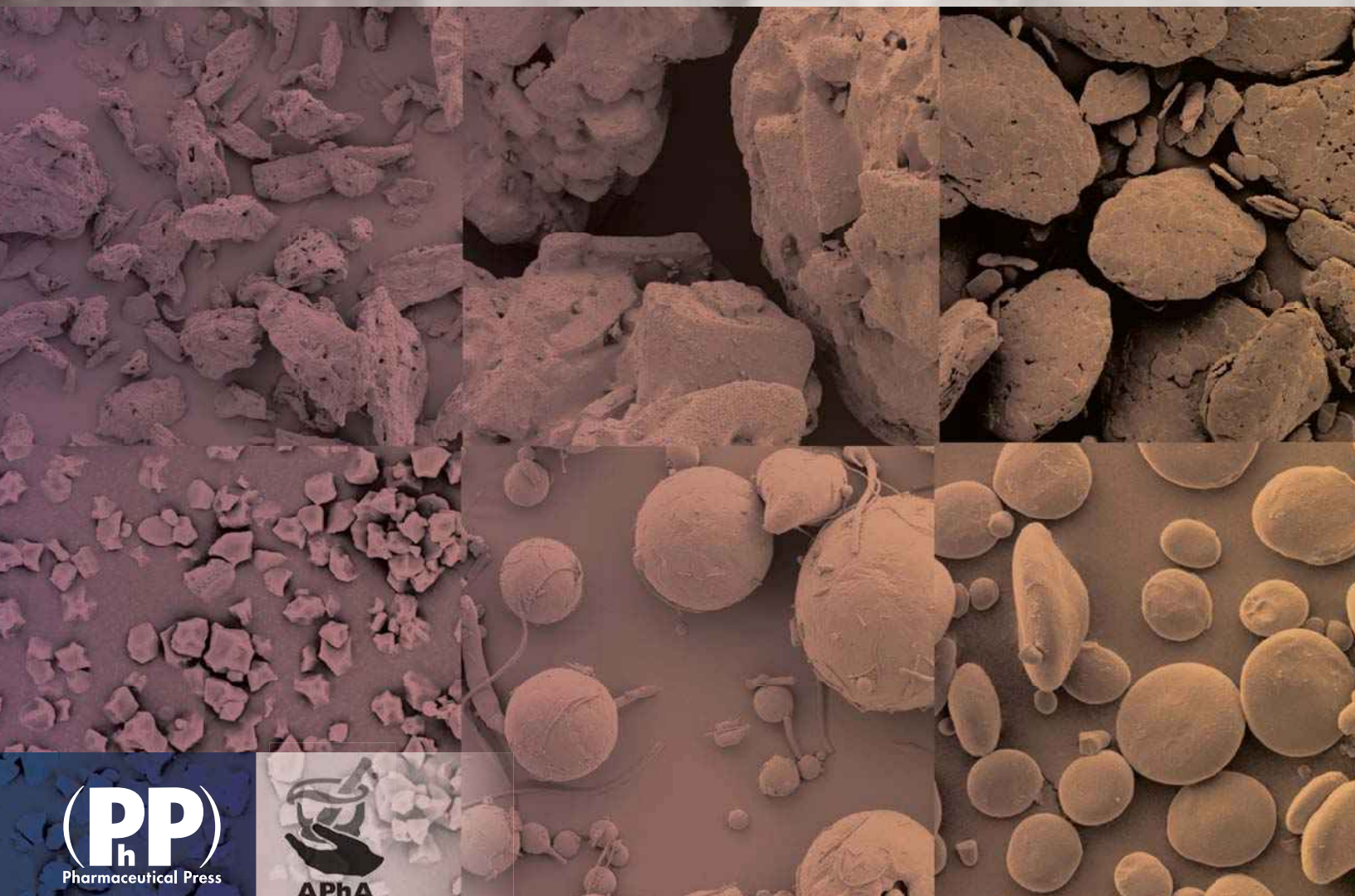


# Handbook of Pharmaceutical Excipients

Sixth edition

Edited by  
Raymond C Rowe, Paul J Sheskey and Marian E Quinn



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SIXTH EDITION

*Edited by*

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## 14 Safety

Hydrogenated castor oil is used in oral and topical pharmaceutical formulations and is generally regarded as an essentially nontoxic and nonirritant material.

