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Allelopathic Effects of Picea pungens

The purpose of my experiment was to test if it is the low pH of Picea pungens (Colorado Blue Spruce) tree needles that inhibits the growth of Lolium multiflorum (annual rye grass) seeds or if it is some other organic variable in the needles. I hypothesized that if I watered seeds with varying pH levels of Needle and Hydrochloric Acid (HCl) solutions that the seeds in the Needle solutions would have less germination than the seeds in the water and HCl solutions. My project involved setting up a growth chamber with controlled heat and light, and watering sets of 100 seeds with Needle and HCl solutions of 3 pH levels: 5, 5.5, and 6. The control was water, pH 7. I watered the solutions for 8 days. I counted the total number of seeds germinated and measured the stem length. The data I collected supports my hypothesis because the seeds in the Needle solutions of pH 5 and 5.5 had lower germination than the HCl and water solutions. The Needle solution of pH 6 had a few less seeds germinated than the HCl and water solutions. After analyzing the data for the average final stem length I found out that the length of stems in the stronger Needle solutions (5 and 5.5) were significantly shorter, by 3 cm, than the HCl and water solutions. The weaker Needle solution was shorter by about 1 cm, also significantly different. These findings lead me to believe that there is some other allelopathic variable in Picea pungens needles that inhibits the germination and stem length of plants.