Buffering agents

Most applications in biotechnologies and biochemistry of proteins operate in aqueous solutions.
Water is determinant to interactions of biological systems, dissociating in H+ and OH- ions thus interfering with ions and charged biomolecules, but also interacting by Van de Wahls binding to solvate biomolecules and by hydrophobic interactions to form micelles or precipitates...

To that point, **buffers** are aqueous solutions containing partly neutralized weak acids or bases that show little change in pH (H+ concentration) whatever ions are added. Requirements should be considered for the choice of the buffer, and it's use in each application. I.e. the pH should be determined at the final temperature, in presence of salts (i.e. phosphate pH change with salts concentration) near the pKa of the buffering compound. The buffering compound should not absorb at wavelengths (i.e. at 240-270nm for mass spectrometry)…

Beside classic **mineral and organic buffers** (Phosphate, Tris, Borate, Citrate, Glycine...) that are widely used, although their pKa do not always suit at best, one might consider biological buffer that have several advantages, and are also proposed with Uptima UltraPure quality.
Biological buffers differ from classic mineral to several points: they have pKa values at or near physiological pH (between 6 and 8). These buffers are non toxic to cells, and are not absorbed through cell membranes. The concentration, temperature, and ionic composition of the medium has minimal effect on the buffering capacity. They are resistant to enzymatic and non enzymatic degradation, furthermore they are essentially transparent to visible and ultraviolet light.

standard buffers & types => alphabetic list

Borate	More
Citrate	More
Glycine	More
Tris	More
Phosphate	More
Other classic mineral and organic buffers	More
Other biological buffers (Good's buffers)	More
Additives for buffer solutions preparation	

Formulated buffers for electrophoresis	TBE, TAE, TG, TG-SD	See Tris formulated buffers
Formulated buffers for chromatography	Tris Ph3,	

Borate

pK_{a1}(25°C)=9.24; pH range 8.5-10.2
Borate buffered saline should not be used in the presence of polyols, including carbohydrates and their derivatives with which they may chelate compounds. Borate buffers also have a high bacteriocidal effect. The use of borate buffers in gel electrophoresis of proteins can result in spreading of the zones.

Boric Acid (MW:61.83 pKa1 - 9.24, pKa2 - 12.74, pKa3 - 13.80, pH range: 8.5-10.2) +	UP070440, 1Kg	
Boric Acid Proteomics Grade	10853A, 500 g	10853B, 1 Kg

Citrate

pKa1 - 3.13 2.2-6.5, pKa2 - 4.76 3.0-6.2, pKa3 - 6.40 5.5-7.2, pH range 3-6.2
Citrate is used notably for elution in affinity chromatography, but also for cell media.

Citric Acid (MW:192.1)	UP168781, 1Kg	
Citric Acid ACS grade/ Biotech grade (MW:192.1)	673410, 500 g	
Citric Acid, Trisodium Dihydrate (MW: 294.1, -)	218830, 1 Kg	218831, 2.5 Kg
Citric Acid, Trisodium Dihydrate Proteomics Grade	10853A, 500 g	10853B, 1 Kg
Citric Acid, Ammonium Salt, Dibasic, UltraPure (MW:226.2)	N12630, 500 g	N12631, 1 Kg

PLP-Buffers

Glycine

pKa1 - 2.35 pH range: 2.2-3.6, pKa2 - 9.78 pH range: 8.2-10.6
Glycine is used in buffers notably for elution in affinity chromatography, in electrophoresis buffers, but also as quenching agent biochemistry.

Glycine (MW:75.07) ±	UP018225, 1Kg
TG-SDS buffer (Tris/Glycine/SDS)	see Tris buffers
TG buffer (Tris/Glycine)	see Tris buffers

Tris, and formulated Tris buffers

Tris(Hydroxymethyl) Aminomethane
pK_a(25°C)=8.30 ; Useful pH range 7.2-9.0
Tris buffers are preferable over phosphate buffers to avoid complex formation with ionic species such as calcium and magnesium in blood. It generally does not suit biochemistry applications because it contains primary amine (interferes with amine reactive agents) and it'spreciable solubility in organic solvents.

