

## Measurement of anti-oxidation of vitamin C using UV-Vis spectroscope

Vitamin C, one of the water-soluble vitamins, is also called ascorbic acid. One of the best-known efficacies of vitamin C is its antioxidation effect. Antioxidation refers to the suppression of oxidation, and usually comes up when explaining the cell aging process and how to prevent such process. That is, cell aging means cell oxidation, and the oxygen entering the body through respiration is used and then remains in the form of active oxygen in the body. The active oxygen leaves the oxygen in an unstable state and accelerates cell aging. Vitamin C is known to be a substance which hinders such oxidation.

This experiment uses UV-Vis spectroscope to examine how effective the antioxidation of the vitamin C performs in reaction to the oxidizer.

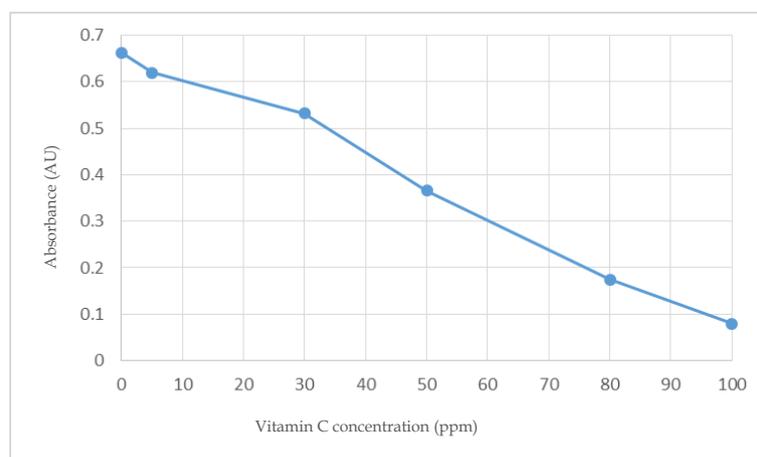
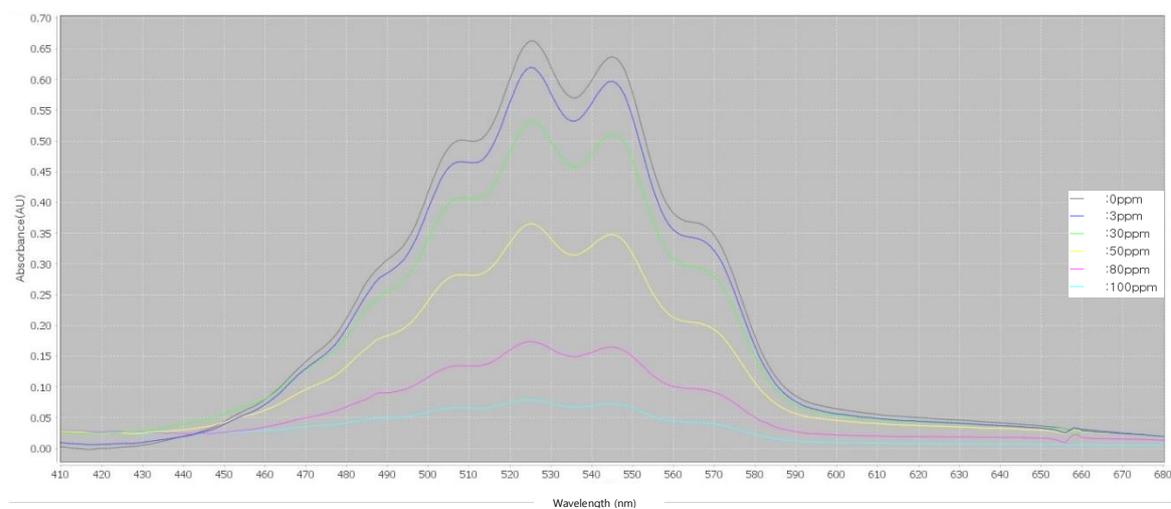
Vitamin C is prepared in concentrations each of 0, 5, 20, 50, 80, 100ppm, and potassium permanganate, a strong oxidizer, is added and the changes in absorbance are measured. Potassium permanganate shows maximum absorption wavelength at 525nm, and as the unique deep purple color of potassium permanganate is closer to transparent, it can be deemed that vitamin C suppresses O<sub>2</sub> generation of manganese peroxide and shows the antioxidation effect.

The figure below shows the color changes of permanganic acid solution as the content of vitamin C grows higher.



