

Turbid Samples

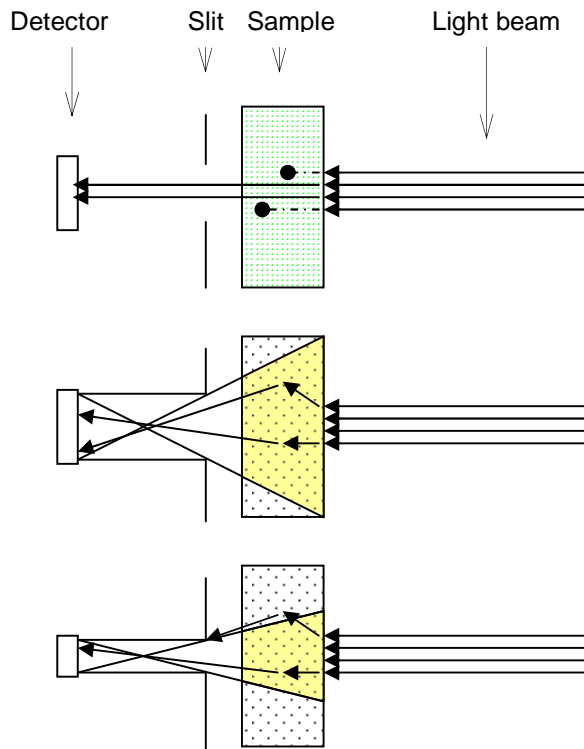
Different instruments give similar absorbance readings when testing transparent samples.

However, when measuring turbid samples, startlingly different measurements can be obtained. Why is this?

Transparent, coloured samples gain their colouration by chemicals within the liquid absorbing light photons of specific wavelengths. These samples show characteristic absorbance bands or peaks.

Turbid samples lose light by scattering it out of the beam, rather than by absorbing photons. Depending on how the instrument is constructed, different amounts of these scattered photons will be collected by the detector and measured. So the same sample can give different absorbancies of different instruments.

This is demonstrated below:



The first diagram shows normal absorbance, with some light being absorbed. The light is undeflected by the sample

The second and third diagrams show the same optical arrangement with a turbid sample. Light is multiply scattered within the sample, so leaving in all directions. The third is the same turbid sample but with a different detector and slit arrangement. Each detector "sees" different amounts of light emitting turbid sample, as shown by the yellow shaded areas. If measuring absorbance the second system will see more of the sample than the third, so will give a lower reading.