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TECHNICAL INFORMATION

Catalog Number: 1010120, 1010122, 1010124

Minimum Essential Medium Eagle (Modified) with Earle's Salts (EMEM), with L-glutamine, without sodium bicarbonate

Description: MEM, originally prepared by Harry Eagle, is one of the most popular cell culture media. Upon his attempts to cultivate normal mammalian fibroblasts and certain HeLa cell subtypes, it was revealed that the nutritional needs of these cell types could not be met by BME. Further studies led to the development of MEM incorporating specific modifications such as higher amino acid concentrations for the cultivation of fastidious cells. MP's MEM may be used to support the growth of a variety of suspension or adherent mammalian cells, including HeLa, BHK-21, 293, HEP-2, HT-1080, MCF-7, SP2/0, CHO. fibroblasts and primary rat astrocytes, with proper supplementation. MP offers MEM with either Earle's or Hanks' salts. Storage Temperature 2-8°C.

The formulation differs from the original in that the concentrations of some of the vitamins have been increased slightly; and in some, the amino acids differ by decimal amounts. In some formulation, the $MgSO_4$ concentration differs from that of Eagle but agrees with that quoted by Parker (Parker quotes 200.00 mg/liter $MgSO_4 \cdot 7H_2O$).

Note about pH and osmolality:

As this is a powdered media, the pH and osmolality are determined by the components and will naturally be lower than is required for the culturing of cells. This is true for media from all suppliers. Therefore, the pH and osmolality need to be adjusted using Sodium Bicarbonate. Addition of the amount of Sodium Bicarbonate recommended below will change both of these parameters to levels suitable for cell culture. Prior to filtration, a minor adjustment of the pH using 1N HCL or 1N NaOH may be necessary. The exactly appropriate pH needs to be determined based on the cell line being used.

Instructions for media preparation:

1. Add 5% less distilled water than the desired total volume to a mixing container just large enough to hold the final media volume.
2. Add powdered medium to room temperature (20 - 30°C) water with gentle stirring. Do not heat water.
3. Rinse inside of pouch to remove all traces of powder.
4. Adding 2000 mg of $NaHCO_3$ per L of medium will adjust the pH to between 7.0 - 8.0. Closely monitor the pH while adding $NaHCO_3$ until pH is in this range. MP Biomedicals catalog number 091688349 is a ready-to-use 7.5% solution of Sodium Bicarbonate. This solution can be used to adjust the pH by adding 0.27 ml per L of media
5. Dilute the medium to the desired volume with distilled water and stir until dissolved. Do not overmix.

6. Adjust the pH to 0.2 to 0.3 units below the desired final working pH by slowly adding, with stirring, either 1N NaOH or 1N HCl. The pH will usually rise between 0.1 - 0.3 units upon filtration. Keep the container closed until the medium is filtered.

7. Process the medium immediately into sterile containers by membrane filtration using a 0.2µm filter. We recommend using a positive pressure system.

References:

1. Eagle, H., *Science*, v. **130**, 342 (1959).
2. Parker, R.C., *Methods of Tissue Culture 3rd Ed.*, Harper and Row, New York. (1961).

Formulation:

Components	mg/L	Mol. Wt.	Mol. (mM)
Amino Acids			
L-Arginine HCl	126.40	174.2	0.73
L-Cystine 2HCl	31.20	313.2	0.10
L-Glutamine	292.00	146.1	2.00
L-Histidine HCl H ₂ O	41.90	209.6	0.20
L-Isoleucine	52.50	131.2	0.40
L-Leucine	52.50	131.2	0.40
L-Lysine HCl	72.50	182.6	0.40
L-Methionine	15.00	149.2	0.10
L-Phenylalanine	32.50	165.2	0.20
L-Threonine	47.60	119.1	0.40
L-Tryptophan	10.00	204.2	0.05
L-Tyrosine 2Na 2H ₂ O	51.90	261.2	0.20
L-Valine	46.80	117.1	0.40
Vitamins			
Choline Chloride	1.00	139.6	0.0072
D-Calcium Pantothenate	1.00	238.3	0.0042
Folic Acid	1.00	441.4	0.0023
myo-Inositol	2.00	180.2	0.0111
Nicotinamide	1.00	122.13	0.0082
Pyridoxine HCl	1.00	205.6	0.0049
Riboflavin	0.10	376.4	0.0003
Thiamine HCl	1.00	337.3	0.0030
Inorganic Salts			
Calcium Chloride [CaCl ₂]	200.00	111	1.80
Magnesium Sulfate [MgSO ₄]	97.70	120.4	0.81
Potassium Chloride [KCl]	400.00	74.55	5.37
Sodium Chloride [NaCl]	6800.00	58.44	116.36
Sodium Phosphate Monobasic [NaH ₂ PO ₄ H ₂ O] Monohydrate	140.00	159.96	0.88
Other			

