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Product Information

Minimum Essential Medium Eagle (MEM) HEPES Modification

Minimum Essential Medium (MEM), developed by Harry Eagle, is one of the most widely used of all synthetic cell culture media. Early attempts to cultivate normal mammalian fibroblasts and certain subtypes of HeLa cells revealed they had specific nutritional requirements that could not be met by Eagle's Basal Medium (BME). Subsequent studies using these and other cells in culture indicated additions to BME could be made to aid growth of a wider variety of fastidious cells.

MEM, which incorporates these modifications, includes higher concentrations of amino acids so the medium more closely approximates the protein composition of cultured mammalian cells. MEM has been used for cultivation of a wide variety of cells grown in monolayers. Optional supplementation of non-essential amino acids to the formulations that incorporate either Hanks' or Earle's salts has broadened the usefulness of this medium. The formulation has been further modified by optional elimination of calcium to permit growth of cells in suspension culture.

MEM Modified with HEPES contains 25 mM HEPES to provide additional buffering capacity to the medium. A zwitterionic buffer, HEPES has a pK_a of 7.3 at 37 °C, which is more compatible with most culture systems than that of sodium bicarbonate, which is usually 6.2 under similar conditions. HEPES will reduce sudden, drastic pH shifts, but as with other buffers, it will not prevent pH shifts entirely.

Reference

1. Eagle, H., Nutrition Needs of Mammalian Cells in Culture. Science, **122**, 501 (1955).

JG,JF,MAM 06/14-1

	M2645	M7278	M5949
	[powder]	[1×]	[1×]
COMPONENT	g/L	g/L	g/L
Inorganic Salts			
$CaCl_2 \cdot 2H_2O$	0.2	0.2	0.2
$MgSO_4$ (anhydrous)	0.09767	0.09767	0.09767
KCl	0.4	0.4	0.4
$NaHCO_3$	—	2.2	2.2
NaCl	5.5	5.5	5.5
Na_2HPO_4 (anhydrous)	0.122	0.122	0.122
Amino acids			
L-Arginine • HCl	0.126	0.126	0.126
L-Alanyl-L-Glutamine	—	—	0.434
L-Cystine • 2HCl	0.0313	0.0313	0.0313
L-Glutamine	0.292	—	—
L-Histidine • HCl • H_2O	0.042	0.042	0.042
L-Isoleucine	0.052	0.052	0.052
L-Leucine	0.052	0.052	0.052
L-Lysine • HCl	0.0725	0.0725	0.0725
L-Methionine	0.015	0.015	0.015
L-Phenylalanine	0.032	0.032	0.032
L-Threonine	0.048	0.048	0.048
L-Tryptophan	0.01	0.01	0.01
L-Tyrosine • 2Na • $2H_2O$	0.0519	0.0519	0.0519
L-Valine	0.046	0.046	0.046
Vitamins			
Choline chloride	0.001	0.001	0.001
Folic acid	0.001	0.001	0.001
myo-Inositol	0.002	0.002	0.002
Niacinamide	0.001	0.001	0.001
D-Panthothenic acid • ½Ca	0.001	0.001	0.001
Pyridoxal • HCl	0.001	0.001	0.001
Riboflavin	0.0001	0.0001	0.0001
Thiamine • HCl	0.001	0.001	0.001
Other			
Glucose	1.0	1.0	1.0
HEPES	5.958	5.958	5.958
Phenol red • Na	0.011	0.011	0.011
Add			
L-Glutamine	—	0.292	0.292
$NaHCO_3$	2.2	—	—