

NIIST develops pollution-free device

Express News Service

May 08, 2012 at 11:42am
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THIRUVANANTHAPURAM: The National Institute for Interdisciplinary Science and Technology (NIIST), Thiruvananthapuram, a constituent laboratory of Council of Scientific & Industrial Research (CSIR), has developed a compact anaerobic digester capable of stabilising household biomass wastes at the site without causing environmental pollution.

It is a suitable facility for managing biomass wastes at the source of origin and biogas recovery. Besides producing methane-rich biogas, the system converts biomass wastes to compost slurry having higher content of stable solids.

The stabilised compost slurry from this biogas plant is an excellent material ready to be used as soil manure for agriculture applications. A digester of 350-litre volume is sufficient to treat around 3 kilograms wastes a day. It produces 250 to 600 litres of methane-rich biogas daily by loading of 1 to 3 kg wastes as input. The biogas produced can be conveniently stored in biogas balloons, waste tubes or in the digester itself.

There is no need of adding water or wastewater. Hard waste materials such as bones are fed through the attached crusher and its central axis rotated by hand for a few times to enable its thorough mixing with other biomass wastes. The wastes loaded through the inlet port travels more than 200 days in the digester before reaching the outlet.

The horizontal design of the digester facilitates the slow movement of wastes, thereby enabling decomposition of large-sized waste materials. The intensive biochemical reactions by the microbial growth in the digester enable breaking down of the particulate matters, fats and complex molecules and lead to production of biogas.

The digested discharge from the outlet is thick slurry free from acidic foul smell unlike the discharge from widely-used household biogas plants. The discharged slurry can be easily collected and stored conveniently for direct soil applications upon requirement. This anaerobic digester controls environmental pollution and avoids mosquito breeding.

The widely-used anaerobic plants of small size are working with large volumes of water where the solids are fed directly or after grinding in some cases.

Invariably such plants discharge large quantities of effluent containing partially digested and undigested organic matters, including fats and fatty acids. Even the biogas plants that were originally designed for cow-dung treatment are being converted for domestic waste without any modification.