The Effect of Natural Antioxidants on Reducing Oxidation

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Antioxidants are theorized to help reduce the risk of degenerative diseases by helping to destroy and neutralize free radicals arising from oxidative reactions in our body. A voltaic cell coupled with a redox reaction was used to investigate the effects of natural antioxidants on inhibiting the rate of oxidation. The effects of blueberries, cranberries, spinach, sweet potato, and dark red kidney beans were tested, with dark red kidney beans predicted to be the most effective as they contained the largest amount of antioxidants per cup. These substances were ground, then added to the anode solution containing zinc (II) sulfate. The absorption of the blue cathodic copper (II) sulfate solution before and after the redox reaction was measured, and this value was converted into a concentration using the Beer Lambert Law. The data were then statistically analyzed. Theoretically, the test that exhibited the least amount of change in concentration during the reaction contained the most effective antioxidant. This experiment showed that dark red kidney beans were the most effective at inhibiting oxidation. There was an average change in concentration of 0.022 absorbance units, which was the lowest out of the five substances tested, especially in comparison to the control group, where there was a change of 0.172. The sweet potato was least effective, as the change in concentration was greater than that of the control at 0.180. An extension of this project could be to isolate the antioxidant chemical and test its effectiveness at hindering oxidation.

Awards Won:

American Statistical Association: Certificate of Honorable Mention