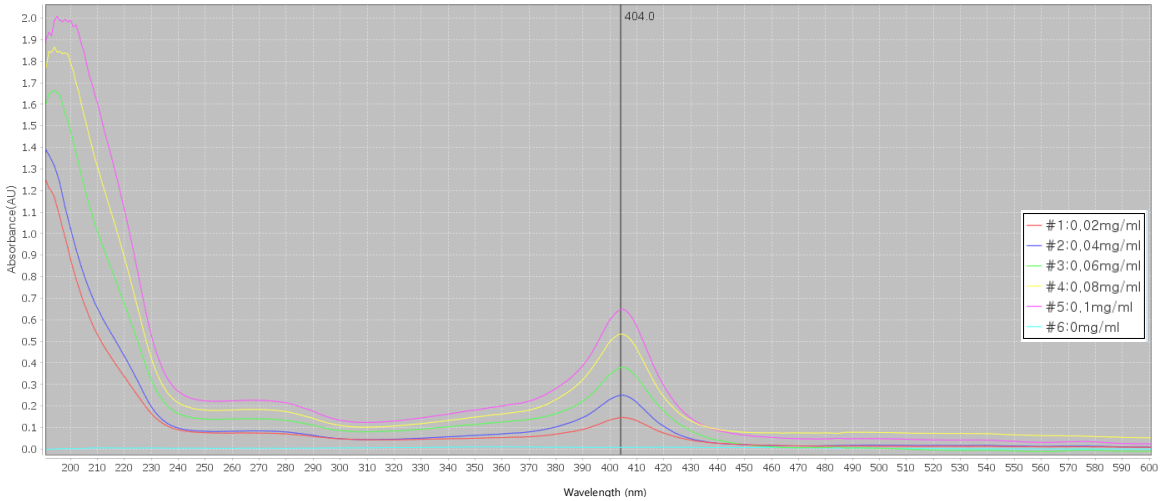
Finding hemoglobin concentration in urine using absorbance intensity

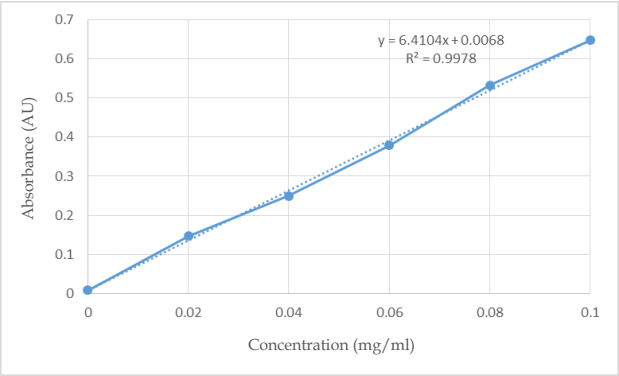
Urine test, which can obtain clinical information with relatively convenient method, is one of the basic tests conducted at the hospital. It is normally conducted by putting urine on the test sheet and then checking for reaction. By using spectroscope, however, certain items can be identified with urine only without using the test sheet, and also a qualitative analysis can be conducted for their amount in urine.

This experiment verified the amount of hemoglobin with UV-Vis spectroscope in order to measure occult blood in urine.

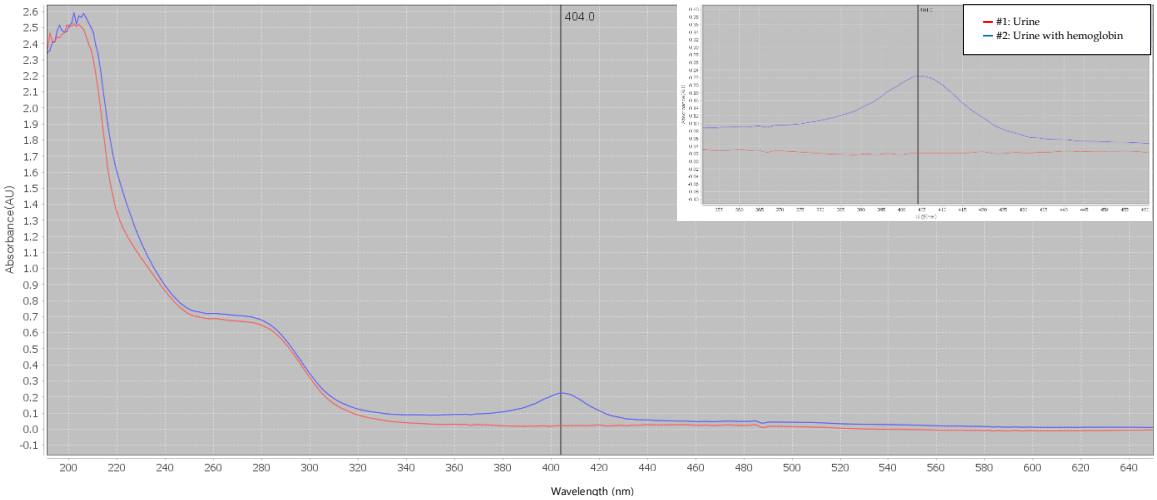
Hemoglobin absorbs light in the visible range of 404nm. The absorption spectrum per concentration can be obtained with Alphalook, resulting in the following data.



The linearity of absorbance per concentration of hemoglobin from above is calculated as follows.

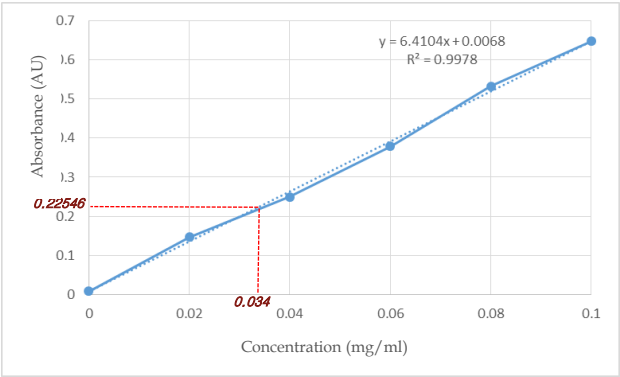


On the other hand, the figure below shows the absorption spectrum of normal urine and of urine with hemoglobin. It can be verified that there is a difference in absorbance of 404nm



area, which is the absorption wavelength of hemoglobin.

The absorbance at 404nm of urine with hemoglobin is 0.2255 AU, and by substituting this value into the standard curve graph, the concentration of hemoglobin in urine can be estimated as about 0.034mg/ml.



In conclusion, the amount of occult blood could be estimated by substituting the absorbance of hemoglobin in urine at the absorption wavelength into the standard curve.