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MOLAR ABSORPTIVITY AND $A_{1\,cm}^{1\%}$ VALUES FOR PROTEINS AT SELECTED WAVELENGTHS OF THE ULTRAVIOLET AND VISIBLE REGIONS—XVIII

DONALD M. KIRSCHENBAUM*
Department of Biochemistry, College of Medicine-Downstate Medical Center, State University of New York, 450 Clarkson Avenue, Brooklyn, NY 11203, U.S.A.

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Abstract—A table of molar absorptivity and $A_{1\,cm}^{1\%}$ values for more than 180 proteins is given. The conditions used to obtain these values and references to the original literature are also given.

INTRODUCTION

The molar absorptivity and $A_{1\,cm}^{1\%}$ values for more than 180 proteins and the conditions under which these values were obtained are listed in Table 1. Additional pertinent information can be found in the footnotes to Table 1.

This paper is part of a continuing compilation of protein data. [KIRSCHENBAUM D. M. (1979) Molar absorptivity and $A_{1\,cm}^{1\%}$ values for proteins at selected wavelengths of the ultraviolet and visible regions—XVII. *Int. J. Pep. Prot. Res.* **13**, 479–492].

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* Faculty Exchange Scholar-SUNY.

Table 1. Molar absorptivity and $A^{1\%}_{1cm}$ values for proteins

Protein	$\epsilon_M^a \times 10^{-4}$	$A^{1\%}_{1cm}$ [b]	nm[c]	Ref.	Comments[d]
Pectinesterase					
Tomato fruit					
(*Lycopersicum esculentum var. Hikari*)		9.5	278	107	Data from Fig. 7 of Ref. 107 pH 7.5, 100 mM KPh
Peptidase, intracellular					
Bacillus subtilis		17.3[e]	280	110	Data from Fig. 9 of Ref. 110 pH 5.8
Phenylalanine ammonia lyase					
Rhodotorula glutinis IFO 559 and					
Rhodotorula texensis IFO 932		15	280	113	
Phosphatase, acid					
Escherichia freundii K1		6.82	280	147	Data from Fig. 6 of Ref. 147 pH 7.0, 0.006 M KPh
Plastocyanin					
Cucurbita pepo	0.475		597	132	
	0.546[f]		280	132	
Polymer					
Copoly (L-Glu:L-Phe)					
76:24		4.71	258	128	
Pro-proteinase C					
Yeast		14.1	280	54	Dry wt
Protein, hypocalcemic					
Bovine parotid gland	4.0	8.6	280	102	Mol wt = 46,500 Ref. 103
Protease					
Lotus seed		1.35	278	139	Data from Fig. 2 of Ref. 139 pH 4.0, 50 mM Ac
Rhizopus niveus		12.6	280	75	
Serratia sp. str. E15		13.0	280	101	0.1 M Ph, pH 7.0
Protease A					
Baker's yeast		11.9	280	51	pH 6.0, 0.01 M NaPh
Protease C					
Baker's yeast		16.6	280	51	pH 6.0, 0.01 M NaPh
Protease, neutral					
Bacillus subtilis var. *amylosacchariticus*		13.8	280	149	Dry wt
Protease, alkaline					
Bacillus subtilis var. *amylosacchariticus*		11.9	280	150	Dry wt
Bacillus No. 221		12.5	280	58	Dry wt
Aspergillus sojae	2.3	8.98	280	53	Mol wt = 25,751 (Ref. 53) pH 5.1 0.2 M Ac
Putrescine oxidase					
Micrococcus rubens		14.2	280	2	
Quinolinate phosphoribosyltransferase					
Alcaligenes eutrophus nov. subsp.					
quinolinicus		3.54	280	64	
Reaction centers					
Rhodopseudomonas gelatinosa	30.5		799	19	
	13.0		850	19	
Rhodopseudomonas sphaeroides	29.4		802	19	
	12.8		865	19	
Renin (EC 3.4.99.19)					
Rat kidney		7.9	280	92	
Rhodopsin					
Bovine	8.4	14.0	280	124	Data from Fig. 1 of Ref. 124 pH 7
Ribonuclease, extracellular					
Yeast (*Rhodotorula glutinis*		15.0	280	112	Dry wt
Ribonuclease					
Turtle	0.835		277.5	106	pH 5.5, 0.1 M Ac
Bovine	0.98		278	106	do.
Ribonuclease U2					
Ustilago sphaerogenes	2.3	18.4	280	99	Mol wt = 12,400 (Ref. 99)

