PREPARATION OF BUFFERS

제공: 박창현

2-Amino-2-methyl-1,3-propanediol(Ammediol) Buffer

Stock Solutions

A: 0.2 M solution of 2-Amino-2-methyl-1,3-propanediol(21.03 g in 1000 ml of distilled water)

B: 0.2 M HCI

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water:

x	pH	x	pH
2.0	10.0	22.0	8.8
3.7	9.8	29.5	8.6
5.7	9.6	34.0	8.4
8.5	9.4	37.7	8.2
12.5	9.2	41.0	8.0
16.7	9.0	43.5	7.8

Acetate Buffer

Stock Solutions

A: 0.2 M solution of acetic acid (11.55 ml in 100 ml of distilled water)

B: 0.2 M solution of sodium acetate (16.4 g of $C_2H_3O_2Na$ or 27.2 g of $C_2H_3O_2Na \cdot 3H_2O$ in 1000 ml of distilled water)

x ml of A plus y ml of B and diluted to a total of 100 ml with distilled water:

x	y	pH
46.3	3.7	3.6
41.0	9.0	4.0
30.5	19.5	4.4
20.0	30.0	4.8
14.8	35.2	5.0
10.5	39.5	5.2
4.8	45.2	5.6

Barbital Buffer

Stock Solutions

A: 0.2 M solution of sodium barbital (Veronal) (41.2 g in 100 ml of distilled water)

B: 0.2 M HCI

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water:

x	pH	x	pH
1.5	9.2	22.5	7.8
2.5	9.0	27.5	7.6
4.0	8.8	32.5	7.4
6.0	8.6	39.0	7.2
9.0	8.4	43.0	7.0

12.7	8.2	45.0	6.8
17.5	8.0		

Cacodylate Buffer

Stock Solutions

A: 0.2 M solution of sodium cacodylate [42.8 g of $Na(CH_3)_2\ AsO_2{\cdot}3H_2O$ in 1000 ml of distilled water]

B: 0.2 M HCI

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water:

x	pH	x	pH
2.7	7.4	29.6	6.0
4.2	7.2	34.8	5.8
6.3	7.0	39.2	5.6
9.3	6.8	43.0	5.4
13.3	6.6	45.0	5.2
18.3	6.4	47.0	5.0
23.8	6.2		

Citrate Buffer

Stock Solutions

A: 0.1 M solution of citric acid (21.01 g in 1000 ml of distilled water)

B: 0.1 M solution of sodium citrate (29.41 g of $C_6H_5O_7Na_3{\cdot}2H_2O$ in 1000 ml of distilled water)

x ml of A plus y ml of B and diluted to a total of 100 ml with distilled water:

x	y	pH	x	y	pH
46.5	3.5	3.0	23.0	27.0	4.13
43.7	6.3	3.2	20.5	29.5	5.0
40.0	10.0	3.4	18.0	32.0	5.2
37.0	13.0	3.6	16.0	34.0	5.4
35.0	15.0	3.8	13.7	36.3	5.6
33.0	17.0	4.0	11.8	38.2	5.8
31.5	18.5	4.2	9.5	41.5	6.0
28.0	22.0	4.4	7.2	42.8	6.2
25.5	24.5	4.6			

Collidine Buffer (0.2 M)

Stock Solution

s-Collidine (pure)	2.67 ml
Distilled water to make	50.00 ml

Buffer

Stock solution	50.00 ml
I N HCI	9.00 ml (approx. for pH 7.4)
Distilled water to make	100 ml

Maleate Buffer

Stock Solutions

A: 0.2 M solution of acid sodium maleate (8 g of NaOH plus 23.2 g of maleic acid or 19.6 g of maleic anhydride in 1000 ml of distilled water)

B: 0.2 M NaOH

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water:

x	pH	x	pH
7.2	5.2	33.0	6.2
10.5	5.4	38.0	6.4
15.3	5.6	41.6	6.6
20.3	5.8	44.4	6.8
26.9	6.0		

Phosphate Buffer(Sörensen)

Stock Solutions

A: 0.2 M solution of monobasic sodium phosphate (27.8 g in 1000 ml of distilled water)

B: 0.2 M solution of dibasic sodium phosphate (53.65 g of $Na_2HPO_4 \cdot 7H_2O$ or 71.7 g of $Na_2HPO_4 \cdot 12H_2O$ in 1000 ml of distilled water)

x ml of A plus y ml of B and diluted to a total of 200 ml with distilled water:

x	y	pH	x	y	pH
93.5	6.5	5.7	45.0	55.0	6.9
92.0	8.0	5.8	39.0	61.0	7.0
90.0	10.0	5.9	33.0	67.0	7.1
87.7	12.3	6.0	28.0	72.0	7.2
85.0	15.0	6.1	23.0	77.0	7.3
81.5	18.5	6.2	19.0	81.0	7.4
77.5	22.5	6.3	16.0	84.0	7.5
73.5	26.5	6.4	13.0	87.0	7.6
68.5	31.5	6.5	10.5	90.5	7.7
62.5	37.5	6.6	8.5	91.5	7.8
56,5	43.5	6.7	7.0	93.0	7.9
51.0	49.0	6.8	5.3	94.7	8.0

Phosphate Buffer (Millonig, 1961)

Stock Solutions

A: 2.26% $NaH_2PO_4 \cdot H_2O$ in water

B: 2.52% NaOH in water

Buffer (0.13 M)

Solution A	41.5 ml
Solution B	8.5 ml

The pH is 7.3 the disired pH can be obtained with solution B without changing the molarity. The buffer is stable for several weeks at 4°C.

Tris(hydroxymethyl)aminomethane Buffer

Stock Solutions

A: 0.2 M solution of tris(hydroxymethyl)aminomethane(24.2 g in 1000 ml of distilled water)

B: 0.2 M HCL

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water:

x	pH	x	pH
5.0	9.0	26.8	8.0
8.1	8.8	32.5	7.8
12.2	8.6	38.4	7.6
16.5	8.4	41.4	7.4
21.9	8.2	44.2	7.2

Tris(hydroxymethyl)aminomethane Maleate Buffer

Stock Solutions

A: 0.2 M solution of Tris acid maleate [24.2 g of tris(hydroxymethyl)aminomethane plus 23.2 g of maleic acid or 19.6 g of maleic anhydride in 1000 ml of distilled water]

B: 0.2 M NaOH

50 ml of A plus x ml of B and diluted to a total of 200 ml with distilled water

x	pH	x	pH
7.0	5.2	48.0	7.0
10.8	5.4	51.0	7.2
I5.5	5.6	54.0	7.4
20.5	5.8	58.0	7.6
26.0	6.0	63.5	7.8
31.5	6.2	69.0	8.0
37.0	6.4	75.0	8.2
42.5	6.6	81.0	8.4
45.0	6.8	86.5	8.6

Veronal Acetate Buffer (Zetterqvist, 1956)

Stock Solution :	Sodium veronal (barbitone sodium)	2.94 g
	Sodium acetate (hydrated)	].94 g
	distilied water to make	100 ml
Ringer's Solution :	Sodium chloride	8.05 g
	Potassium chloride	0.42 g
	Calcium chloride	0.18 g
	Distilled water to make	100 mI
Buffer :	Stock solution	10.0 ml
	Ringer's solution	3.4 ml

Distilled water	25.0 ml
0.1 M HCl	11.0 ml(approx.)