

Wastewater Solutions

Novozymes BioRemove™ 5600

## Application Sheet

BioRemove 5600 contains unique fungal technology that is specially blended to treat a broad spectrum of hard-to-degrade compounds found in complex industrial wastewaters. BioRemove 5600 is used to improve recalcitrant COD (hard COD) reduction and increase plant stability.

### Benefits

Industrial wastewater often contains a complex mixture of organic compounds that vary in degradability. Simple compounds are degraded first, leaving more complex compounds which often take longer to degrade. If complex compounds are not completely degraded by the time they pass through the plant, they can impact the effluent COD and cause permit violations. In addition, they can adversely affect the microbial community's ability to form healthy floc particles and settle.

This recalcitrant material can be comprised of lignins, complex hydrocarbons, surfactants, dyes, and other compounds, depending on the type of industry. These compounds are often harder to degrade and of lower nutritional value to the microbial community. Chemical oxidation or expanding the plant size are common ways of addressing recalcitrant COD, but they are expensive and increase the overall complexity of the wastewater operation.

The fungi in BioRemove 5600 were isolated for their ability to degrade recalcitrant COD. The degradation abilities of BioRemove 5600 go beyond those of bacteria and can impact the overall degradation of recalcitrant COD. BioRemove 5600 is used in addition to other BioRemove bacterial products for optimal results. BioRemove bacterial products improve the overall microbial community's treatment efficiency, while BioRemove 5600 focuses on lowering the COD contribution from recalcitrant compounds. BioRemove 5600 optimizes overall treatment efficiency, provides protection from COD violations, and is an alternative to chemicals and equipment for recalcitrant COD reduction.

## Performance

BioRemove 5600 has been proven to be an effective biological solution for decreasing the concentration of recalcitrant COD in effluent. Figure 1 shows COD reduction after the addition of BioRemove 5600 to a recycle pulp and paper mill producing corrugated cardboard that was in jeopardy of violating its permit due to recalcitrant COD. The mill had explored chemical oxidation but was reluctant to undergo the expense and hassle of dealing with an additional chemical feed unit. With the addition of BioRemove 5600 to the wastewater treatment system, average COD reduction improved to 92%, a 7% improvement compared to before BioRemove 5600 was added. This kept the plant safely below its permit level and eliminated the need for chemical oxidation of COD.

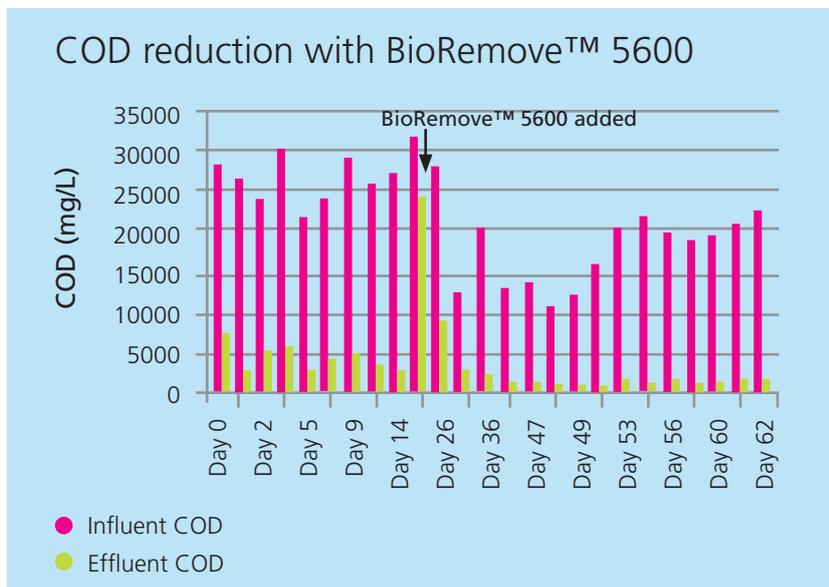


Fig. 1. COD in the effluent is lower and stable after Novozymes BioRemove 5600 addition.

## Recommended use

BioRemove 5600 can be used for multiple applications, including increasing removal of recalcitrant COD, reducing surcharges and permit violations, and increasing plant stability. For optimal performance, BioRemove 5600 should be added with BioRemove bacterial products. This combination approach improves the microbial community and targets the widest range of COD reduction, including recalcitrant compounds.

BioRemove 5600 is added daily directly to the aerobic treatment unit. The fungi in BioRemove 5600 perform within the wide pH range of 2.0–7.0 and are particularly adapted to acidic wastewater conditions. Wastewater temperature affects activity, with an increase in growth rate correlated to an increase in temperature up to 40 °C (104 °F), unless otherwise indicated. Very low activity can be expected below 5 °C (41 °F).

The dosage rate for BioRemove 5600 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 5600 is needed for seeding new systems or recovering from plant upsets.

### **Product characteristics**

BioRemove 5600 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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