Measuring Antioxidants in Food and Beverages

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About a decade ago it was discovered by Italian scientists that the Briggs-Rauscher oscillating reaction is sensitive to antioxidants. These free-radical scavengers inhibit the reaction; the oscillation stops for a certain period of time, then it resumes. It has been established that the inhibition time depends on the concentration of the antioxidant added. The purpose of this science project was to use the oscillating reaction as a tool for measuring antioxidant activities in extracts from natural sources, such as fruits and drinks. One advantage of the method was its simplicity. After combining 0.15 M malonic acid, 0.02 M manganese sulfate, 0.2 M sodium iodate, 0.077 M sulfuric acid, and 4 M hydrogen peroxide solutions, the sample was added to the stirred mixture. The elapsed time between the observed color changes was measured with a stopwatch. Ascorbic acid and 2,6-dimethoxyphenol were selected as standards to test the effect of individual antioxidants on the Briggs-Rauscher reaction. Both compounds showed a linear correlation between concentration and inhibition time. Afterwards, citruses, berries, teas and coffees were examined for antioxidant activity. The inhibition times were compared within each group to determine the antioxidant strength. The teas had inhibition times from 38.3 seconds to 178.8 seconds. The citruses had inhibition times from 45.7 seconds to 124.7 seconds. The berries had inhibition times from 69 seconds to 137.4 seconds. The coffees had inhibition times from 17.6 seconds to 54.3 seconds. In conclusion, the results demonstrated the viability of the method for the analysis of natural antioxidant compounds.

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