Table 1—*continued*

Protein	$\epsilon^{a}_{M} \times 10^{-4}$	$A^{1\%\,b}_{1\,cm}$	nm[c]	Ref.	Comments[d]
Ribonucleotide reductase, Protein B2					
Escherichia coli	11.9		280	142	Data from Fig. 2 of Ref. 142
Ricin					
Ricinus communis		14	280	168	
Ricin D					
Ricinus communis		13.26	280	159	
Rubredoxin					
Desulfuromonas acetoxidans	1.67	27.10	280	122	Mol wt = 6163 (Ref. 122)
	0.71	11.52	370	122	do.
	0.60	9.74	490	122	do.
Rubredoxin, Cobalt					
Pseudomonas oleovorans	0.9405		350	94	
	0.3010		470	94	
	0.1128		620	94	
	0.1232		685	94	
	0.1034		478	94	
Rusticyanin					
Thiobacillus ferro-oxidans	0.4550		287	22	
	0.1060		450	22	
	0.1950[g]		597	22	
	0.0750		750	22	
Serendip					
Dioscoreophyllum cumminsii	1.86	16.2	278	153	pH 5.6
Serine sulfhydrase (EC 4.2.1.22)					
Chicken liver		15	280	30	
	0.9	2	430	30	Mol wt = 4400 per pyridoxal phosphate (Ref. 30)
Spectrin					
Human erythrocyte		11	278	120	K
		10.7[h]	280	133	AAA; deoxycholate solution
		10.1	280	31	N
Bovine erythrocyte		11.5	280	125	0.1 M NaCl containing 0.01 M NaPh Interf., LS
Spinin					
Marine bacterium D71	1.06	5.56	275.5	21	Mol wt = 19,000 (Ref. 21)
		5.75	280	21	AAA
Subtilisin					
Bacterial					
5-Dimethylaminonaphthylsulfonyl-	0.420		340	155	
Subtilisin BPN′ (EC 3.4.21.14)					
Commercial	2.92	10.63	278	151	pH 7.0 Mol wt = 27,500
		10.78	278	60	
		10.66	280	60	
Sulfhydryl oxidase					
Bovine milk		7.41	278	65	LS
Sulfite reductase					
Red alga (*Porphyra yezoensis*)		3.48	278	129	Data from Fig. 5 of Ref. 129 pH 7.5, 0.05 M KPh
Sulfite reductase, NADP-, (EC 1.8.1.2)					
Escherichia coli					
Holoenzyme		1.16	587	141	Biuret
Hemoprotein		2.40	587	141	
Flavoprotein		1.24	455	141	
Sulphatase (EC 3.1.6.1)					
Ox liver					
Blα	9.52	17	280	33	Mol wt = 56,000 (Ref. 33) pH 7.4, pH 9.0; Refr.
Blβ	9.52	17	280	33	do.
Superoxide dismutase (EC 1.15.1.1)					
Human liver	1.97		283.5	97	Contains Mn.
	0.2049		480	97	do.
Bovine heart mitochondria	20	23.3	280	90	Contains Mn Mol wt = 86,000 (Ref. 90)

