

Monomeric Cyanine Nucleic Acid Stains

Table 1. Contents and storage information.

Material	Amount	Concentration	Storage	Stability
Monomeric cyanine nucleic acid stains	1 mL *	1 mM solution in DMSO	<ul style="list-style-type: none"> • ≤-20°C • Desiccate • Protect from light 	When stored as directed, products should be stable for 6–12 months.

* We recommend aliquotting the solution into several containers for storage.

Approximate absorption/fluorescence emission maxima: See Table 2.

Introduction

Invitrogen's monomeric cyanine nucleic acid stains (Table 2) allow ultrasensitive detection of double-stranded nucleic acids. They are ideally suited for nuclear staining in flow cytometry¹ and fluorescence microscopy² applications in fixed cells.

Table 2. Spectral characteristics of monomeric cyanine nucleic acid stains.

Name	Catalog #	MW *	Abs † (nm)	$\epsilon_{\max} \ddagger$ (cm ⁻¹ M ⁻¹)	Em † (nm)	QY§	Excitation Light Source (nm)
PO-PRO™-1	P3581	579	435	50,100	455	0.39	He-Cd 442
BO-PRO™-1	B3583	595	462	58,100	481	0.16	He-Cd 442
YO-PRO®-1	Y3603	629	491	52,000	509	0.44	Ar 488
TO-PRO®-1	T3602	645	515	62,800	531	0.25	Ar 514
JO-PRO™-1	J11373	630	530	94,400	546	0.38	Nd: YAG 532
PO-PRO™-3	P3585	605	539	87,900	567	0.57	He-Ne 543
BO-PRO™-3	B3587	621	575	80,900	599	0.62	Kr 568
YO-PRO®-3	Y3607	655	612	100,100	631	0.16	He-Ne 594
TO-PRO®-3	T3605	671	642	102,000	661	0.11	He-Ne 633
TO-PRO®-5	T7596	697	748	108,500	768	ND	

* Molecular weight. † Absorption and fluorescence emission maxima. ‡ Molar extinction coefficient. § Fluorescence quantum yield determined relative to fluorescein in 0.1 M NaOH (QY = 0.92). Abs, Em, ϵ_{\max} and QY determined for DNA complexes in 10 mM Tris, 1 mM EDTA, 50 mM NaCl, pH 7.4. The spectral appearance of some dyes may be slightly altered inside cells. **ND** = Not determined.

Guidelines For Use

Allow all solutions to warm to room temperature and mix thoroughly before use.

Spectral Characteristics

The fluorescence spectra of the monomeric cyanine nucleic acid stains cover the entire visible wavelength range, as shown in Figure 1 and summarized in Table 2. The table also lists optical filter sets and laser line sources suitable for excitation and detection of these dyes. These dyes may also be used with ultraviolet trans- or epi-illuminator excitation sources. As shown in Figure 2, the fluorescence excitation spectrum of DNA-bound TO-PRO[®]-1 dye has a short-wavelength peak at about 275 nm. The maximum amplitude of this peak is about 25% relative to the main peak at 515 nm. PO-PRO[™]-1, BO-PRO[™]-1 and YO-PRO[®]-1 dyes exhibit similar ultraviolet excitation peaks. The monomeric cyanine nucleic acid stains exhibit large degrees of fluorescence enhancement upon binding to DNA (or RNA), varying from 400- to 1800-fold for the “1-series” and 20- to 200-fold for the “3-series.” Consequently, the fluorescence of unbound dye is negligible under most experimental detection conditions.

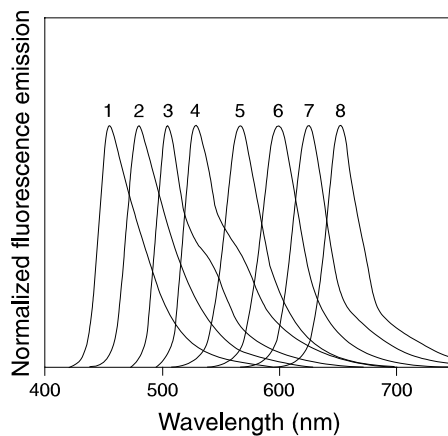


Figure 1. The normalized emission spectra of Invitrogen's monomeric cyanine nucleic acid stains bound to calf thymus DNA. The peaks correspond to the emission of 1) PO-PRO[™]-1; 2) BO-PRO[™]-1; 3) YO-PRO[®]-1; 4) TO-PRO[®]-1; 5) PO-PRO[™]-3; 6) BO-PRO[™]-3; 7) YO-PRO[®]-3; and 8) TO-PRO[®]-3.

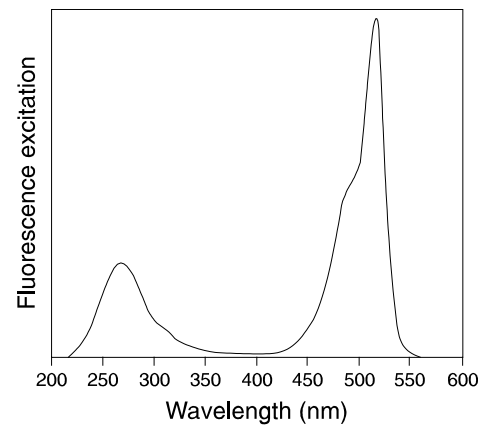


Figure 2. Fluorescence excitation spectrum of TO-PRO[®]-1 dye complexed with DNA at a ratio of 1 dye:50 base pairs.

References

1. Cytometry 15, 129 (1994);
2. Cell 75, 373 (1993).

Product List Current prices may be obtained from our website or from our Customer Service Department.

Cat #	Product Name	Unit Size
B3583	BO-PRO™-1 iodide (462/481) *1 mM solution in DMSO*	1 mL
B3587	BO-PRO™-3 iodide (575/599) *1 mM solution in DMSO*	1 mL
J11373	JO-PRO™-1 iodide (530/546) *1 mM solution in DMSO*	1 mL
P3581	PO-PRO™-1 iodide (435/455) *1 mM solution in DMSO*	1 mL
P3585	PO-PRO™-3 iodide (539/567) *1 mM solution in DMSO*	1 mL
T3602	TO-PRO®-1 iodide (515/531) *1 mM solution in DMSO*	1 mL
T3605	TO-PRO®-3 iodide (642/661) *1 mM solution in DMSO*	1 mL
T7596	TO-PRO®-5 iodide (745/770) *1 mM solution in DMSO*	1 mL
Y3603	YO-PRO®-1 iodide (491/509) *1 mM solution in DMSO*	1 mL
Y3607	YO-PRO®-3 iodide (612/631) *1 mM solution in DMSO*	1 mL

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