



The Ocean Optics Curie Spectrofluorometer is designed to measure fluorophores with excitation and emission properties across a wide 200-850 nm UV-Vis wavelength range. Our objective is to demonstrate the capabilities and sensitivity of the system in measuring DNA and protein concentration in solution using three Molecular Probes Quant-iT Assay Kits. Detection limits are reported for each kit.

The Ocean Optics Curie is a high-sensitivity cuvette emission spectrofluorometer that can detect picomolar-range concentration of fluorophores in solution from 200–850 nm.

The Curie features a CCD-array detector and is distinguished by internal linear variable filtering technology. The patented filtering helps to discriminate between powerful pulsed xenon wavelengths from the onboard excitation source and the weak spectral emissions from samples. The Curie is the only spectrofluorometer with linear variable filtering technology that can be used to spectrally shape excitation energy and eliminate the need for scanning monochromators. Each filter's transmission or blocking band can be moved throughout the 230–500 nm or 300–750 nm wavelength range.

Experimental Conditions

Three Molecular Probes Quant-iT Assay Kits were used to review the Curie's performance. The Quant-iT PicoGreen dsDNA Assay Kit (P7589) and the DNA Broad Range DNA Assay Kit (Q33130) were used to measure double-stranded DNA (dsDNA) in solution. The Quant-iT Protein Assay Kit (Q33210) was used to measure protein in solution. All working solutions and standards were prepared per the instructions provided with each kit. Sufficient volumes were prepared to allow for measurements in a standard 1-cm quartz fluorescence cuvette.

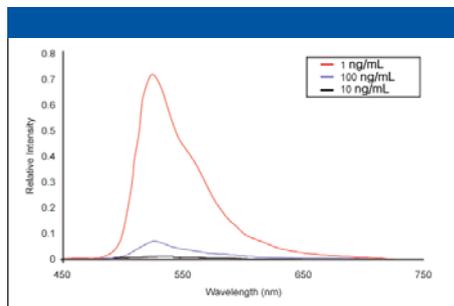


Figure 1: Fluorescence spectra acquired for the PicoGreen Assay Kit (Molecular Probes Quant-iT PicoGreen dsDNA Kit [P7589]).

DNA and Protein Concentration Measurements Using Fluorescence Analysis

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to 10 ng/mL concentration at a five-second integration time. Even lower detection limits are possible with longer integration periods.

Figure 2 shows the fluorescence spectra acquired for the Broad Range DNA Assay Kit. Using this kit, the Curie was able to detect dsDNA to 5 mg/mL concentration at a 1-s integration time.

Figure 3 shows the fluorescence spectra acquired for the Protein Assay Kit. Using this kit, the Curie was able to detect protein concentration to 25 mg/mL at a 0.5-s integration time.

Conclusions

The Curie Spectrofluorometer is sensitive enough to detect the full range of fluorescence standards included in the Quant-iT DNA and Protein Assay Kits. Using the ultra-sensitive PicoGreen Assay Kit, detection limits to 10 ng/mL were achieved. These data illustrate that the Curie is capable of excitation and emission detection throughout the UV-Vis region. The Curie is a cost-effective CCD-array platform that provides a less complex alternative to more sensitive PMT-based technologies for dsDNA and protein analysis.

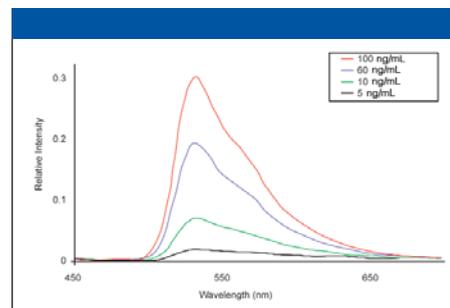


Figure 2: Fluorescence spectra acquired for the Broad Range DNA Assay Kit (Molecular Probes Quant-iT Broad Range dsDNA Kit [Q33130]).

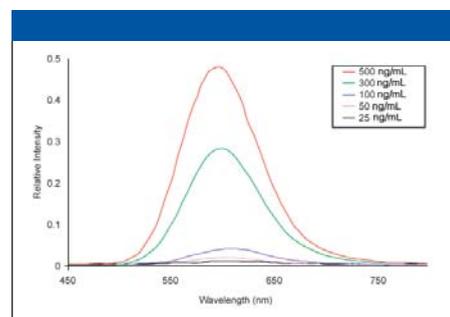


Figure 3: Fluorescence spectra acquired for the Protein Assay Kit (Molecular Probes Quant-iT Protein Assay Kit [Q33210]).

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