Table 1—*continued*

Protein	$\epsilon_M^a \times 10^{-4}$	$A_{1\,cm}^{1\%\,b}$	nm[c]	Ref.	Comments[d]
Swordfish (*Xiphias gladius L.*)					
Liver cytosol		3.63[f]	268[f]	7	Dry wt
Bacillus megaterium	5.3	13.25	282	3	Data from Fig. 6 of Ref. 3 Mol wt = 40,000 (Ref. 3)
Bacillus stearothermophilus	5.7	14.2	280	96	Mol wt = 40,000 (Ref. 96)
Chromatium vinosum	0.322	0.785	350	68	Mol wt = 41,000 (Ref. 68)
	8.77	21.4	280	68	do.
Chlorobium thiosulfatophilum	8.21	19.1	280	69	pH 7.8, 10 mM KPh Mol wt = 43,000 (Ref. 69)
Desulfovibrio desulfuricans	0.2580		350	52	pH 7.6, 10 mM KPh
	8.6		280	52	do.
Escherichia coli	5.1	13.8	280	29	pH 7.8, 50 mM KPh Mol wt = 37,000 (Ref. 29)
Escherichia coli B	10.1		280	143	
	0.1850		350	143	
Euglena gracilis					
SOD I	10.2	22.63	280	70	Mol wt = 45,000 (Ref. 70)
	0.3920		340	70	do.
SOD II	9.6	21.52	280	70	do.
	0.4000		340	70	do.
Mycobacterium lepraemurium		15	280	59	Data from Fig. 10 of Ref. 59
Mycobacterium tuberculosis	143.4[i]	163[i]	280	77	pH 7, 50 mM KPh Mol wt = 88,000 (Ref. 77)
Photobacterium sepia		19.4	280	123	
	0.25		350	123	
Photobacterium leiognathi		17.1	280	123	
	0.25		350	123	
Blue-green alga (*Plectonema boryanum*)	6.69	16.0	280	6	pH 7.8, 10 mM KPh Mol wt = 41,700 (Ref. 6)
	0.2860	0.691	350	6	do.
Red alga (*Porphyridium cruentum*)	4.9		280	100	
	0.0170		450	100	
Pseudomonas ovalis	8.06	20.15	280	165	Mol wt = 40,000 (Ref. 165)
	0.2920	0.73	350	165	do.
Rhodopseudomonas spheroides		16.3	280	84	
	0.0542		475	84	
Blue-green alga (*Spirulina platensis*)		14.1	280	84	
	0.2180		350	84	
Thermus aquaticus		0.238	478	130	Lowry
		16.2	280	130	do.
Thermus thermophilus		15.8	280	131	Dry wt pH 7.5, 10 mM Tris–HCl
Baker's yeast (*Saccharomyces cerevisiae*)	18.7	19.3	280	126	pH 7.8, 0.05 M KPh Mol wt = 97,000 (Ref. 126)
Tannase					
Aspergillus flavus		11.8	280	161	Dry wt
Yeast (*Candida* sp.)	17	6.8	280	4	Mol wt = 250,000 (Ref. 5)
Tektin A					
Bovine erythrocyte					
Membrane		10.1	280	18	Interf.
Thaumatin					
Thaumatococcus danielli Benth					
I	1.24	7.69	278	154	pH 5.6 Mol wt = 21,000 (Ref. 154)
II	1.54	7.53	278	154	pH 5.6 Mol wt = 20,400 (Ref. 154)
Thermolysin					
Commercial		15.5	280	115	AAA
Thermomycolase					
Malbranchea pulchella		13.5	280	156	pH 7.0, dry wt