▪Tris base (MW: 121.14) ±	UP031657, 1Kg	UP031658, 5x1Kg
▪Tris HCl (MW: 157.6) ±	UP09154D, 500 g	UP09154E, 1 kg
▪Tris buffer 0.1M solution pH 7.4 nuclease free biotechnology grade	587550, 500 ml	587551, 100 ml
▪Tris buffer 0.5M solution pH 6.8 biotechnology grade	725200, 500 ml	
▪Tris buffer 0.5M solution pH 6.8 proteomics grade	725201, 500 ml	
▪Tris buffer 1.0M solution pH 7.5 sterile ultra pure grade	N13710, 100 ml	
▪Tris buffer 1.0M solution pH 8 sterile biotechnology grade	586780, 100 ml	586781, 500 ml
▪Tris buffer 1.0M solution pH 9 sterile ultra pure grade	N13720, 250 ml	
▪Tris buffer 1.0M solution pH 10 sterile ultra pure grade	N13740, 250 ml	N13740, 250 ml
▪Tris buffer 2.0M solution pH 7.5	N14620, 1 L	
▪Tris buffer 2.0M solution pH 7.8	N14610, 500 ml	
▪TAE Solution 25X Concentrate (Tris/Acetate/EDTA)	UP892574, 1.6L	
▪TAE Powder	892580 1 u (40 L)	
▪TAE Ready-pack	665100, 2 packs (50 L)	
▪TBE Solution 10X Concentrate (pH:8.3) ±	UP89510A, 5L	UP86510C, 4 x 5 L
▪TBE Solution 5X Concentrate	N14790, 1 L	N14791, 4 L
▪TBE Powder	892533, 1 u (40 L)	
▪TBE Ready-pack	892535, 2 packs (20 L)	
▪TBE disodium Ready-pack	473840, 2 packs (20 L)	
▪Tris Buffered Saline (TBS), 20X Liquid Concentrate	N14580, 4 L	
▪Tris Buffered Saline (TBS), 20X Ready-Pack™	740040, 2 packs	
▪Tris Buffered Saline (TBS), powder pask	UP77004A, 1 pack (10L)	
▪TTE Solution 10X concentrate	R59980, 1 L	R59981, 5 L
▪TTE Ready-pack	R59982, 1 Pack (10 L)	

Phosphate, and formulated Phosphatebuffers

phosphatePhosphate buffer should not be used in assays where competition for phosphate groups, or complex formation with a metal ion is essential for the enzyme activation. Phosphate ions will inhibit carboxypeptidase, carboxylase, urease, muscle diaminase, formase and phosphoglucomutase
PBS (Phosphate Buffered Saline Buffer) is used in various laboratory technics, including immunodetection, biochemistry, purification, cell culture…

▪PBS Ultrapure, powder packs	UP68723A, 1pack (10 L)
▪PBS Ultrapure, ready-to-use tabs	UP307157, 100tabs (100ml each)
▪Phosphate Buffered Saline, 10X Liquid Concentrate	N14010, 4 L

PLP-Buffers

▪Phosphate Buffered Saline, 20X Liquid Concentrate	N13760, 500 ml	N13761, 1 L
▪Phosphate Buffered Saline with Tween 20, pH 7.5	N13810, 500 ml	N13811, 1 L
▪Phosphate Buffered Saline, Sterile 1X Solution, pH 7.4	N13520, 100 ml	N13521, 500 ml

Other mineral and organic buffers

▪Imidazole (MW:68.08 pKa: 6.95, pH range 6.2-7.8)	020220, 10 g	020228, 50 g
▪Imidazole Proteomics grade	BI9270, 10 g	BI9271, 50 g
▪Succinic Acid Free Acid (MW: 118.09 pKa1 - 4.21 3.2-5.2, pKa2 - 5.64 5.5-6.5)	N12170, 500 g,	N12171, 2.5 Kg

Other buffering agents – organic "Good's buffers"

▪All Good's Buffers	See complete list	p.E22
▪HEPES, free acid (MW:238.3 pKa:7.55 pH range: 6.8-8.2) +	UP061940, 250 g	06194P, 1 Kg
▪MOPS, UltraPure (MW: 209 pKa: 3 7.20 pH range: 6.5-7.9)	UP062000, 100 g	UP062002, 500 g
▪MOPS (MW: 209.3, pK_a(25°C)=7.2, useful pH range is 6.5-7.9) +	UP061940, 250g	
▪PIPES (MW: 302.4, pK_a(25°C)=6.8, useful pH range is 6.17.5) +	UP061890, 100g	UP061981, 250g

Additive biochemicals for buffer preparation

▪AEBSF (protease inhibitor, wide spectrum, stable)	UP401070, 100 mg	
▪Antipain dihydrochloride	25731C, 5 mg	
▪Aprotinin	18558D, 10 mg	
▪Detergents	see complete list (p.E)	
▪DTT (1,4-Dithiothreitol) Biotechnology Grade	UP284250, 1 g	UP284255, 5 g
▪SDS, powder	UP649100, 500 g	
▪SDS, 20 % solution	UP896826, 500 ml	UP896827, 2x500 ml
▪Sucrose	UP252031, 1 kg	
▪Sucrose, Ultra Pure Grade	UP031904, 1 kg	
▪Urea, 8 M Solution	N13830, 250 ml	
▪Urea, 8M solution, proteomics grade	N13831, 250 ml	
▪Protease inhibitors	See complete list: see p.E18-19	
▪Water Nuclease free, Sterile, RNase-Free Solution	457420, 500 ml	

Ordering information

Catalog size quantities and prices may be found at http://www.interchim.com.
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