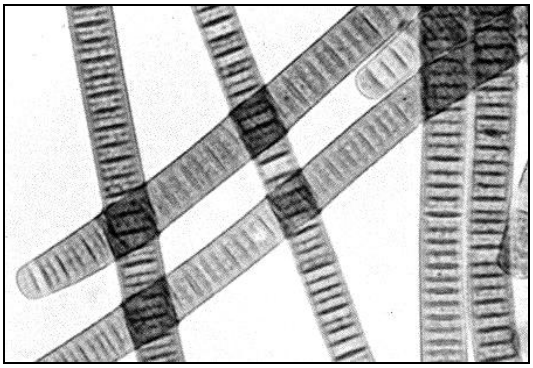
Application Note: Phycoerythrin and Phycocyanin Optical Kits for the Detection of Cyanobacteria

Overview

Cyanobacteria has been found to be a numerically abundant faction of the phytoplankton community. Their roles in primary production, community structure, and spatial and temporal distribution are of interest for numerous scientific studies as well as natural water monitoring. Since chlorophyll fluorescence cannot be used to accurately determine cyanobacterial presence, analyzing phycobilin concentrations is essential for detecting, quantifying, and monitoring cyanobacterial levels. Turner Designs now offers two optical kits to quickly and easily detect this portion of the phytoplankton population.

Phycoerythrin: In marine species such as *Synechococcus spp*., phycoerythrin is the dominant accessory pigment. Narrow band interference filters are used for excitation and emission wavelengths of 544 nm and 577 nm to minimize background interferences from the matrix and other pigments.

Phycocyanin: In contrast, fresh water taxa such as *Anabaena, Microcystis,* and *Spirulina*, are rich in phycocyanin. For detection of this pigment, we offer narrow band interference filters that utilize excitation and emission wavelengths of 600 nm and 640 nm, respectively.



Applications

- Biomass estimation in aquatic environments
- Primary production budgets
- Nitrogen fixation estimations and nitrogen budgets
- Characterization of phytoplankton community structure and distribution
- Detection of noxious and toxic phytoplankton taxa
- Drinking water monitoring to prevent quality degradation

Ordering Information

The Phycoerythrin Optical Kit (**P/N: 10-304**) includes a Daylight White Lamp, a 544nm excitation filter, a 577nm emission filter, and a 10-053 Reference Filter (>535 nm).

The Phycocyanin Optical Kit **(P/N: 10-305)** includes a Cool White Mercury Vapor Lamp, a 600nm excitation filter, a 640 emission filter, and a 10-051 reference filter (>665 nm).

The 10-304 and 10-305 Optical Kits work in the 10-AU-005-CE Field Fluorometer and the Model 10 Analog Fluorometer. Visit our website at www.turnerdesigns.com for detailed information on numerous fluorescence applications or call us at (408) 749-0994.

Publications

Cowles, T.J., R.A. Desiderio, S. Neuer. 1993. *In situ* Characterization of Phytoplankton from Vertical Profiles of Fluorescence Emission Spectra. Marine Biology. 115: 217-222.

Lee, T. et. al. 1994. *In vivo* Fluorometric Method for Early Detection of Cyanobacterial Waterblooms. Journal of App. Phycology. 6: 489-495.

Murphy, L.S., and E.M. Haugen. 1985. The Distribution and Abundance of Phototrophic Ultraplankton in the North Atlantic. Limnology and Oceanography. 30(1): 47-58.

Watras, C.J. and A.L. Baker. 1988. Detection of Planktonic Cyanobacteria by Tandem *in vivo* Fluorometry. Hydrobiologia. 169: 77-84.

Yentsch, C.S. and D.A. Phinney. 1985. Spectral Fluorescence: an Ataxonomic Tool for Studying the Structure of Phytoplankton Populations. Journal of Plankton Research. 7(5): 617-632