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| Chem 216 |
| Determination Iron in a Vitamin Tablet by Ultraviolet-Visible Spectroscopy |
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| 5/3/2010 |

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# Purpose:

The purpose of this experiment is to determine the amount of Iron present in a vitamin tablet by ultraviolet-visible spectroscopy.

# Procedure:

The procedure in the lab manual was followed. However, we diluted the unknown by a dilution factor of 10 and another by 20. Moreover, we included a blank for both the unknown and the standards for the operation of the UV-Vis instrument.

# Data:

|  |  |
| --- | --- |
| Mass of Tablet | 589.5 mg |
| Mass of powder: | 524.7 mg |
| Concentration of pure Fe: | 90.3 mg/l |

After graphing the spectrum of the 5mL standard in the 400-700nm wavelength range, we found out that the absorption maximum of the tablet is at 509 nm. Hence, we run the other standards at 509 nm in order to graph a calibration curve.

|  |  |
| --- | --- |
| solution name | Absorbance at 509 nm |
| STD 3ml | 0.0462 |
| STD 4ml | 0.0789 |
| STD 5ml | 0.0916 |
| STD 6 ml | 0.1322 |
| Unknown Fe UV sample | 0.0554 |

The UV spectrum of the 5mL Standard is provided at the end of the Lab Report.

# Calculations:

To calculate the concentration of Fe in the standards,

STD 6ml, 6ml x 90.3 mg/l = [Fe] x 100ml $\gg $[Fe] = 5.418 ppm

|  |  |  |
| --- | --- | --- |
| solution name | Concentration of Fe ppm | Absorbance at 509 nm |
| STD 3ml | 2.709 | 0.0462 |
| STD 4ml  | 3.612 | 0.0789 |
| STD 5ml | 4.515 | 0.0916 |
| STD 6 ml | 5.418 | 0.1322 |
|  |  |   |
| Unknown Fe UV sample |  | 0.0554 |

A = 0.03 (CFe2+) – 0.0346

For the unknown A = 0.0554 🡺 (CFe2+) = (0.0554 + 0.0346)/0.03 = 3.00 ppm

 (CFe2+)= 3.00(ppm) x$\frac{100ml}{5ml}×\frac{100ml}{10ml}$= 600ppm

mFe2+= 600 ppm x 0.1 (L)= 60.0 mg

%Fe2+= (60.0 mg / 524.7 mg)x100 = 11.44%

# Discussion:

We wasted some time trying to dilute the sample in order to obtain an absorbance within the calibration curve. If such dilutions could be explained in the Lab manual before it would be better.

# Conclusion:

UV-Vis is a reliable analytical tool; however, in order to compare with atomic absorption spectrometry, we have to perform the other experiment. After, careful quantitative comparison between the two methods, a more reliable method will be specified.