

Wastewater Solutions

Novozymes BioRemove™ 2300

Application Sheet

BioRemove 2300 contains a combination of microorganisms that are specially blended for petroleum refining and petrochemical applications. The beneficial microorganisms in BioRemove 2300 are able to degrade hydrocarbons like alkanes and aromatic compounds. BioRemove 2300 is used in petroleum refining wastewater systems to improve plant efficiency and simplify operations by improving hydrocarbon degradation, reducing hydrocarbon-related filament outbreaks, and improving system stability.

Benefits

There are many steps involved in the refining and petrochemical process for crude oil, which can result in a wide variety of pollutants, including hydrocarbons entering the wastewater treatment system. Refining and petrochemical wastewaters contain similar constituents, and BioRemove 2300 has been proven to remove many commonly found hydrocarbons.

Although the characteristics of the refining and petrochemical wastewater depend on the types of processes carried out, generally these pollutants are characterized by high amounts of chemical oxygen demand (COD), biological oxygen demand (BOD), and toxic chemicals. Common pollutants found in refining and petrochemical wastewaters are hydrocarbons, toluene, cyanide, heavy metals, benzene, phenolics, sulfides, strong acids, and strong bases. These compounds negatively affect the pollutant removal capability and overall health of the microbial community, causing lower hydrocarbon degradation rates and excess oil and grease. Excess oil and grease can also cause troublesome filament growth outbreaks, which can be difficult to get rid of. BioRemove 2300 is also tolerant and effective in high-salinity wastewaters, which makes it a very versatile product. 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 COD, BOD, oil, grease, and toxic substances from effluent.

BioRemove 2300 contains a blend of microorganisms that can degrade petroleum hydrocarbons, including alkanes and aromatic compounds typically found in refinery wastewater. Maintaining a healthy microbial community with BioRemove 2300 improves plant efficiency and simplifies operations by improving hydrocarbon degradation, floc formation, and settling in clarifiers.

Performance

BioRemove 2300 has been proven to be an effective biological solution for decreasing the concentration of hydrocarbons in wastewater. Figure 1 shows total alkanes removal by BioRemove 2300 in comparison to controls. After 7 days, the addition of BioRemove 2300 cultures resulted in a 96% reduction in alkanes.



Fig. 1. Novozymes BioRemove™ 2300 reduced alkanes by 96%.

Figure 2 shows total aromatics removal by BioRemove 2300. The total aromatics removal for BioRemove 2300 was 92.1% by day 28.

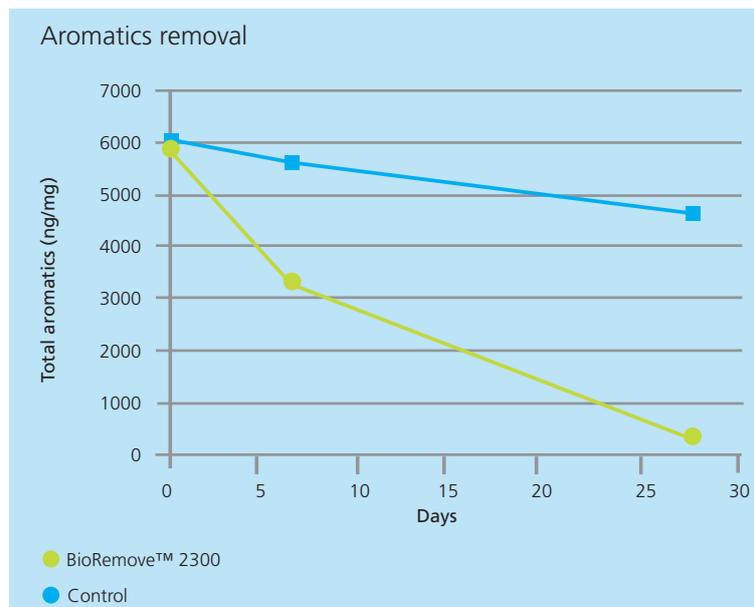


Fig. 2. Novozymes BioRemove™ 2300 reduced aromatics by 92%.

