



Water & Environmental Technologies

BioRemove COD LT

BioRemove COD LT is an advanced blend of beneficial microorganisms for application to wastewater systems with low-temperature conditions. The addition of BioRemove COD LT helps maintain COD removal efficiency at low temperatures. The regular addition of BioRemove COD LT can also help reduce the impact of high influent COD and hydraulic washouts.

Benefits

Temperature drops impact the biochemical reactions associated with bacterial metabolism and reproduction. Reaction rates typically decrease by half for each 10 °C (50 °F) drop. This decrease in reaction rate is often first seen as a decrease in oxygen uptake rate (OUR) activity or as a decline in COD removal. It can take months for the microbial community to adapt to low-temperature conditions, causing significant problems to plant operation.

BioRemove COD LT contains beneficial microorganisms proven to tolerate cold-temperature wastewater applications. By building microbial communities with BioRemove COD LT just prior to seasonal changes, wastewater operators ensure a safe and fast transition to winter operation. Many wastewater facilities find it difficult to lower their F/M ratio in cold temperatures, as many microorganisms tend to spend their energy on stress-induced, cellular maintenance instead of reproduction. Augmenting with BioRemove COD LT removes this challenge as the microorganisms' reproduction is not restricted at lower temperature operating conditions.

Performance

In biological treatment systems, cold temperatures impact microbial growth by slowing down cellular metabolism and the transfer of nutrients across the cell membrane. Bacterial cell membranes contain fatty acids, which may be saturated or unsaturated. Saturated fatty acids congeal at higher temperatures than unsaturated fatty acids. The higher the concentration of saturated fatty acids, the more likely the cell membrane will congeal and become rigid at low temperatures, thereby inhibiting the transfer of nutrients across the cell membrane. The psychrophilic (cold loving) organisms in BioRemove COD LT have much higher concentrations of unsaturated fatty acids in the cell membrane. This allows the membrane to stay more fluid at low temperatures and reduces the impact that low temperatures have on nutrient transport.

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BioRemove COD LT is formulated with naturally occurring microorganisms that have been carefully isolated from low-temperature environments and screened not only for survivability but also for the highest activities in degrading organic compounds.

With BioRemove COD LT, wastewater treatment systems can significantly reduce the period of acclimation and ensure that COD removal rates are maintained and discharge compliance is not jeopardized.

Table 1 shows data from a food processing wastewater plant that was seeded with BioRemove COD LT. Performance was good in the wastewater system except during colder months. As temperatures declined, maintenance dose of this product was applied to the aeration basin. The effluent BOD was 88% lower and the effluent TSS 48% lower compared to the previous year, when the plant did not use BioRemove COD LT.

EFFLUENT/OPERATING CONDITIONS	WINTER WITHOUT BIOREMOVE COD LT	WINTER WITH BIOREMOVE COD LT
Average BOD	98 mg/L	12 mg/L
Average TSS	65 mg/L	34 mg/L
Average MLSS temperature	14° C (57° F)	11° C (51° F)
Lowest MLSS temperature recorded	9° C (49° F)	7° C (45° F)

Table 1 BioRemove COD LT led to improved BOD and TSS removal in colder temperatures.

Recommended Use

BioRemove COD LT can be used for multiple applications, including daily dosing to maintain the microbial community's health during the onset of low-temperature conditions, daily dosing to maintain the microbial community's health in year-round cold environments, increased dosing in response to temperature fluctuations, and seeding during cold-weather plant start-ups and recoveries.

The dosage rate for BioRemove COD LT is dependent on the volume of the biological reactor and the BOD or COD loading in the system. During the initial seeding period, an increased dosage is used to quickly establish the microorganisms in the system. Once the microbial community is properly established, regular dosing is recommended to maintain an accelerated level of biological activity and to continue to minimize upsets. Waiting until after cold weather arrives will likely necessitate higher dosing due to slower acclimation and will vary with operating sludge age.

Optimum pH and Temperature

BioRemove COD LT bioaugmentation programs generally start 1 month prior to the onset of cold weather. Dosing should begin before wastewater temperatures reach 4° C (39° F) or before wastewater temperatures reach 13° C (55° F). BioRemove COD LT is added daily directly to the aerobic treatment units. The microorganisms in BioRemove COD LT perform with the pH range 6.0–9.0, with an optimum near 7.0.

Product Characteristics

PRODUCT	APPLICATION	PHYSICAL FORM
BioRemove COD LT	Low-temperature COD removal	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. More information can be found in the corresponding product safety data sheet (SDS).

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