

Recovery of Energy from Wastes

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Tannery is an important industrial sector in India. The sector has export earnings potential and provides employment opportunities. At the same time, however, tanning is an extremely polluting industry characterized by high organic and inorganic loads. During leather processing, about 30 m³ of wastewater and about 0.5 tonnes of solid waste will be generated per tonne of raw hide/skin. Presently, the effluents generated from the tannery cluster are treated by primary treatment, anaerobic lagoon followed by extended aeration process or two-stage extended aeration process to reduce the organic load to meet the standards prescribed by the regulatory authority. In open anaerobic lagoon, effluent undergoes anaerobic degradation process leading to the generation of methane and hydrogen sulfide. Methane is one of the important greenhouse gases (GHGs), as it has 21 times more global warming potential than CO₂. In Tamil Nadu, about 12 Common Effluent Treatment Plants (CETPs) are operating ranging from 600 m³/day to 4000 m³/day. In total, about 20,000m³/day of effluent with average COD of 4,000 mg/L is generated. About 10,000 tonnes per day of methane i.e., equivalent to 210,000 tonnes of CO₂ is released into the atmosphere. In order to reduce the emission of methane, efforts are made to convert the open anaerobic into closed anaerobic system and also burn the methane generated which will reduce the GHG effect by 20 times. Hence, all the new CETPs designed and implemented will have only closed anaerobic systems like Upflow anaerobic sludge blanket (UASB) to minimize the global warming effect. Similarly, the solid waste (fleshings, trimmings, primary sludge, etc.) generated from tanneries also contain considerable portions of organics leading to generation of methane when disposed in an unscientific manner. Efforts are also made to convert the fleshing and sludges from CETPs into energy through anaerobic digestion process. Similarly, waste generated from other agro-based industries such as distillery, slaughter house, poultry, starch, dairy, etc. has a huge potential for energy generation from wastes. In addition, studies have demonstrated a synergistic effect in biogas production during anaerobic treatment by mixing wastes generated from different industrial sectors.