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Stench-free way to treat wastes

T. Nandakumar



The National Institute for Interdisciplinary Science and Technology (NIIST) here, a constituent laboratory of the Council of Scientific and Industrial Research (CSIR), has developed a refined technology for source-level treatment of household waste that addresses the drawbacks of conventional units.

The Environmental Technology Group at NIIST has designed a compact anaerobic digester that can treat all kinds of biodegradable household wastes, including spoilt food, crop biomass, animal wastes, mixture of plant and animal wastes, garbage, agriculture wastes, water weeds and garden cuttings. Besides producing methane-rich biogas, the system converts the biomass waste to compost slurry for use as organic manure.

The pilot plant that has been in operation for the last 10 months produces 250 to 600 litres of biogas daily from one to three kg of biodegradable household waste, enough for two to three hours of cooking. The gas produced can be conveniently stored in neoprene balloons, waste tubes or in the digester itself.

Biogas plants

The plant works on the principle of anaerobic digestion for treatment of biodegradable biomass and the recovery of biogas. "Conventional biogas plants used for treatment of household wastes are just scaled-down versions of gobar gas plants designed to run on cattle dung. They require large quantities of water and discharge foul-smelling effluents containing undigested or partially digested matter," says Principal Scientist and project leader V.B. Manilal.

"Fats, the significant ingredient in the food wastes are only partially decomposed in normal household digesters and biogas plants. The stench and pollution caused by such plants can only be addressed by separating fats and other slow degrading materials from the wastes. Similarly, the solid biomasses are not fully degraded and mineralised in the conventional biogas plants unless they are mechanically ground," he points out.

No need to add water

The technology developed by CSIR-NIIST obviates the need to add water or wastewater to the waste. Hard waste materials such as bones are fed into the unit through an attached hand-cranked crusher.

The wastes loaded through the inlet port travel through the digester for more than 200 days before reaching the outlet.

The slow movement of wastes enables decomposition of large-sized waste materials. The intensive biochemical reactions by the microbial growth in the digester break down the particulate matter, fats and complex molecules and lead to production of biogas.

The thick slurry discharged through the outlet is free from the acidic foul smell typical of widely-used household biogas plants. The slurry can be easily collected and stored conveniently for direct soil application.

The pollution free system also prevents mosquitoes from breeding.