Filtration of Carbonic Acid Out of Water

Maher, Jack (School: Muskego High School)
Narine, Jasmine (School: Muskego High School)

Rapidly developing industrial processes and manufacturing are releasing an alarming and overwhelming surplus of 29 gigatons of CO2 into the atmosphere every year, adding to the natural discharge of 750 gigatons from the Carbon Cycle. Studies have found that 30% of this surplus CO2 in the atmosphere gets absorbed into the ocean, creating Carbonic Acid and acting as a natural scrubber. This absorption has led to the destruction of marine ecosystems, decalcifying shellfish, deteriorating coral reefs, increasing algal blooms and invasive species, as well as decreasing oxygenated water and plankton populations. The group is approaching this problem by researching favorable algal species which are able to deacidify water practically, efficiently, and without causing environmental harm. Four algae species will be tested in a preliminary experiment, monitoring the growth rates using a colorimeter, as well as observing the metabolic rates through changes in acidity, dissolved oxygen, and atmospheric CO2. Our goal is to design and prototype a localized filtration device which harnesses the photosynthetic power of a benign culture of algae to filter Carbonic Acid and release pure oxygenated water. The group aims to design a controlled environment within the filter to contain the growth and CO2 metabolizing power of the algae into a usable water filter. The team's main engineering question is whether the introduction of algae will deacidify localized bodies of water practically, efficiently, and safely. Furthermore, byproducts will be tested for value while researching the most favorable design, structure, and composition of the filter.