

Hari Sowrirajan

*Can Using Cyanobacteria Reduce CO<sub>2</sub> Emissions from Cars?*

The global temperature is on the rise due to the greenhouse effect caused largely by CO<sub>2</sub> emissions. This has the potential to produce environmental catastrophes in the future. It is imperative to reduce these CO<sub>2</sub> emissions. 31% of all CO<sub>2</sub> emissions in the United States are from transportation alone (EPA, 2011). The aim of this project was to test the effects of cyanobacteria (algae) on carbon dioxide and ultimately to see if it could be used to reduce car emissions.

Cyanobacteria transformed the predominantly CO<sub>2</sub> rich atmosphere of the early Earth into the atmosphere we have today. Therefore theoretically cyanobacteria could be used to reduce CO<sub>2</sub> emissions from cars.

Cyanobacteria was added to water containing dissolved CO<sub>2</sub> and the CO<sub>2</sub> concentration was measured over time. The pH was measured at intervals. The CO<sub>2</sub> concentration was determined using the pH (acidity)-KH (water hardness)-CO<sub>2</sub> relationship. The KH was found to stay constant throughout the experiment. Diffusion occurs in the natural world, where particles move from areas of higher concentration to areas of lower concentration. Thus, the CO<sub>2</sub> dissolved in the water would naturally escape. Care was taken to reduce the rate of dissipation of the dissolved CO<sub>2</sub>.

When carbon dioxide is dissolved in water, the water turns acidic. The cyanobacteria raised the pH of the water by about an average of 0.2 a day, turning the water basic and therefore reducing the carbon dioxide concentration in the water. However, the absorption of CO<sub>2</sub> was not linear, so different amounts of CO<sub>2</sub> were absorbed daily.