

It is also used in organic chemistry techniques for the separation of enantiomers and diastereomers in thin-layer chromatography.⁽¹³⁾

19 Specific References

- Jambhekar S, *et al.* The physicochemical characteristics and bioavailability of indomethacin from beta-cyclodextrin, hydroxyethyl-beta-cyclodextrin, and hydroxypropyl-beta-cyclodextrin complexes. *Int J Pharm* 2004; 270(1-2): 149–166.
- Cirri M, *et al.* Development of fast-dissolving tablets of flurbiprofen-cyclodextrin complexes. *Drug Dev Ind Pharm* 2005; 31(7): 697–707.
- Tenjarla S, *et al.* Preparation, characterization, and evaluation of miconazole-cyclodextrin complexes for improved oral and topical delivery. *J Pharm Sci* 1998; 87: 425–429.
- Mura P, *et al.* Comparative study of ibuprofen complexation with amorphous beta-cyclodextrin derivatives in solution and in the solid state. *Eur J Pharm Biopharm* 2002; 54(2): 181–191.
- Siefert B, Keipert S. Influence of alpha-cyclodextrin and hydroxyalkylated beta-cyclodextrin derivatives on the *in vitro* corneal uptake and permeation of aqueous pilocarpine-HCl solutions. *J Pharm Sci* 1997; 86(6): 716–20.
- de Miranda JC, *et al.* Cyclodextrins and ternary complexes: technology to improve solubility of poorly soluble drugs. *Braz J Pharm Sci* 2011; 47(4): 665–681.
- Irie T, *et al.* Amorphous water-soluble cyclodextrin derivatives: 2-hydroxyethyl, 3-hydroxypropyl, 2-hydroxyisobutyl, and carboxamidomethyl derivatives of beta-cyclodextrin. *Pharm Res* 1988; 5(11): 713–717.
- Menard FA, *et al.* Potential pharmaceutical applications of a new beta cyclodextrin derivative. *Drug Dev Ind Pharm* 1988; 14(11): 1529–1547.
- Aria JL, ed. Cyclodextrins in Drug Delivery. In: Erdoğan N, Bilensoy E. *Nanotechnology and Drug Delivery, Volume 1: Nanoplatforms in Drug Delivery*. Boca Raton, FL: CRC Press, 2014; 178–209.
- Sharma, *et al.* Pharmaceutical and physical properties of paclitaxel (Taxol) complexes with cyclodextrins. *J Pharm Sci* 1995; 84(10): 1223–1230.
- Sigma Aldrich. Material safety data sheet: (2-Hydroxyethyl)-β-cyclodextrin, May 2012.
- Shandong Binzhou Zhiyuan Bio-Technology Co., Ltd. Product information: Hydroxyethyl-β-Cyclodextrins (HE-β-CD) <http://www.bzzysw.com> (accessed 1 December 2014).
- Armstrong DW, *et al.* Use of hydroxypropyl- and hydroxyethyl-derivatized beta-cyclodextrins for the thin-layer chromatographic separation of enantiomers and diastereomers. *J Chromatogr* 1988; 452: 323–330.

20 General References

- Loftsson T, Stefánsson E. Cyclodextrins in eye drop formulations: enhanced topical delivery of corticosteroids to the eye. *Acta Ophthalmol Scand* 2002; 80(2): 144–150.
- Sharma N. Exploring versatile applications of cyclodextrins: an overview. *Drug Deliv* 2014; 22: 1–19.
- Stella VJ, He Q. Cyclodextrins. *Toxicol Pathol* 2008; 36(1): 30–42.
- Szejtli J. Cyclodextrins in pharmaceuticals. In: *Cyclodextrin Technology*, 1988. Boston, MA: Kluwer Academic Publishers; 236.

21 Author

ME Quinn.

22 Date of Revision

2 October 2015.

Hydroxyethylmethyl Cellulose

1 Nonproprietary Names

BP: Hydroxyethylmethylcellulose
PhEur: Methylhydroxyethylcellulose
USP-NF: Hymetellose

2 Synonyms

Cellulose, 2-hydroxyethyl methyl ester; *Culminal MHEC*; HEMC; hydroxyethyl methylcellulose; methyl 2-hydroxyethyl cellulose; methylhydroxyethylcellulosum; MHEC; *Tylopur MH*; *Tylopur MHB*; *Tylose MB*; *Tylose MH*; *Tylose MHB*.