Table 1—*continued*

Protein	$\epsilon^{a}_{M} \times 10^{-4}$	$A^{1\%\,b}_{1\,cm}$	nm[c]	Ref.	Comments[d]
Thionein, Copper-					
Bovine liver, fetal	0.1210		300	50	Per mol Cu
	0.2870		280	50	do.
	0.3320		250	50	do.
Thionein, Mercury					
Rat liver	1.2		270	145	
Thioredoxin II					
Yeast (*Saccharomyces cerevisiae*)	1.17	9.27	280	121	Refr. Mol wt = 12,600 (Ref. 121)
Thioredoxin reductase (*Escherichia coli*)		14.8	280	119	pH 7.6, 50 mM Ph, 3 mM EDTA Data from Fig. 6 of Ref. 119
Threonine deaminase (EC 4.2.1.16)					
Escherichia coli B		8.4	280	73	Refr. pH 7.4, 0.1 M KPh
Thrombin (EC 3.4.21.5)					
Bovine		17.5	280	37	Interf.
Human		19.17	280	148	pH 6.4, 0.75 M NaCl, 10 mM NaPh Interf.
α-Thrombin					
Human		17.5	280	36	1 M HOAc, Refr.
		17.4	280	36	pH 7.4, 0.21 M NaCl, 0.02 M NaPh
		18.3	280	36	0.1 M NaOH
Thrombin-like enzyme					
Snake venom (*Bothrops atrox*)	4.5	15.6	280	57	0.1 M AmBic Dry wt Mol wt = 29,000 (Ref. 57)
β-Thromboglobulin					
Human platelets	0.6768	1.88	280	118	Mol wt = 36,000 (Ref. 118)
Thrombospondin					
Human platelets		10.5	280	79	Lowry
Thymidylate synthetase					
Lactobacillus casei	10.5		278	86	pH 7.0, 100 mM KPh Biuret
Form III[j]	0.707		375	28	
Thyroxine-binding globulin					
Human plasma		4.54	280	137	
	5.2	8.9	280	42	Mol wt = 58,000 (Ref. 42)
	4.4	6.9	280	91	Mol wt = 64,000 (Ref. 91)
	4.75		280	109	
		6.17[k]	280	4	pH 7.5, 0.1 M Tris-HCl, 0.05 M Ph, Refr.
Toxin					
Scorpion (*Androctonus australis*)					
Toxin I	1.071		276	127	0.5 N HOAc
Toxin II	1.808		276	127	do.
Australian snake venom (*Oxyuranus s. scutellatus*)					
Taipoxin	6.3	15	278	38	Mol wt = 45,600 (Ref. 38)
α	3.1	23	278	38	
β	1.5	11	278	38	
γ	1.1	6.7	276	38	
Diphtheria					
Fragment A		11.8	278	98	
Yeast[u]	3.14	27.38	280	116	Mol wt = 11,470 (Ref. 116)
Sea anemone (*Anemonia sulcata*)					
Toxin I	1.15	24.4	280	9	Mol wt = 4702 (Ref. 9)
Toxin II	1.18	27.9	280	9	Mol wt = 4197 (Ref. 9)
Clostridium perfringens					
θ toxin		12.5	280	164	AAA
Ethiopian cobra (*Naja haje*) venom					
Toxin III	0.898	11.33	280	74	Mol wt = 7907 (Ref. 74)

