

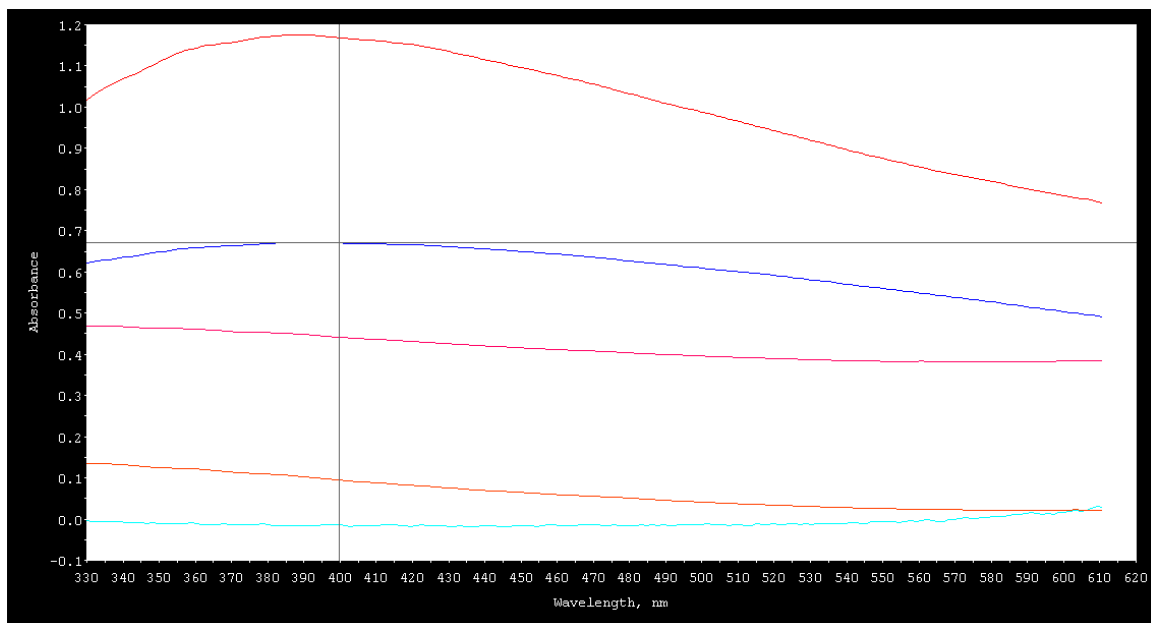
Four spectrophotometers were used to collect spectra on a turbid, scattering sample with no intrinsic absorbance.

The correct absorbance reading of zero is impossible on all spectrophotometers sensitive to scatter.

Only the new Olis Mitochondria Machine is able to **eliminate** the effect of scatter completely.

The wavelength range was chosen to coincide with the range of the electron transport chain. The sample contains about 10^8 one micron polystyrene particles per milliliter water.

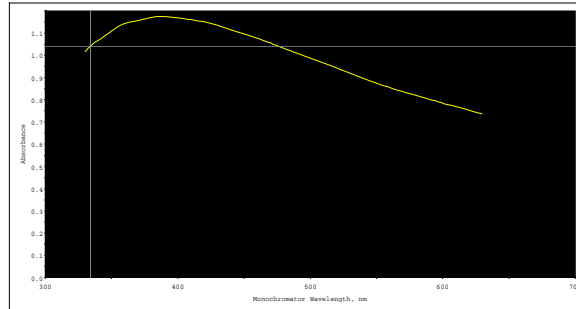
The instruments included a single beam diode array spectrum (most affected by scatter) to the Olis RSM 1000 based Mitochondria Machine (not affected by scatter and rapid-scanning capable).



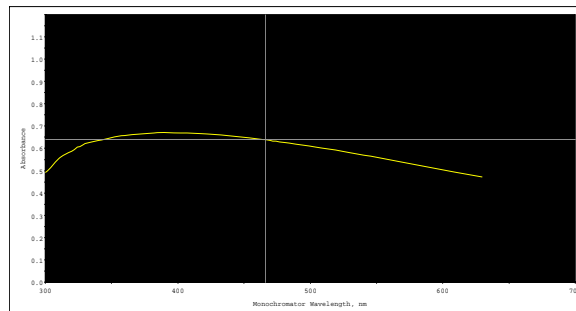
The scale on this graph is -0.1 to 1.2 AU, so that the (zero) absorbance spectrum returned by the Olis Mitochondria Machine can be seen.

All other graphs used in this document are scaled 0 to 1.2 AU

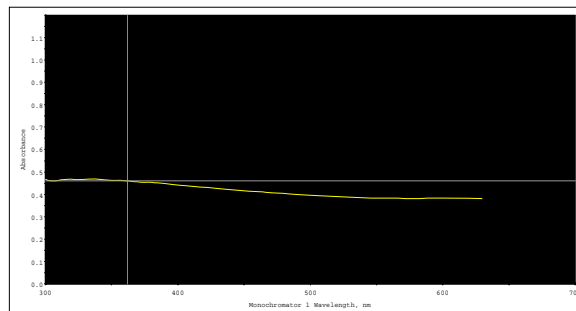
A **2.3 second** spectrum acquired on an Olis computerized HP 8452 diode array. Clearly, this apparatus handles scatter very poorly, returning apparent high absorbance from **1.2 to 0.75 AU**.



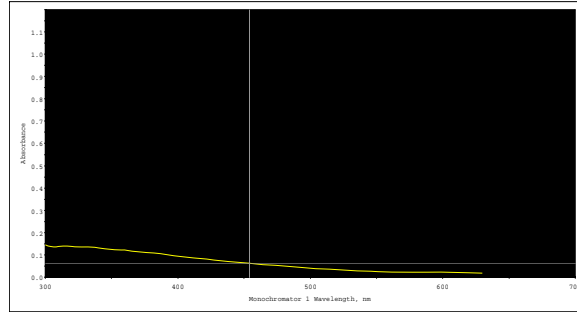
Next, we moved to an Olis modernized Cary 14, a premier choice for clear sample preparations. This spectrum was collected in **105 seconds**. The apparent high absorbance is about half of what the diode array returned (**0.7 to 0.5 AU**).



The following spectrum was collected on an Olis modernized Aminco DW-2 spectrophotometer, the established gold standard for working with turbid samples. Data acquisition time was **90 seconds**. The instrument's "split beam" mode was used, wherein true sample and reference were acquired (as was done with the results from the Cary and the Olis RSM 1000). Values ranged from **0.5 to 0.4 AU**.



Here we have a spectrum from the modernized Aminco DW-2 collected in the instrument's "dual wavelength" mode, wherein the answer is a difference spectrum (the "reference" was the wavelength selected to have no chemistry); acquisition time was **83 seconds**. Absorbance values ranged from **0.15 to 0.02 AU**. This has been considered satisfactory for decades.



Today, the gold standard has been surpassed by the 'platinum.'

A **0.83 second** spectrum from the Olis RSM 1000 with the DeSa Suspension Presentation Chamber (DSPC) returns the correct zero absorbance for this highly scattering, non-absorbing sample preparation.

With the DSPC on the millisecond scanning Olis RSM 1000, the effect of scatter is **eliminated (0.03 to 0 AU)** and the door is now wide open to high speed spectral studies on mitochondria, yeast, bacteria, plant suspensions, and other turbid whole cell suspensions!

