Study on the Effects of Polyvinyl Chloride (PVC) Water Contamination on the Oxygen Production Levels of Elodea densa (Aquatic Elodea Plant)

Paciorek, Katelynn (School: Wiregrass Ranch High School)

Polyvinyl Chloride (PVC) is classified as a thermoplastic that contains Benzyl Butyl Phthalate (BBP) plasticizers to increase durability in construction; however, BBP is known to cause harm to aquatic ecosystems and the health of aquatic plants due to its highly reactive ester chemical makeup. This research aimed to determine to what extent PVC impacts water quality and how it affects the oxygen production of Elodea densa, therefore determining how PVC impacts aquatic plant health and productivity. To accomplish this, 7g of powdered PVC was added to 5 of 15 800ml purified water samples containing a stem-bundle of E. Densa to see how this exposure impacts the quality of water (measured via pH, GH, KH, NO3, NO2) and E. Densa's oxygen production over 24 hours using a dissolved oxygen (DO) probe in mg/L. The collected data suggests that the addition of PVC to purified water and E. Densa caused the average DO to decrease from an average of 6.368 mg/L to 4.608 mg/L, showing potentially harmful decreases in available oxygen. The standard deviations of the average pH and GH (with and without PVC) are zero, showing statistical significance in the fact that PVC slightly increases pH and greatly increases GH. This research suggests that PVC increases freshwater pH to a slightly basic level and increases the water hardness (GH) and level of carbon dioxide in water (KH). It also supports the suggestion that PVC causes E. densa to produce less oxygen than those not exposed to PVC.

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