Table 1—*continued*

Protein	$\epsilon_M^a \times 10^{-4}$	$A_{1cm}^{1\%}$ [b]	nm[c]	Ref.	Comments[d]
Western diamond-back rattlesnake (*Crotalus atrox*)					
Hemorrhagic toxin, toxin e		11.35	278	10	Data from Fig. 10 of Ref. 10
Apotoxin e		11.35	280	10	do.
Zn regenerated toxin e		11.35	280	10	do.
Transcortin					
Human plasma		7.07	280	40	
Transferrin					
Sheep serum		12.3	280	46	
Human serum	8.96	11.2	280	136	Mol wt = 80,000 (Ref. 136)
Apotransferrin	8.72	10.9	280	49	Mol wt = 80,000 (Ref. 49)
Monoferric-	9.92	12.4	280	49	do.
Diferric-	11.2	14.0	280	49	do.
Apo-sero-		11.2	280	95	
iron-sero-		14	280	95	
Fe^{3+}-Transferrin-anion complex[l]					
Carbonate	0.260		465	135	$\epsilon_m = 1\ eq^{-1}\ cm^{-1}$
Oxalate	0.160		465	135	do.
Malonate	0.175		465	135	do.
Maleate	0.120		473	135	do.
Ketomalonate	0.130		446	135	do.
Salicylate	0.240		446	135	do.
Glycine	0.180		488	135	do.
Phenylalanine	0.135		468	135	do.
Thioglycolate	0.120		505	135	do.
Nitrilotriacetate	0.300		465	135	do.
Human milk					
Apo-lacto-		11	280	95	
Iron-lacto-		14.3	280	95	
Transglutaminase					
Rabbit liver		14.0	280	-1	AAA
Triosephosphate isomerase (EC 5.3.1.1)					
Clostridium sp.					
Strain 69	7.3	13.8	280	140	Mol wt = 53,000 (Ref. 140)
Cl. pasteurianum	7.3	13.8	280	140	do.
Cl. thermosaccharolyticum					
Strain 3814	7.3	13.8	280	140	do.
Human skeletal muscle	7.44	12.96	280	24	0.015 M AmAc, pH 6.7; 0.09 M NaPh, pH 6.3 and pH 7.1; 50 mM Tris–HCl, pH 7.5; 5 mM TEA, pH 7.8 Dry wt Mol wt = 57,400 (Ref. 24)
Tropomyosin					
Human muscle		3.30	280	23	
Carp muscle		2.90	278	138	
Rabbit skeletal muscle		3.45	278	89	0.5 M KCl, 1 mM EGTA, 50 mM Tris–HCl, pH 8.0
		2.5	277	166	N
Troponin					
Rabbit muscle		4.5	278	166	N
Troponin C					
Human muscle		2.14	280	23	
Dogfish (*Squalus acanthias*)		7.0	280	88	Refr.
Rabbit Muscle		2.0	275–8	146	20 mM Tris–1 mM $Mg(Ac)_2$, pH 7.5
Troponin I					
Human muscle		3.97	280	23	
Chicken breast muscle		4.97	280	160	
leg muscle		5.60	280	160	
Bovine cardiac muscle		3.7	280	15	50 mM Tris–HCl 0.5 M KCl, 1 mM EGTA, pH 7.5
Rabbit cardiac muscle	1.03	4.37	280	44	Mol wt = 23,550 (Ref. 44)
Slow muscle	1.15	5.43	280	43	Mol wt = 21,146 (Ref. 43)

Table 1—*continued*

Protein	$\epsilon^a_M \times 10^{-4}$	$A^{1\%\,b}_{1\,cm}$	nm[c]	Ref.	Comments[d]
Troponin T					
Human muscle		5.00	280	23	
Chicken					
Breast muscle	2.09	6.23	280	160	Mol wt = 33,500 (Ref. 160)
Leg muscle	2.34	7.66	280	160	Mol wt = 30,500 (Ref. 160)
Bovine cardiac muscle		3.9	278	16	
Trypsin (EC 3.4.21.4)					
Streptomyces griseus	3.9	17.2	280	114	Mol wt = 22,800 (Ref. 114) AAA
Bovine (Commercial)	2.52		280	111	
Rabbit pancreas	2.08	9.9	280	66	Interf. Mol wt = 21,700 (Ref. 66)
African lungfish (*Protopterus aethiopicus*)[p]		18.3	280	25	Interf.
Trypsinogen					
Human pancreas (cationic)		14.8	280	13	Interf.
Whale pancreas (*Balaenoptera acutorostrata*)		13.55	280	12	Dry wt
Tryptophanase (EC 4.1.99.1)					
Proteus rettgeri	24.4	11.0	280	167	Dry wt Mol wt = 222,000 (Ref. 167)
Bacillus alvei					
Holo-		12.9	278	61	AAA
Apo-		12.4	278	61	AAA
Tryptophanyl t-RNA synthetase (EC 6.1.1.2)					
Beef pancreas		8.4	280	32	AAA
TRS^m_{82}		10.3	280	32	AAA
Protease-resistant core		7.5	280	32	AAA
Tubulin					
Bovine brain		12.6	280	27	Refr.
Calf brain	1.54	2.86	295	80	pH 7 Mol wt = 54,000 (Ref. 80)
	5.99	11.09	295	80	pH 12
Human brain		7.2	280	72	
Tyramine oxidase					
Sarcina lutea		15	280	163	
β-Tyrosinase					
Escherichia intermedia		8.37	280	162	
Erwinia herbicola		8.08	280	162	
Tyrosinase (EC 1.14.18.1)					
Mushroom	0.11		755	152	
Neurospora crassa	9.24	22[n]	280	82	Mol wt = 42,000 (Ref. 82)
	1.69		345	82	After H_2O_2 treatment
		15	280	47	
Tyrosyl-tRNA synthetase (EC 6.1.1.1)					
Baker's yeast		8.4	280	35	
Uracil-DNA glycosidase					
Escherichia coli	3.68	15	280	83	Mol wt = 24,500 (Ref. 83) AAA
Urate oxidase (EC 1.7.3.3)					
Candida utilis	14.0	11.7	280	63	Mol wt = 120,000 (Ref. 63)
Uricase					
Candida utilis		—[o]		62	
Uridinediphosphoglucose dehydrogenase (EC 1.1.1.22)					
Escherichia coli	3.35	3.9	277	134	Lowry, 50 mM KPh pH 7.0, 1 mM DTT Mol wt = 86,000 (Ref. 131)
Uridine phosphorylase (EC 2.4.2.3)					
Escherichia coli		6.73	280	81	Dry wt 8.9 mM Ph, pH 7.0, 1 mM EDTA
		7.80	260	81	0.1 M NaOH
Urocanase (EC 4.2.1.49)					
Pseudomonas testosteroni	10.88	9.22	280	48	Dry wt, pH 7.0 Mol wt = 118,000 (Ref. 146)

