

Product Information

HEPES hemisodium salt

Catalog Number **H7637**
Store at Room Temperature

CAS RN 103404-87-1

Synonyms: *N*-(2-hydroxyethyl)piperazine-*N'*-(2-ethanesulfonic acid) hemisodium salt;
4-(2-hydroxyethyl)piperazine-1-ethanesulfonic acid hemisodium salt

Product Description

Molecular formula: C₈H_{17.5}N₂O₄S · 0.5Na
Molecular weight: 249.30

Useful pH range: 6.8–8.2

pK_a values:^{1,2} pK₁ ~3

pK₂ = 7.85 at 0 °C

7.55 at 20 °C

7.31 at 37 °C

ΔpK_a/ΔT = -0.014/°C³

HEPES has been described as one of the best all-purpose buffers available for biological research.³ At most biological pHs the molecule is zwitterionic and is most effective as a buffer at pH 6.8–8.2. HEPES has been used in a wide variety of applications, including tissue culture.

Buffer strength for cell culture applications is usually in the range of 10–25 mM; HEPES is used in media formulations to stabilize pH at 37 °C.¹ Care must be taken to maintain appropriate osmolality in the media and toxicity with respect to a given cell line must be evaluated. Isotonicity data have been tabulated.⁴ HEPES is reportedly superior to the use of NaHCO₃ in controlling pH in tissue and organ culture.⁵

In protein determination procedures, HEPES interferes with the Folin-Ciocalteu protein assay; however, the biuret protein assay is unaffected.⁶

HEPES was the buffer of choice in a protein deposition technique in electron microscopy because it did not affect metal substrates.⁷ HEPES does not bind magnesium, calcium, manganese(II) nor copper(II) ions.⁸

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Preparation Instructions

The product is soluble in water (25 g/50 ml [33% w/w]), yielding a clear, colorless solution with pH ~7.5 at 25 °C. For user convenience, HEPES hemisodium salt was formulated to dissolve in water to produce a buffer solution at pH ~7.5 with little or no pH adjustment needed. To adjust pH, minimal quantities of HCl or NaOH may be used.

Solutions may be autoclaved under standard conditions.^{1,2}

Storage/Stability

Store the product at room temperature.

References

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5. Shipman, C., "Control of Culture pH with Synthetic Buffers", Ch. 7 in *Tissue Culture, Methods and Applications* (Academic Press, 1973) p. 709.
6. Himmel, H.M., and Heller, W., J. Clin. Chem. Clin. Biochem., **25**, 909-913 (1987).
7. Panitz, J.A., et al., J. Electron Microscopy Technique, **2**, 285-292 (1985).
8. Good, N.E., and Izawa, S., Methods in Enzymology, **24B**, 53 (1972).
9. *Merck Index*, 12th Ed., #4687 (1996).
10. Stoscheck, C.M., Methods in Enzymology, **182**, 50 (1990).

PH,CKV,MAM 04/08-1

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