EXTINCTION COEFFICIENTS AND FLUORESCENCE DATA

Calculate extinction coefficient of an oligo by either summing up the extinction coefficients of the individual bases times their number of occurrences. Or use a formula that takes into account nearest neighbor effects. An algorithm for this calculation can be found on the web. Just type in the sequence and the program will calculate the concentration of a λ A260/ml solution.

Cat.No.	Nucleoside	λmax-1	Emax-1	Emax-1	λmax-2	Emax-2	E260	E260	Notes
		(nm)	(ml/µmole)	(L/mol.cm)	(nm)	(ml/µmole)	(ml/µmole)	(L/mol.cm)	
10-1001	7-deaza-dA	270	11.3				9.4		
10-1003	N6-Me-dA	266	16.9				15.2		
10-1006	Etheno-dA	295	3.4		274	5.9	4.7		
10-1007	8-Br-dA	266	16.4				14.8		
10-1008	8-Oxo-dA	268	12.2				11.1		
10-1014	pdC	295	7.7		234	14.7	5.1		
10-1017	Pyrrolo-dC	339	2.36		229	17.5	2.41		
10-1021	7-deaza-dG	259	12.6				12.6		
10-1027	8-Br-dG	253	12.1				11.3		
10-1028	8-oxo-dG	294	5.2		250	6.7	5.9		
10-1031	5'-OMe-dT	266	9				8.3		
10-1035	Carboxy-dT	297	16.1		261	14.7	14.7		
10-1036	2-thio-dT	278	17.5		220	14.8	10		
10-1040	dI (Inosine)	249	12.5				7.5		
10-1041	dNebularine	262	7.1				7		
10-1043	3-Nitropyrrole	283	8.8				7.7		
10-1044	5-Nitroindole	328	8.5		265	17	16		
10-1045	4-Methylindole	265	7.9				7.2		
10-1046	2-Aminopurine	303	6.8		243	5.7	1		
10-1047	dP	294	6.7		231	7.4	2.9		
10-1048	dK	279	10.7				7.7		
10-1050	dU	262	10				10		

10-1052	4-thio-dU	330	30.4				3.6		
10-1053	5-OH-dU	280	7.8				4.9		
10-1054	pdU	291	11.3		231	11.4	3.5		
10-1055	d-pseudoU	262	7.7				7.6		
10-1056	Fluorescein-dT							7.1 L/(mmol·cm)	
10-1060	5-Me-dC	277	9				5.7	7.8 L/(mmol·cm)	
10-1061	5-Me-dZ	314	4.8		218	8.6	1.8		
10-1062	hmdC							8.7 L/(mmol·cm)	
10-1063	5-OH-dC	292	6.3		220	13.3	3.4		
10-1065	5-Me-isodC	260	6.3				6.3		
10-1067	5-Me-isodC	260	6.3				6.3		
10-1076	7-deaza-dX	284	6.5		252	10.4	8.8		
10-1077	iso-dG	292	11				4.6		
10-1078	iso-dG	292	11				4.6		
10-1080	5-Br-dC	287	6				3.1		
10-1081	5-I-dC	293	5.7				3.3		
10-1085	2,6-diaminoPurine	278	10.2		255	9.3	8.5		
10-1090	5-Br-dU	278	9.7				5.1		
10-1091	5-I-dU	287	7.7				3.7		
10-1094	Furano-dT	See plot							
10-1095	2,4-difluoro-toluene	266	2.3				1.8		
10-1097*	AP-dC	362	10.5				10.9		
10-1514	Formyl-dC							11.3 L/(mmol·cm)	
10-1530	dihydro-dT	210	6.3				<0.1		
10-1539	DBCO-dT							18,800	
10-1550	dihydro-dU	210	6.3				<0.1		
10-1554	5-Ethynyl-dU	287	10.3				3.8		
10-1934	5-Formylindole	298		14,050				9,700	
10-	DBCO-TEG							8,000	

1941									
10-3055	PseudoUridine							8,100	Ref: http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3851715/

Note: Biotin and Cholesterol have no absorbance at 260nm.

*With an extinction coefficient of approximately 10,500 M-1 and a quantum yield of fluorescence of 0.2, AP-dC is 2-3 times as bright as our popular Pyrrolo-dC analog. In addition, AP-dC exhibits a Stokes' shift greater than 100 nm. As with most fluorescent base analogs, it is substantially quenched upon forming a duplex. The quantum yield drops to 0.1 while gaining significant structure in the emission spectrum (Figure 4), making it an ideal probe of DNA structure.

FLUORESCENCE DATA

Dye	E 260 nm	E λ max	Excitation max	Emission max	QY	Notes
	($M^{-1} \cdot cm^{-1}$)	($M^{-1} \cdot cm^{-1}$)	(nm)	(nm)		
Acridine	39,500	9,120	421	497		
2-aminopurine	1,000	3,600	303	371		
5'-CDPI$_3$ MGB™	37,900	59,300	340			
Cy3	4,930	136,000	547	563	0.15	
Cy3.5	24,000	116,000	591	604	0.15	
Cy5	10,000	250,000	646	662	0.3	
Cy5.5	21,500	209,000	688	707	0.3	
Dabcyl-dT	29,100	32,000	476			
5'-Dabcyl	11,100	32,000	468			
Eclipse Quencher	6,600	33,300	530	N/A	0	
Etheno-dA	4,800	5,800	276	405	0.035	
Ferrocene-dT	14,200					
6-FAM	20,900	75,000	495	521	0.9	
Fluorescein-dT	38,800	75,000	494	522	0.9	
HEX	31,580	96,000	537	556	0.7	
Methylene Blue	10,300	81,000	665			
NBD	3,700	19,500	485	535	0.1	
Psoralen	16,500	11,000	301			
Pyrrolo-dC	4,000	3,700	345	470	0.07/0.02	QY 0.07 single-stranded; 0.02 ds, deprotected in ammonia 55°C ON
Pyrene-dU	18,500	42,200	402			
Redmond Red	12,100	74,000 (pH 9.1) 52,300 (pH 7.1)	579	595	0.84	
TAMRA	32,300	89,000	556	580	0.7	
TET	16,255	86,000	519	539	0.9	
Yakima Yellow	23,700	83,800	530.5	549	0.96	

PHYSICAL PROPERTIES OF BLACK HOLE QUENCHERS

Quencher	λmax (nm)	E260 (L/mol.cm)	Emax (L/mol.cm)
BHQ-0	493	7,700	34,000
BHQ-1	534	8,000	34,000
BHQ-2	579	8,000	38,000
BHQ-3	672	13,000	42,700