the plant stability in a refinery wastewater treatment system.

Recommended use

BioRemove 2500 can be used for multiple applications, including daily dosing to maintain microbial health, increased dosing during high loading or upsets, and seeding during plant start-ups.

BioRemove 2500 is added directly to the conventional or high-rate aerobic treatment unit. The microorganisms in BioRemove 2500 perform within the pH range 6.0–9.0, 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 40 °C (104 °F), unless otherwise indicated. Very low activity can be expected below 5 °C (41 °F).

The dosage rate for BioRemove 2500 is dependent on a number of variables, including wastewater constituents, average daily flow, volume of the biological reactor, phenol loading, and overall 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. Specific dosing recommendations are determined based on plant-specific conditions.

Increased dosing of BioRemove 2500 is needed for seeding new systems or recovering from plant upsets.

Product characteristics

BioRemove 2500 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.

Novozymes Biologicals FR
Phone: + 33(0) 1 30 15 28 40
Parc Techno. des Grillons
60, route de Sartrouville – Bât 6
78232 Le Pecq Cedex
France
wastewater@novozymes.com

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