Table 1—*continued*

Protein	$\epsilon_M^a \times 10^{-4}$	$A_{1cm}^{1\%,b}$	nm[c]	Ref.	Comments[d]
Urokinase (EC 3.4.99.26)					
Human urine		12.6	280	144	
Uronic acid dehydrogenase (EC 1.2.1.35)					
Pseudomonas syringae	4.1	6.8	278	157	Data from Fig. 4 of Ref. 157 0.02 M NaPh, pH 8.0 Mol wt = 60,000 (Ref. 157)
Uteroglobulin					
Rabbit uterine fluid	0.1800	1.2	280	108	0.1 N NaOH Mol wt = 15,000 (Ref. 108)
Valine:tRNA ligase (EC 6.1.1.9)					
Yeast	17.1	15.1	280	85	0.05 M KPh, pH 7 Mol wt = 113,000 (Ref. 78)
Valyl-tRNA synthetase					
Chick embryo brain	9	8.2	280	11	
Escherichia coli		10.8	280	117	
	19.8	18	280	105	Mol wt = 110,000 (Ref. 105)
Virus					
Adenovirus type 2 hexon		14.3	279	45	N and AAA 0.01 M NaPh, pH 7
Beet yellow		2.4[e]	260	71	LS
Coronarvirus 229 E		54.3	256	55	0.3 M Ph, pH 7.2, LS
		34.0	280	55	do.
		51.8	260	55	do.
Cynosurus mottle		73	260	104	
		45.3	280	104	
Sugar beet yellows		[f]		8	
Reovirus type 3		91	260	34	0.15 M NaCl or 0.015 M NaCl, pH 7
Vitellenin, Apo-					
Hen egg yolk					
Fraction I		13.3	nc[r]	14	6 M GHCl
Fraction Ia		13.3	nc[r]	14	do.
Fraction II		20.5	nc[r]	14	do.
Emu egg yolk		17	nc[r]	14	do.
Xanthine dehydrogenase					
Neurospora crassa		9.14	450	87	Data from Fig. 5 of Ref. 87
		51.2	280	87	$A_{280}/A_{450} = 5.6$
		5.1	550	87	$A_{450}/A_{550} = 1.8$
Turkey liver	7.29		450	20	Per 2 eq. flavin
	7.39		460	20	do.
	2.46		550	20	do.
Xanthine oxidase					
Milk	7.25		450	158	Per 2 eq. flavin
	34.8		280	158	do., $A_{280}/A_{450} = 4.8$[s]
Xylanase					
Streptomyces sp. E-86		13.7	280	76	pH 6.5
Xylose isomerase					
Streptomyces albus	5.37	12.94	280	56	10 mM Tris–maleate pH 7.0 containing 0.0001 M $MnCl_2$ and 0.0001 M $CoCl_2$ Mol wt = 41,500 (Ref. 56)
β-D-Xylosidase (EC 3.2.1.21)					
Bacillus pumilus		17.8	280	17	Dry wt
β-Xylosidase					
Malbranchea pulchella		13.2	280	93	pH 6.7
Penicillium wortmanni		11.3	280	26	Dry wt
Wool					
Merino sheep					
Component 0.62		38	277	39	pH 6
		40	284	39	pH 12
		40	290	39	pH 12

