

# Resource Recovery from Wastewaters for Sustainable Development

**Meghanath Prabhu Sambhu, Srikanth Mutnuri\***

*Applied and Environmental Biotechnology Laboratory, Department of Biological Sciences, Birla Institute of Technology and Science –Pilani, K. K. Birla Goa Campus, Goa, India*  
E-mail: srikanth.mutnuri@gmail.com, srikanth@goa.bits-pilani.ac.in

---

**Abstract**—Wastewater is the largest source of organic matter which is available in India. There are no measures being taken for the recovery of valuable nitrogen (N) and phosphorus (P) from the wastewater. Very few treatment plants have been supplemented with technologies to recover energy and nutrient for agriculture. In this study resource recovery such as energy and fertilizer production was successfully carried out using sustainable environmental technologies. Energy in the form of biogas was generated by adopting anaerobic digestion technology. The co-digestion of sewage sludge with food waste indicated that mixing ratio of 1:2 was optimum for maximum biogas production. Loading rate study was carried with 1:2 mixing ratio in lab scale 5L volume reactor. Effect of increasing loading rate on the diversity of methanogens was also investigated. Results showed that loading rate of 1 gVS/l/d produced maximum biogas. In the methanogenic diversity studies using T-RFLP, it was found that hydrogenotrophic methanogens might be predominating in the co-digestion. Results from lab scale were tested at the pilot scale in 60 cu. m. reactor. Sewage sludge can be directly used to make the compost fertilizer. Anthropogenic black soils of the Amazon region are locally known as Terra Preta (TP). Terra preta compost was successfully produced and its effect as fertilizer was tested on the growth of *Vigna radiata*.