A study was arranged using a third-party nationally accredited contract laboratory to test the efficacy of BioRemove 2300 and nine competitors. The performance graphs (Figures. 3 & 4) show BioRemove 2300 compared to negative and nutrient-only controls.

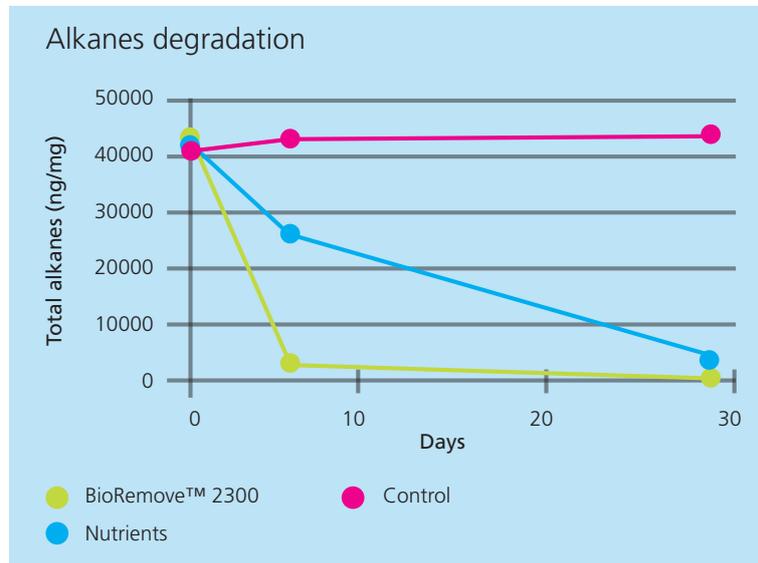


Fig. 3. BioRemove™ 2300 can degrade more alkanes and at a faster rate than any other commercially available biological product tested.

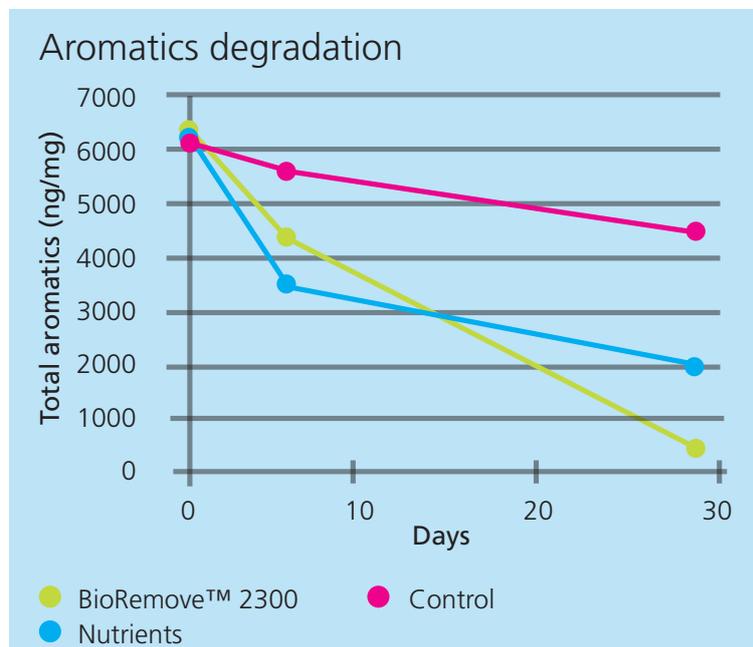


Fig. 4. BioRemove™ 2300 can degrade more aromatics and at a faster rate than any other commercially available biological product tested.

Recommended use

BioRemove 2300 can be used for multiple applications, including daily dosing to maintain microbial community health, increased dosing during high loading or upsets, and seeding during plant start-ups.

BioRemove 2300 is added daily directly to the aerobic treatment unit. The microorganisms in BioRemove 2300 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 2300 is dependent on a number of variables, including wastewater constituents, average daily 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. Specific dosing recommendations are determined based on plant-specific conditions. Increased dosing of BioRemove 2300 is needed for seeding new systems or recovering from plant upsets.

Product characteristics

BioRemove 2300 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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