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FOOTNOTES TO TABLE 1

[a] ϵ_M is the molar absorptivity with units of $M^{-1}\,cm^{-1}$ and is either the value reported in the literature or calculated from the $A_{1\,cm}^{1\%}$ value and the molecular weight.

[b] $A_{1\,cm}^{1\%}$ is the absorption for a 1% solution in a 1 cm cuvet and is either the value reported in the literature or calculated from the ϵ_M and the molecular weight. The relationship between ϵ_M, $A_{1\,cm}^{1\%}$, and molecular weight, MW, is $10\epsilon_M = [A_{1\,cm}^{1\%}]\,[MW]$.

[c] Refers to the wavelength cited and may not be the peak of the absorption band.

[d] Abbreviations used and methods of protein determination: *Abbreviations*: Do, same as above; KPh, potassium phosphate; NaPh, sodium phosphate; Ph, phosphate; Ac, acetate; EDTA, ethylenediaminetetraacetic acid; HOAc, acetic acid; AmBic, ammonium bicarbonate; AmAc, ammonium acetate; TEA, triethylamine; EGTA, ethylene glycol bis (β-aminoethylether)-*N*,*N*′-tetraacetic acid; GHCl, guanidine hydrochloride; DTT, dithiothreitol. *Methods of protein determination*: Dry wt, dry weight; AAA, amino acid analysis; Interf., interferometry; LS, corrected for light scattering; Biuret, Lowry, colorimetric methods; Refr., refractometry; K, N, nitrogen determination.

[e] This value is for 10 mg N/ml.

[f] From the relationship: $\epsilon_{597}/\epsilon_{278} = 0.87$.

[g] Based on copper content the value if 0.2238.

[h] See also Ref. 67.

[i] These values obtained by using the data in Fig. 7 of Ref. 59. I believe that these values are in error by a factor of 10, i.e. $\epsilon_M = 14.3 \times 10^4$ and $A_{1\,cm}^{1\%} = 16.3$ are the correct values.

[j] This is a ternary complex of enzyme, 5-fluorodeoxyuridylate, and methylenetetrahydrofolate.

[k] Corrected for presence of thyroxine.

[l] Anion, absorption shoulder in nm, ϵ_M in $1\,eq^{-1} \times 10^4$: glyoxylate, 400–600, 0.180; pyruvate, 430–460, 0.140; α-ketoglutarate, 410–430, 0.185; acetoacetate, 410–430, 0.135; glycolate, 400–460, 0.170; lactate, 430–440, 0.125; phenyllactate, 420–430, 0.160; phenylglycolate, 400–420, 0.135; malate, 420–480, 0.150; gluconate, 420–430, 0.150; no complexes formed with succinate, methyllactate, citrate, chloroacetate; with EDTA there is an absorbance maximum at 5.5 nm.

[m] A fully active lower molecular weight form of the enzyme.

[n] This is the average of 21.8 (dry weight), 22.2 (refractometry), and 23 (amino acid analysis).

[o] Solution with 1 mg protein nitrogen has an absorption value of 7.44 at 280 nm.

[p] The value uncorrected for light scattering if 2.9.

[q] Extinction coefficient at 260 nm equals 2.03/mg.

[r] n.c. is not cited.

[s] Data from Fig. 1 gives $A_{280}/A_{450} = 6.4$.

[t] Data from Fig. 2 of Ref. 54.

[u] Source is *Saccharomyces cerevisiae*.

[v] This is trypsin A_1.

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