

Collaboration with California Institute of Technology for sustainable sanitation

The School of Environmental Sciences, Mahatma Gandhi University and the California Institute of Technology (Caltech), USA were entered into a collaborative research programme to work towards developing sustainable sanitation devices for the future. The collaboration was formally announced by the Vice Chancellor, Dr. Babu Sebastian, in the presence of Prof.M.R. Hoffmann (Caltech, USA) and Prof.C.T.Aravindakumar (Indian Collaborator and the Professor of School of Environmental Sciences). The project envisions to replace the existing septic tank based toilet system with a sustainable and fully solar powered electrochemical treatment system. This new treatment system could reduce the water use considerably by treating and recycling the wastewater for flushing; further the treatment produces hydrogen gas – which is considered as one of the cleanest fuels at low energy consumption. The Indian team led by Prof. C.T. Aravindakumar are focused on looking into the suitability of this technique in Indian conditions and would probably modify some of its design. This joint collaboration is initially intended for about 2 years. Both the institutions plan to further widen the collaboration in other areas of the environmental technology include energy.

The waste in Caltech's photovoltaic toilet goes to a septic holding tank, where it breaks down in a low-oxygen environment. Then it drops into a solar-powered electrochemical reactor, which is designed to break down water and human waste material into hydrogen gas. The urine gets oxidized to a chlorinated byproduct that further disinfects the water. The water is filtered and stored in a holding tank where it is recycled to flush the toilets or used for irrigating crops. The hydrogen gas can then be stored in hydrogen fuel cells to provide a backup energy source for night time operation or for use under low-sunlight conditions.