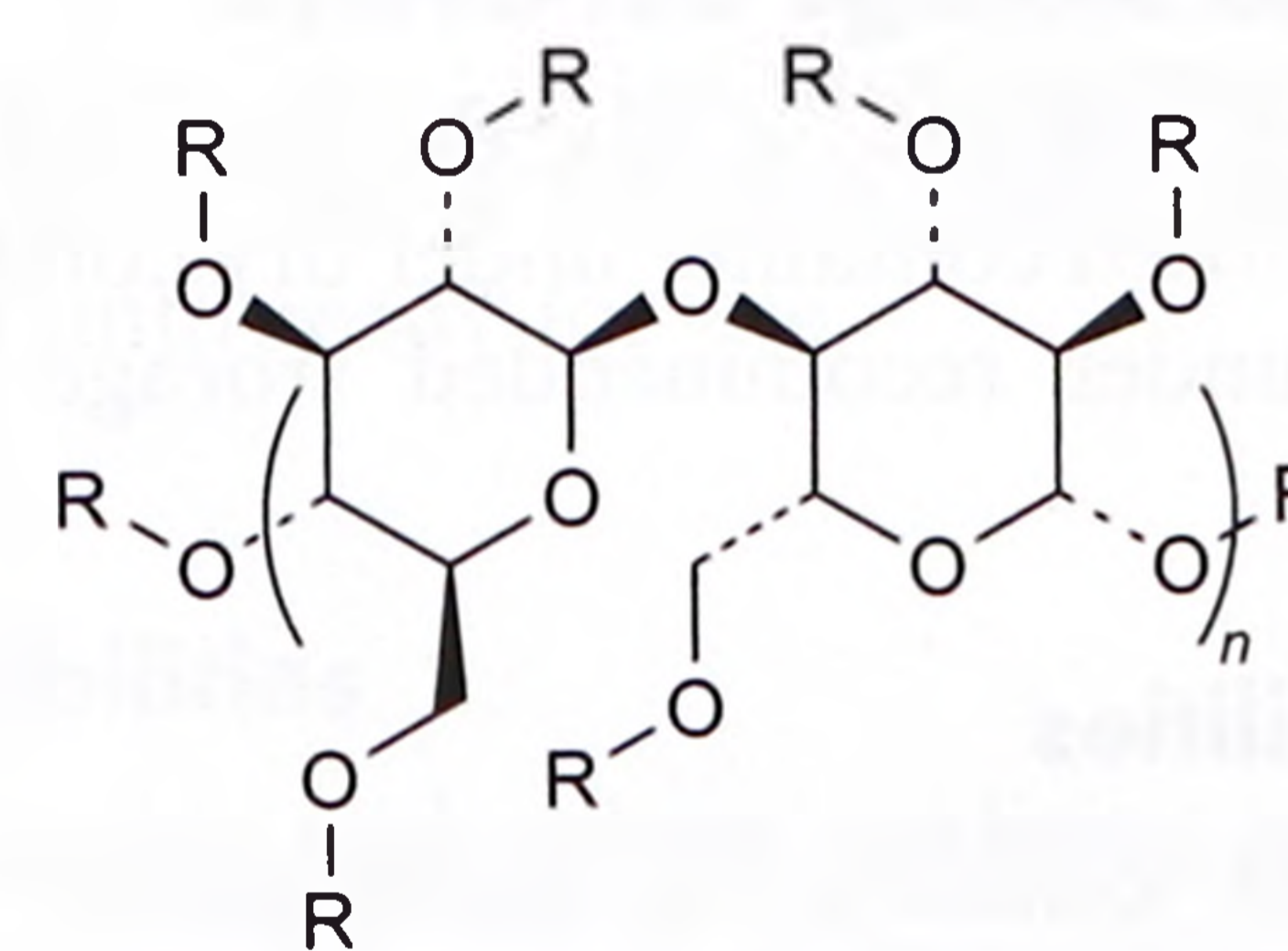
3 Chemical Name and CAS Registry Number

Hydroxyethylmethylcellulose [9032-42-2]

4 Empirical Formula and Molecular Weight

The PhEur 9.2 describes hydroxyethylmethyl cellulose as a partly O-methylated and O-(2-hydroxyethylated) cellulose. Various different grades are available, which are distinguished by appending a number indicative of the apparent viscosity in millipascal seconds (mPas) of a 2% w/v solution measured at 20°C.

5 Structural Formula



R = (CH₂CH₂O)_xH, CH₃ or H

where x is a number of hydroxyethyl units.

6 Functional Category

Coating agent; emulsion stabilizing agent; modified-release agent; suspending agent; tablet and capsule binder; viscosity-increasing agent.

7 Applications in Pharmaceutical Formulation or Technology

Hydroxyethylmethyl cellulose is a nonionic polymer used as an excipient in a wide range of pharmaceutical products, including oral tablets and suspensions, emulsions and topical gel preparations.^(1–4)