Acute oral toxicity studies in animals have shown that hydrogenated castor oil is a relatively nontoxic material. Irritation tests with rabbits show that hydrogenated castor oil causes mild, transient irritation to the eye.

LD<sub>50</sub> (rat, oral): >10 g/kg

## 15 Handling Precautions

Observe normal precautions appropriate to the circumstances and quantity of material handled.

## 16 Regulatory Status

Accepted in the USA as an indirect food additive. Included in the FDA Inactive Ingredients Database (oral capsules, tablets, and sublingual tablets).

Included in nonparenteral medicines licensed in the UK. Included in the Canadian List of Acceptable Non-medicinal Ingredients.

## 17 Related Substances

Castor oil; vegetable oil, hydrogenated.

## 18 Comments

Various different grades of hydrogenated castor oil are commercially available, the composition of which may vary considerably.

*Sterotex K* (Karlshamns Lipid Specialities), for example, is a mixture of hydrogenated castor oil and hydrogenated cottonseed oil. See Vegetable Oil, hydrogenated for further information.

The EINECS number for hydrogenated castor oil is 232-292-2.

## 19 Specific References

- 1 Kline CH. Thixcin R-thixotrope. *Drug Cosmet Ind* 1964; 95(6): 895–897.
- 2 Yonezawa Y *et al.* Release from or through a wax matrix system. III: Basic properties of release through the wax matrix layer. *Chem Pharm Bull (Tokyo)* 2002; 50(6): 814–817.
- 3 Vergote GJ *et al.* An oral controlled release matrix pellet formulation containing microcrystalline ketoprofen. *Int J Pharm* 2002; 219: 81–87.
- 4 Danish FQ, Parrott EL. Effect of concentration and size of lubricant on flow rate of granules. *J Pharm Sci* 1971; 60: 752–754.
- 5 Hölzer AW, Sjögren J. Evaluation of some lubricants by the comparison of friction coefficients and tablet properties. *Acta Pharm Suec* 1981; 18: 139–148.

## 20 General References

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## 21 Author

RT Guest.

## 22 Date of Revision

11 February 2009.

# Cellulose, Microcrystalline

## 1 Nonproprietary Names

BP: Microcrystalline Cellulose

JP: Microcrystalline Cellulose

PhEur: Cellulose, Microcrystalline

USP-NF: Microcrystalline Cellulose

## 2 Synonyms

*Avicel PH; Cellets; Cellex; cellulose gel; hellulosum microcrystallinum; Celphere; Ceolus KG; crystalline cellulose; E460; Emcocel; Ethispheres; Fibrocel; MCC Sanaq; Pharmacel; Tabulose; Vivapur.*

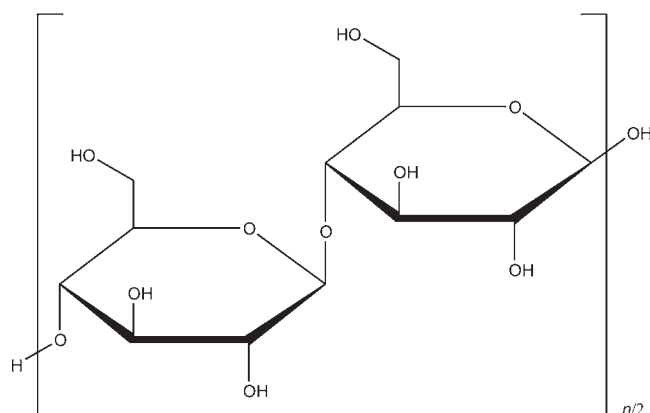
## 3 Chemical Name and CAS Registry Number

