

**Title :** Use of Nanotechnology and Solar Energy to purify water contaminated with bacteria and organochemicals.

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About two billion people in the world do not have a safe supply of water. These people live largely in rural areas. In addition, following natural disasters the water supply is often contaminated. It is therefore necessary to develop inexpensive methods to decontaminate water. In this project, an attempt was made to decontaminate water with *Escherichia coli* (E.Coli) bacteria and the organic pollutant Dichloroacetic acid. This was done using UV light and titanium dioxide nanoparticles, on a specially prepared membrane, in a special solar reactor. The titanium dioxide nanoparticles in the presence of UV light serve as a catalyst, increasing the rate of purification of the contaminated water. To investigate the properties of the reactor surface, a scaled-down version of the surface was prepared and viewed using an electron microscope. The images sourced showed the titanium dioxide nanoparticles randomly distributed on the glass ballotini, effectively coating it. Water contaminated with bacteria was allowed to flow over the surface of the reactor. Firstly, with a surface of ordinary glass exposed to sunlight, then with an active plastic surface of titanium dioxide nanoparticles on glass ballotini also exposed to sunlight. The water was subsequently tested for bacterial content at specific intervals. A similar experiment was carried out with water contaminated with dichloroacetic acid. In this case, the water was tested for chloride ions, using an ion-selective electrode, which would indicate break down of the acid. Testing so far with the plane glass surface, sunlight had minimal effect on the bacterial infected water. Experiments are continuing with the E. Coli infected water and Dichloroacetic acid.