Bacta-Pur®

Biological Sulfide Reduction in Wastewater Collection & Treatment Systems © 2010

ECOPROBIOTICS®, of the Bacta-Pur® System, are beneficial communities of natural bacteria, which have been on earth for millions of years and have been selected for their synergistic ability to biodegrade pollutants and to improve water quality. ECOPROBIOTICS® increase biodiversity. Just as people take probiotic yogurt for its' ability to assure the presence of the optimal community for digestion and immunity, ECOPROBIOTICS® improve ecosystem health. EVERY PRODUCTION of Bacta-Pur® products is analyzed and cleared for shipment ONLY after passing all performance tests and being CERTIFIED PATHOGEN FREE using techniques from the food industry. ECOPROBIOTICS® are purely natural and beneficial; they NEVER contain added chemicals such as surfactants, emulsifiers or enzymes…, nor do they contain genetically modified (GMO) or deliberately mutated organisms. ECOPROBIOTICS® are safe and beneficial. Disease causing organisms are never used, as others do or permit. All bacterial cultures in the Bacta-Pur® product are listed on the Canadian DSL.

Summary

SYMPTOMS	TREATMENT BENEFITS
• nuisance and toxic odors being released from manholes, air relief valves and lift stations	• elimination causes of noxious and toxic odors
• corrosion dissolving cement and metal structures in sewers, lift stations	• corrosion prevention & extension of infrastructure life
• poor settling & dewatering due reduced floc strength or sulfur filamentous bacteria	• improved settling & dewatering
• high operating expenses for sulfide odor & corrosion control	• reduced of operating expenses

Problems due to Dissolved Sulfides in Wastewater Systems

The presence of dissolved sulfides in wastewater can cause sever odor and corrosion problems. The dissolved sulfide occurs as a mixture of hydrogen sulfide (H_2S) gas and hydrosulfide ions. H_2S is the most common source of nuisance odors (rotten eggs) in wastewater systems. It is relatively soluble in water, but it will be released in the air at points of high turbulence, such as 90° bends and force main discharges. Even at low concentrations of dissolved sulfide it is possible to generate a large amount of H_2S gas, depending on the pH and temperature of the wastewater and the turbulence. Moreover, when oxygen becomes available, the H_2S is converted into sulfuric acid by sulfate oxidizing bacteria causing corrosion.

The presence of sulfide in wastewater can also affect wastewater plant performance by decreasing settling. Dissolved sulfides in wastewater reduce Fe^{3+} to Fe^{2+} weakening floc strength. Shear forces then disintegrate floc causing poor settling and dewatering and increasing total suspended solids in the effluent. High sulfide concentration in the aeration tank also favors the overgrowth of sulfur filamentous bacteria, such as *Beggiatoa*, *Thiotrix*. These microorganisms use sulfide as a source of energy oxidizing it to elemental sulfur. Excessive growth of filamentous microorganisms, reduces compaction and settling of activated sludge floc yielding sludge bulking.

Dissolved sulfides usually occur from anaerobic decomposition of inorganic sulfates and the reduction of organic sulfide. In an anaerobic environment (sludge, grease, slime layers) sulfate-reducing bacteria (SRB) use the sulfate ion as oxygen source for respiration and convert the sulfate and sulfide to dissolved sulfide. Production of dissolved sulfide usually occurs in the solids within gravity sewers and force mains or in wet wells, and primary clarifiers in treatment plants.