Cellulose [9004-34-6]

## 4 Empirical Formula and Molecular Weight

(C<sub>6</sub>H<sub>10</sub>O<sub>5</sub>)<sub>n</sub> ~36,000

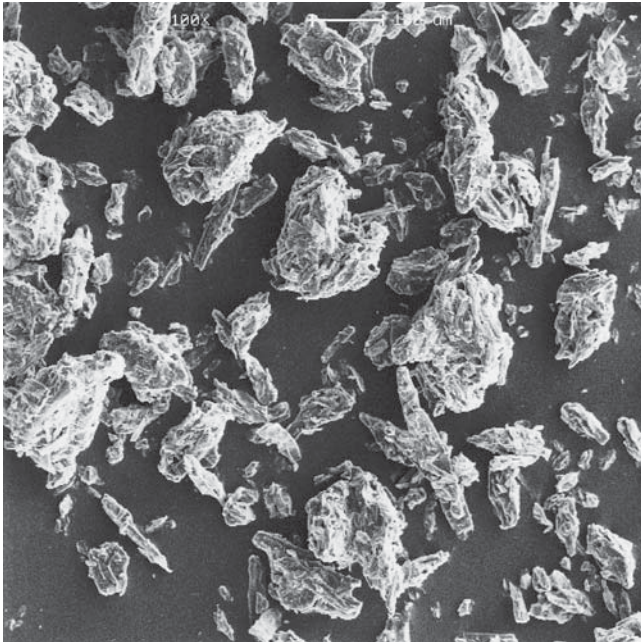
## 5 Structural Formula



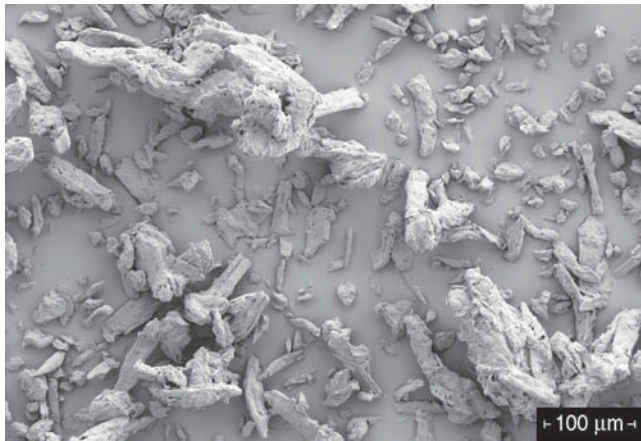
## 6 Functional Category

Adsorbent; suspending agent; tablet and capsule diluent; tablet

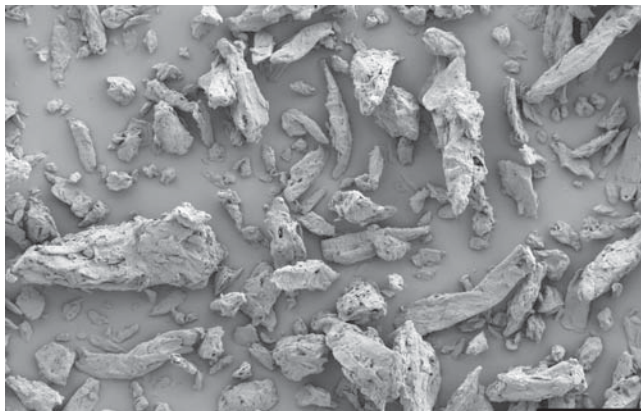
**SEM 1:** Excipient: microcrystalline cellulose; manufacturer: JRS Pharma LP; lot no.: 98662; magnification: 100×.



