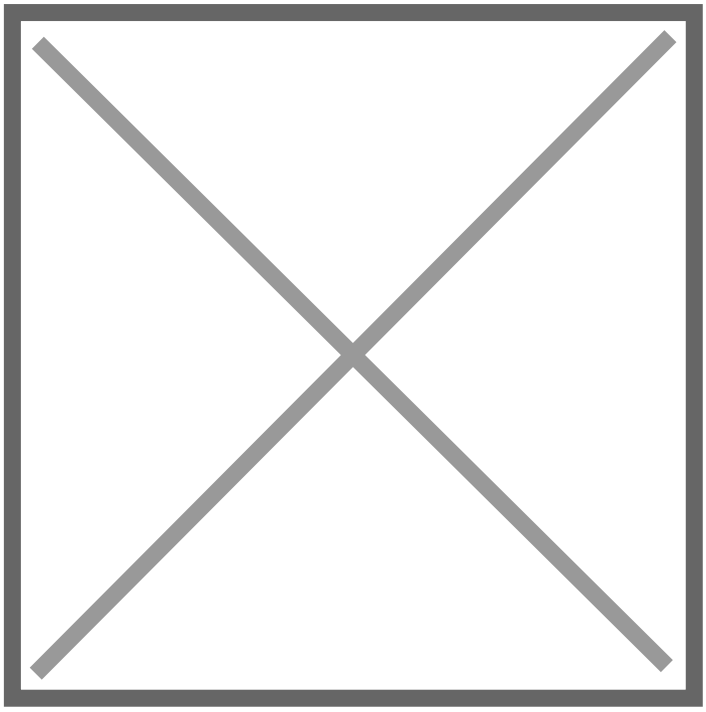
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## Sanitation revolution

05 September 2012 | News



Chang

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At the outset let me congratulate the Defence Research & Development Organization (DRDO) and Eram Scientific Solutions, Thiruvananthapuram, Kerala for their efforts to dispose human waste through eco-friendly toilets. These two organizations have kick-started a silent sanitation revolution. While DRDO has approached the problem through a biotech route, Eram has approached it from the electronics side. Yet, what is significant is that their efforts are finding honorable mention across the world.

DRDO's biodigester technology is a spinoff technology that was developed to treat biological wastes of soldiers serving in high altitude area. This technology is now being pilot tested by Indian Railways and in the of Dhamra-Jhamjadi region in Orissa as eloos. The technology has two components-one, a low temperature active inoculums and the other temperature controlled biodigester. A consortium of anaerobic bacteria that has been formulated and adopted to work at even extreme temperatures is the component which acts as inoculums (seed material) to the biodigester and converts the organic waste into methane and carbon-dioxide. The anaerobic process inactivates the pathogens responsible for water born diseases. Biodigester serves as reaction vessel for biomethanation and provides the anaerobic conditions and required temperature for the bacteria. The optimum temperature is maintained by microbial heat, insulation of the reactor and solar heating.

Eram Scientific Solutions, on the other hand, has fabricated an electronic public toilet made up of steel, fiber, and aluminum. The electronic toilet, called Delight Bharat, operates with sensors and systems that automatically flush, clean, and sterilize the toilet. Eram Scientific won a grant of more than $450,000 to make public toilets more accessible to the urban poor from Gates Foundation.

Bill Gates also recently announced the winners of the Reinvent the Toilet Challenge-an effort to develop Ã¢â?¬Å?next-generationÃ¢â?¬? toilets that will deliver safe and sustainable sanitation to the 2.5 billion people worldwide who don't have it. California Institute of Technology in the United States received the $100,000 first prize for designing a solar-powered toilet that generates hydrogen and electricity. Loughborough University in the United Kingdom won the $60,000 second place prize for a toilet that produces biological charcoal, minerals, and clean water. University of Toronto in Canada won the third place prize of $40,000 for a toilet that sanitizes feces and urine and recovers resources and clean water.

These are all humble beginning which may require modification in design, materials and digesting microorganisms as these toilets have to function at atmospheric temperature between -55 to 60 degree C. They have to meet standards of biosafety from faecal matter based gases and manures. And an awareness campaign about the benefits need to be launched and fears if any should be allayed. It's time that the Indian companies in the biotech space joined the bandwagon to provide revolutionary solutions for sanitation and solid waste management problems. The Planning Commission has allocated ₹36,000 crore in the 12th Five-Year Plan for sanitation alone, which is a whopping 350 percent jump as compared to the ₹7,816 crore allocation in the 11th Plan.