Dextrose	1000.00	180.2	5.55
Phenol Red Sodium Salt	10.00	376.4	0.03
Add			
NaHCO ₃ Powder (g/L)		2.20	
NaHCO ₃ 7.5% Solution (mL/L)		29.40	

Availability:

1X Liquids:

Minimum Essential Medium Eagle (Modified) with Earle's Salts:

Catalog Number	Description	Size
1210249	1X EMEM with 2.00 g/l sodium bicarbonate without L-glutamine	100 ml
1210254		500 ml
1210654	1X EMEM with 0.85 g/l sodium bicarbonate without L-glutamine	500 ml
1210354	1X EMEM with L-glutamine, 2.00 g/l sodium bicarbonate	500 ml
1210454	1X EMEM with 20 mM HEPES, without sodium bicarbonate, L-glutamine	500 ml
1622049	1X EMEM with 2.00 g/l sodium bicarbonate, without L-glutamine, L-Arginine	100 ml
1622749	1X EMEM with 2.00 g/l sodium bicarbonate, without L-glutamine, phosphate	100 ml
1622754		500 ml
1622249	1X EMEM with 2.00 g/l sodium bicarbonate, without L-glutamine, methionine	100 ml
1622254		500 ml
1641449	1X EMEM with 2.00 g/l sodium bicarbonate, without L-glutamine, cystine, methionine, cysteine	100 ml
1641454		500 ml
1212754	1X EMEM with non-essential amino acids, 0.85 g/l sodium bicarbonate, penicillin (200 IU/ml), streptomycin (100 ug/ml), without L-glutamine	500 ml

Minimum Essential Medium Eagle (Modified) for Suspension Cultures (MEMS) with Earle's Salts:

Catalog Number	Description	Size
1216254	1X MEMS with magnesium chloride, 2.00 g/l sodium bicarbonate, without L-glutamine, MgSO ₄	500 ml
1217254	1X MEMS with magnesium sulfate, 2.00 g/l sodium bicarbonate, without L-glutamine	500 ml

Minimum Essential Medium Eagle (Modified) with Hanks' Salts:

Catalog Number	Description	Size
1213249	1X HMEM with 0.35 g/l sodium bicarbonate, without L-glutamine	100 ml
1213254		500 ml
1213454	1X HMEM with 20 mM HEPES, without sodium bicarbonate, L-glutamine	500 ml

10X Liquids:

Minimum Essential Medium Eagle (Modified) with Earle's Salts:

Catalog Number	Description	Size
1410049	10X EMEM without L-glutamine, sodium bicarbonate	100 ml
1410054		500 ml
1410149	10X EMEM with L-glutamine without sodium bicarbonate	100 ml

1410154	500 ml
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Minimum Essential Medium Eagle (Modified) for Suspension Cultures (MEMS) with Earle's Salts:

Catalog Number	Description	Size
1417054	10X MEMS without sodium bicarbonate, L-glutamine	500 ml

Powders:

Minimum Essential Medium Eagle (Modified) with Earle's Salts:

Catalog Number	Description	Size
1010120	EMEM with L-glutamine without sodium bicarbonate	10 x 1 liter
1010122		1 x 10 liter
1010124		1 x 50 liter
1110020	Auto-Pow (Autoclavable) EMEM without L-glutamine, sodium bicarbonate	10 x 1 liter
1110022		1 x 10 liter
1110024		1 x 50 liter
1111020	Auto-Pow (Autoclavable) EMEM without L-glutamine, phenol red, sodium bicarbonate	10 x 1 liter
1111022		1 x 10 liter
1012120	EMEM with non-essential amino acids, L-glutamine, without sodium bicarbonate	10 x 1 liter
1012122		1 x 10 liter

Minimum Essential Medium Eagle (Modified) for Suspension Cultures (MEMS) with Earle's Salts:

Catalog Number	Description	Size
1017122	MEMS with L-glutamine, without sodium bicarbonate	1 x 10 liter
1117020	Auto-Pow (Autoclavable) MEMS without L-glutamine, sodium bicarbonate	10 x 1 liter
1117022		1 x 10 liter

Minimum Essential Medium Eagle (Modified) with Hanks' Salts:

Catalog Number	Description	Size
1013120	HMEM with L-glutamine, without sodium bicarbonate	10 x 1 liter
1013122		1 x 10 liter
1013124		1 x 50 liter