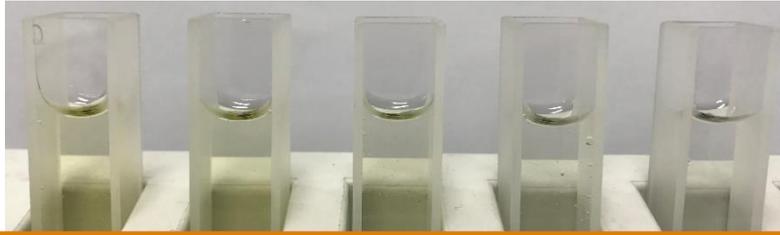
Potassium permanganate + vitamin C respectively 0, 5, 30, 50, 80, 100 ppm

The measurement of the absorbance of this sample results in the following graph.



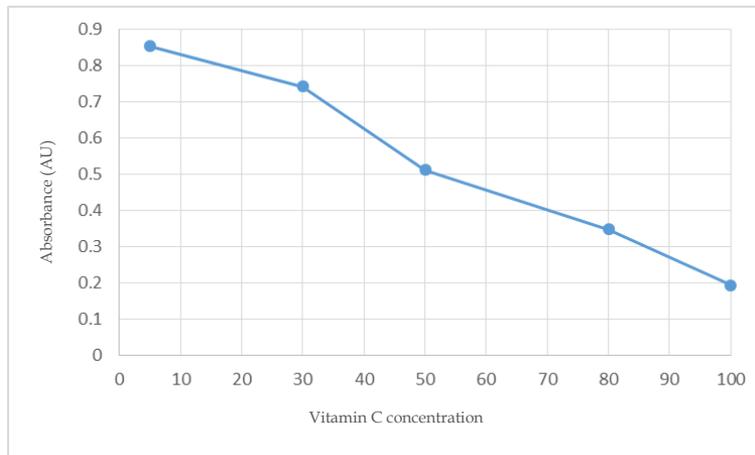
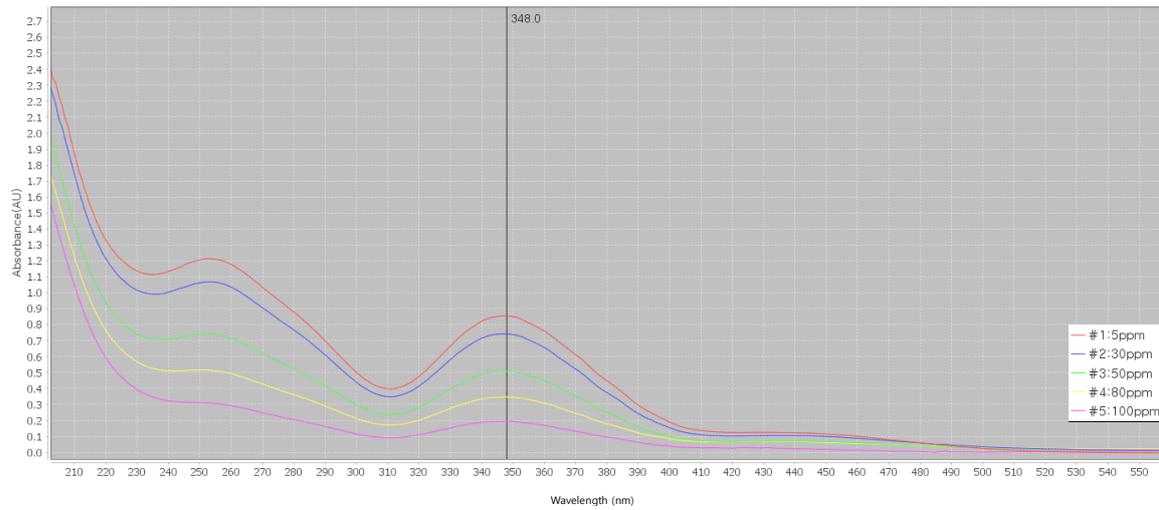
It appears that the higher the concentration of vitamin C is, the weaker the intensity of absorbance of potassium permanganate grows, and this shows that vitamin C suppresses the activity of a strong oxidizer.

On the other hand, the antioxidation of vitamin C was verified in the same manner by using potassium dichromate, an oxidizer with weaker intensity than potassium permanganate but with absorption wavelength of UV area.



Potassium dichromate + vitamin C respectively 5, 30, 50, 80, 100 ppm

As for UV peak of potassium dichromate, peak changes can be observed at 348nm.



Like potassium permanganate, potassium dichromate is a dark yellow solution characteristic of the oxidizer, and the antioxidation effect can be verified as it grows transparent with the increase in the concentration of vitamin C.

Through the above experiment, the absorbance change according to vitamin C concentration for two types of oxidizers absorbing UV and Vis light, and it could be verified that vitamin C suppresses oxidation reaction.