



Mukesh Pandya

Jaihind College, India

Role of biochemistry in industrial wastewater treatment processes

Developments in production technologies have resulted in the concentrated highly concentrated streams of wastewater with high BOD and COD levels a challenge to treat effectively. Biological treatments are widely practiced to treat wastewater containing wide range of organic pollutants by Aerobic and Anaerobic process. The key to success of Biological Processes are Microorganisms which carry out versatile Biochemical reactions to degrade simple to complex, aliphatic to aromatics and recalcitrant organics under ideal physico-chemical conditions in nature.

Although these treatment programs are cheap, but the plants are operated without Optimization as well as understanding the Biochemistry of Microbial Metabolisms and parameters for maintaining metabolic balances.

Aerobic and Anaerobic process were studied for different Industrial Wastewater from Petrochemical and specialty products and Palm Oil Mills and optimum operating conditions were determined. The main key to these studies were types of microorganisms in biomass developed, their co-metabolism and enzyme profiles which transform organics and reduce BOD, COD and TOC levels.

Physico-chemical conditions for growth and multiplication of active bacteria biomass and management of biomass activities were the key for successful operation of both Aerobic and Anaerobic Treatments plants. Analysis for pH, BOD, COD, TN, AN, Alkalinity, VFA TDS MLSS, MLVSS were the key parameters for maintaining high activity of Biomass for achieving 95-99% reduction in BOD and COD levels with discharge levels much below Environment Standards.

Valuable from wastewater in terms of Biogas, Biomass and recycle of treated wastewater were difficult earlier but now easy and Industries are moving ahead with Zero Discharges approach. In this both GHG emissions as well as conservations of water are achieved.

This paper highlights case studies w.r.t various approaches in treatment of wastewater from Industries using Biochemical and Physico-chemical parameters to enhance and economize the treatment programme. Application of Biomass engineering for conversion of organic solids waste from Palm Oil mills to compost as soil conditioner. Results on various studies carried out will be presented during the conference.

It was observed that Biochemical balance w.r.t Biomass, Organic loading, Nutrient balance, and physico-chemical parameters-maintained effectiveness of treatment programs. Methane contents in Biogas could be achieved in a range of 60-65% with > 90% reduction in BOD and COD. Balance of Microbial consortium for efficient aerobic and anaerobic process gave sustainable efficient and economical treatment efficiencies.

Biography

Mukesh Pandya retired as Professor and HOD after 4 decades of teaching at Jai Hind College affiliated to University of Mumbai. He specialized in Industrial collaboration over 3 decades for wastewater Treatment, Design and development of total solution. His expertise was for low cost robust treatment programme for Industries in India and overseas which are running effectively. Guided students for PG and Doctorate programmes in the field of Microbial Biotechnology.

mukeshpandya51@gmail.com