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21 Author

KP Hapgood.

22 Date of Revision

4 May 2017.

Hydroxyethyl Cellulose

1 Nonproprietary Names

BP: Hydroxyethylcellulose
PhEur: Hydroxyethylcellulose
USP–NF: Hydroxyethyl Cellulose

2 Synonyms

Cellosize HEC; cellulose hydroxyethyl ether; cellulose 2-hydroxyethyl ether; cellulose hydroxyethylate; ethylhydroxy cellulose; ethylose; HEC; HE cellulose; hetastarch; 2-hydroxyethyl cellulose ether; hydroxyethylcellulosum; hydroxyethyl ether cellulose; hyetellose; *Natrosol*; oxycellulose; *Tylose H*; *Tylose PHA*.

3 Chemical Name and CAS Registry Number

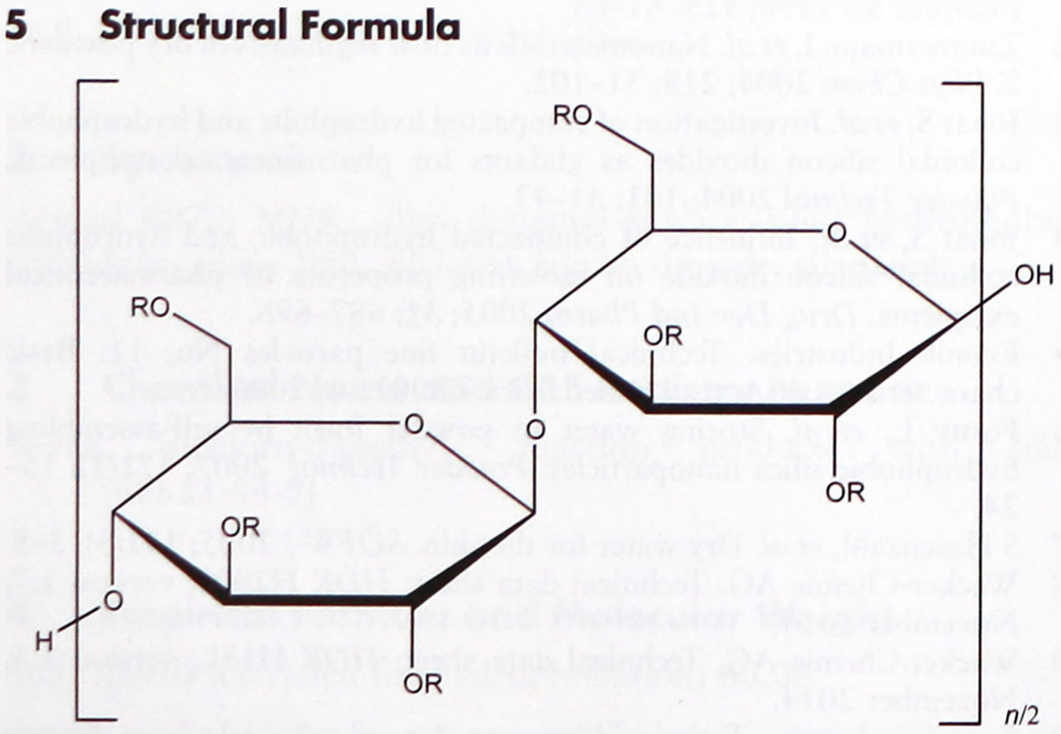
Cellulose, 2-hydroxyethyl ether [9004-62-0]

4 Empirical Formula and Molecular Weight

Hydroxyethyl cellulose is a partially substituted poly(hydroxyethyl) ether of cellulose.[1] It is available in several grades that vary in viscosity and degree of substitution; some grades are modified to improve their dispersion in water.

See Section 10.

5 Structural Formula



R is H or $[—CH_2CH_2O—]_mH$ where m is a common integral number of cellulose derivatives.

6 Functional Category

Coating agent; suspending agent; tablet and capsule binder; viscosity-increasing agent.

7 Applications in Pharmaceutical Formulation or Technology

Hydroxyethyl cellulose is a nonionic, water-soluble polymer widely used in pharmaceutical formulations. It is primarily used as a thickening agent in ophthalmic[2] and topical formulations.[3] It is also used as a binder[4] and film-coating agent for tablets[4] and capsules, and in oral solutions and suspensions. The concentration of hydroxyethyl cellulose used in a formulation is dependent upon the solvent and the molecular weight of the grade. Hydroxyethyl cellulose hydrogels may be used in various delivery systems.[6]

Hydroxyethyl cellulose is also widely used in cosmetics, hair care and personal care products, including toothpastes, body lotions, and deodorants.[1,7]

8 Description

Hydroxyethyl cellulose occurs as a white, yellowish-white or grayish-white, odorless and tasteless, hygroscopic powder.

9 Pharmacopeial Specifications

See Table I. *See also* Section 18.

Table I: Pharmacopeial specifications for hydroxyethyl cellulose.

Test	PhEur 9.2	USP 40–NF 35 S1
Identification	+	+
Characters	+	—
Appearance of solution	+	—
Viscosity	75.0–140.0%	+
pH	5.5–8.5	6.0–8.5
Loss on drying	≤10.0%	≤10.0%
Lead	—	≤0.001%
Residue on ignition	—	≤5.0%
Sulfated ash	≤4.0%	—
Chlorides	≤1.0%	—
Heavy metals	—	≤20 µg/g
Nitrates	+	—
Glyoxal	≤20 ppm	—
Ethylene oxide	≤1 ppm	—
2-Chloroethanol	≤10 ppm	—