

The Effects of Micro-nutrient Optimization on Wastewater Treatment Plant Performance

Ian Spice, Maat Environmental Engineering Corp.

Historically, improvements to wastewater treatment plant capacity and performance have concentrated on physical/mechanical changes or the addition of bacteria or chemicals. The discussion which follows is directed at highlighting a unique approach to wastewater treatment systems improvement.

An under explored area of wastewater treatment science is the effect of the micro-nutrient balance on the performance of biological systems. Through the optimization of micro-nutrient levels within a given system, studies completed by MEEC have found that specific indigenous bacteria can be selectively stimulated, increasing plant organic capacity by 25% to 35%.

Naturally formulated from plant extracts, the BIOLOGIC line of micro-nutrient products (manufactured by SciCorp Systems Inc., www.scicorp.net), have been engineered to create the optimum growth environment to stimulate increased biomass and activity of Facultative Anaerobes – indigenous to all organic waste systems. This proprietary, micro-nutrient formulation is comprised of select minerals (Copper, Magnesium, Potassium, Zinc), nutrients (TKN, Sulphates), amino acids (Ascorbic, Benzoic, Lipoic) and vitamins (B-6/12, C, E and K), all critical to cell growth and biological activity.

The plant performance studies presented will demonstrate measureable performance improvements resulting from continuous BIOLOGIC addition (2 to 5ppm), including; increased organic reduction, improved solids settling and effluent quality, reduced sludge generation and improved sludge quality, and increased methane production. In addition, the hydrolyzation of FOG reduces maintenance issues, while the ability of Facultative Anaerobes to suppress the growth of sulphate-reducing bacteria, eliminates odour issues throughout the plant.

Furthermore, in many jurisdictions, the resulting financial benefits (reduced energy, chemicals, maintenance and sludge handling costs) significantly exceed the BIOLOGIC application costs, providing both improved performance and overall operational cost savings.

It is expected that the results presented, will stimulate future discussion and academic interest in the science of micro-nutrient management as a fundamental consideration in the optimization of wastewater treatment systems.

Ian Spice, P. Eng., QP

Mr. Spice is a senior engineer with over 22 years experience in the environmental industry, serving in both technical support and management positions within consulting and industry. Through his unique career, Mr. Spice has gained unrivaled experience in the area of environmental liability assessment and management, assisting Fortune 500 companies with the management of their real estate portfolios, developing, implementing and managing due diligence assessment programs, providing liability valuations to senior management and assisting with the development of long-term liability management programs.

Mr. Spice has also designed and directed countless site remediation projects, both for on-going industrial/commercial properties and in support of Brownfield Re-development projects (residential, retail). Mr. Spice has advanced practical experience with leading edge remediation processes and impact receptor risk management approaches, enabling the development to cost-effective strategies directed at satisfying the site-specific requirements.

As an MOE-registered Qualified Person (QP), Mr. Spice has served as an expert witness and completed numerous peer reviews, while also authorizing several Records of Site Condition (RSC).

Mr. Spice has also gained practical experience in the area of waste management, including wastewater treatment plant assessment/optimization, solid waste audits, and the design/evaluation of compost and nutrient management systems.