Treatment of Food Processing Wastes in Brazil with Effective Microorganisms

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Introduction

An increasing volume of solid wastes and effluents is being generated worldwide through industrial development. Meanwhile, governments and consumer groups are demanding that these materials be properly treated to minimize their potential hazard as environmental pollutants. However, treatment technologies are often expensive and add substantially to the cost of production. Thus, industries are looking for cost-effective methods of processing, and possibly recycling, their wastes and effluents that would enhance their competitiveness and economic viability. Nowhere is this problem more acute than in the food processing industry. This poster paper discusses how two food processing industries in Brazil have used Effective Microorganisms (EM) to treat waste ef-fluents effectively and reduce their malodor potential.

The Amapora Dairy

This facility processes 18,000 liters of milk each day for cheese production. In so doing, it generates 40,000 liters/day of waste effluent mainly from milk residues and from water for washing equipment. The treatment system they were using consisted of oxidation ponds with addition of limestone to prevent extreme acidity from developing. However, this system was not effective as indicated by a slow rate of organic waste oxidation, unacceptable fly infestations, and a high level of malodors.

In 1994 the dairy modified its treatment system to include the use of EM. This involved one initial application of 100 liters of EM introduced at the outflow of the first oxidation pond followed by one liter of EM and one liter of molasses dripped at the outflow each day. Soon after EM application there was a dramatic reduction in fly populations and the level of malodors. Also, chemical oxygen demand (COD) has gradually decreased “downstream” from 1250 mg/liter to 825 mg/liter.

The Yamakawa Cassava Factory

This factory processes about 200 tons of cassava per day during the peak harvesting season which produces 45 tons of starch and nearly one million liters of waste effluent each day. The effluent consists of water from root washings and discarded plant juices. Another waste by-product produced in large volumes during starch extraction is cassava residue or cassava bagasse.

The system for treating the aqueous effluent consists of settling tanks and oxidation ponds, with continuous aeration to enhance biodegradation of the organic matter. To further the extent of degradation, 150 kg of quicklime (CaO) was applied daily along with some cattle manure as an additional source of carbon and nutrients. The results, however, were not satisfactory because putrefaction predominated which caused excessive malodor problems.

In 1994 the factory began using EM in its treatment system for the effluent. EM was added to the settling tanks and to the outside oxidation ponds. A drip system was devised for continuous metering of EM and molasses into the effluent stream. This has resulted in a significant reduction of malodors and vegetation has again started to grow around the treatment ponds.

After starch extraction, the cassava bagasse was inoculated with EM diluted with water at 1 : 1,000 and processed into silage. Later the silage was mixed with chopped green grass and fed to cattle. The silage had a pleasant odor, indicative of fermentation, and was readily consumed by the animals. EM is now also added to the animal’s drinking water and to their holding areas. This has substantially reduced fly populations and malodors.

These are just two examples of how EM technology has benefited two food processing industries in Brazil through improved waste management, nutrient recycling, environmental protection, animal health and cost reduction.

General References

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