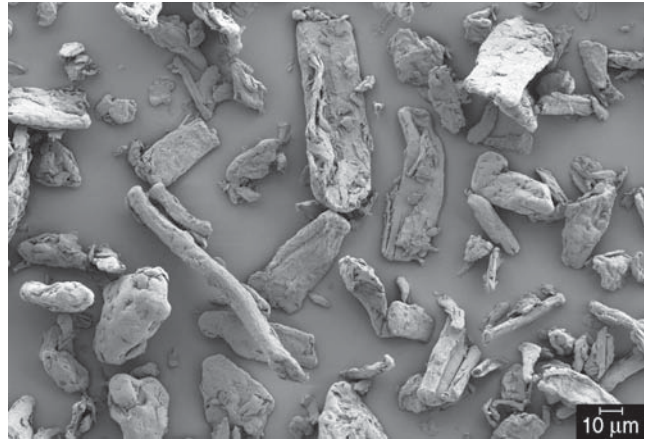
**SEM 2:** Excipient: microcrystalline cellulose (*Avicel PH-101*); manufacturer: FMC Biopolymer. magnification: 200×; voltage: 3 kV.



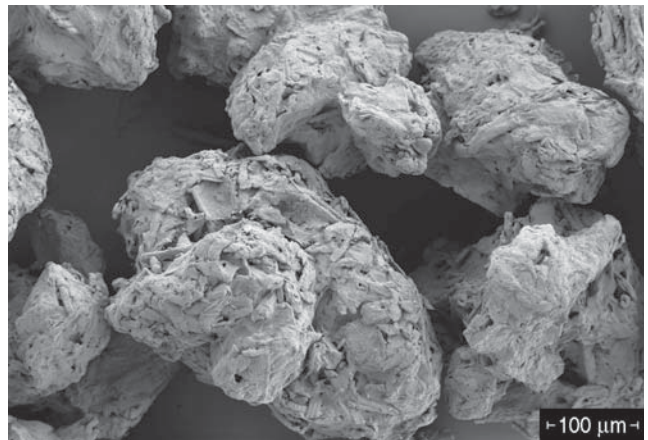
**SEM 3:** Excipient: microcrystalline cellulose (*Avicel PH-102*); manufacturer: FMC Biopolymer. magnification: 200×; voltage: 3 kV.



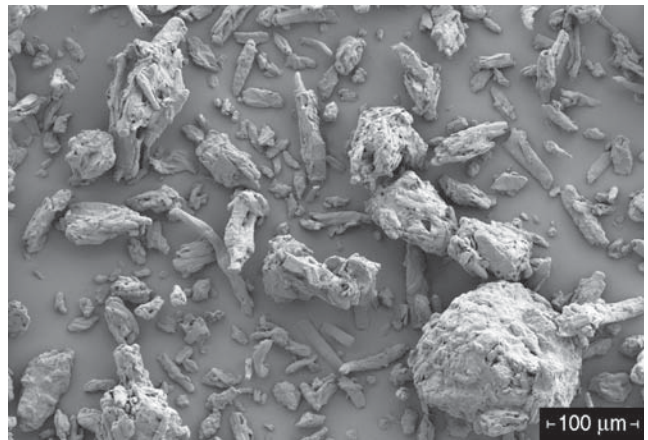
**SEM 4:** Excipient: microcrystalline cellulose (*Avicel PH-105*); manufacturer: FMC Biopolymer. magnification: 500×; voltage: 3 kV.



**SEM 5:** Excipient: microcrystalline cellulose (*Avicel PH-200*); manufacturer: FMC Biopolymer. magnification: 200×; voltage: 3 kV.



**SEM 6:** Excipient: microcrystalline cellulose (*Avicel PH-302*); manufacturer: FMC Biopolymer. magnification: 200×; voltage: 3 kV.



## 7 Applications in Pharmaceutical Formulation or Technology

Microcrystalline cellulose is widely used in pharmaceuticals, primarily as a binder/diluent in oral tablet and capsule formulations where it is used in both wet-granulation and direct-compression processes.<sup>(1-7)</sup> In addition to its use as a binder/diluent, microcrystalline cellulose also has some lubricant<sup>(8)</sup> and disintegrant

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