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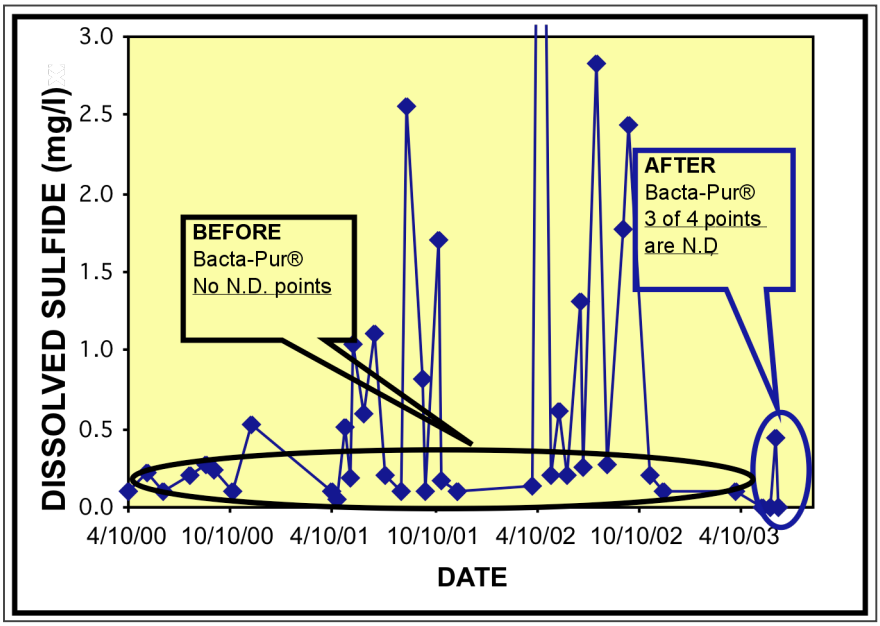
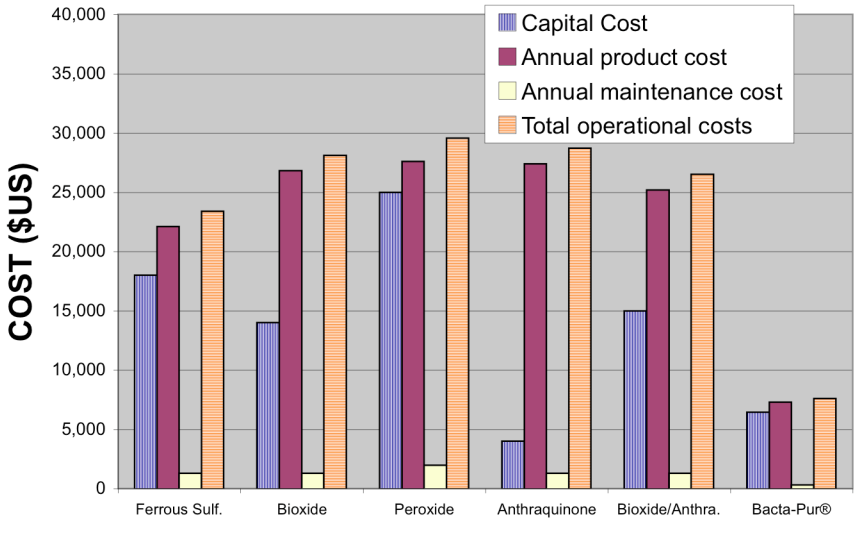
Prevention of Sulfide Formation with Bacta-Pur® System

The Bacta-Pur® System used to reduce sulfides consists of the beneficial cultures Bacta-Pur® XLG and the BACTIVATOR®Ⓓ. Use of Bacta-Pur® XLG assures the presence of a balanced community of strains, to digest grease and sludge while reducing soluble sulfur. The BACTIVATOR®Ⓓ is an automatic activation, growth and conditioning incubator, which assures that active cultures, in the optimal physiological condition, are added 24 hours a day.



Digestion of the grease, sludge, slime layer, in wastewater collection and treatment systems, removes the habitat for SBR bacteria, preventing sulfide generation. Furthermore, the uptake of sulfur compounds by beneficial bacteria in Bacta-Pur® XLG, reduces food for SRB or filamentous sulfur bacteria. Beneficial microbial communities replace the undesirable ones. The bacteria in Bacta-Pur® XLG continue to work down stream to improve settling and to help stabilize and optimize wastewater treatment. Organic wastes are converted into carbon dioxide, water and biomass.

Best results are achieved by continuous addition of Bacta-Pur® XLG in the most upstream location in the collection wastewater system. BACTIVATOR®Ⓓ can be placed on the upstream end of different sewer branches. Dose rates as low as 0.8 ppm, based on the flow, can be sufficient to reduce the formation of dissolved sulfide downstream in collection & wastewater systems. Use of the Bacta-Pur® System is most cost-effective. Use of alternative electron receptors can be reduced or eliminated in most circumstances.



Calculations based on 1MGD with 5 ppm dissolved sulfide. Costs for products other than Bacta-Pur® from Harshman, V. , July 2003, Follow your nose, controlling odors in all their forms, Water Envir. & Tech., 15(7):31-35.

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