
Handbook of PHARMACEUTICAL EXCIPIENTS

Second Edition

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Dextrose

1. Nonproprietary Names

BP: Glucose
PhEur: Dextrosum (glucosum) monohydricum
USP: Dextrose

2. Synonyms

Blood sugar; *Caridex*; corn sugar; D-(+)-glucopyranose monohydrate; grape sugar; starch sugar; *Tabfine D-100*.

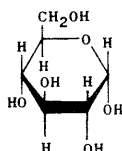
3. Chemical Name and CAS Registry Number

D-(+)-Glucose monohydrate [5996-10-1]
See also Section 18.

4. Empirical Formula Molecular Weight

$C_6H_{12}O_6 \cdot H_2O$ 198.17 (for monohydrate)
See also Section 18.

5. Structural Formula



Anhydrous material shown.

6. Functional Category

Tablet and capsule diluent; therapeutic agent; tonicity agent; sweetening agent.

7. Applications in Pharmaceutical Formulation or Technology

Dextrose is widely used in solutions to adjust tonicity and as a sweetening agent. Dextrose is also used as a direct compression tablet diluent and binder, primarily in chewable tablets. Although comparable as a tablet diluent to lactose, tablets produced with dextrose monohydrate require more lubrication, are less friable and have a tendency to harden.⁽¹⁻³⁾ The mildly reducing properties of dextrose may be used when tableting to improve the stability of active materials which are sensitive to oxidation.

Dextrose is also used therapeutically and is the preferred source of carbohydrate in parenteral nutrition regimens.

8. Description

Dextrose occurs as odorless, sweet-tasting, colorless crystals or as a white crystalline or granular powder.

9. Pharmacopeial Specifications

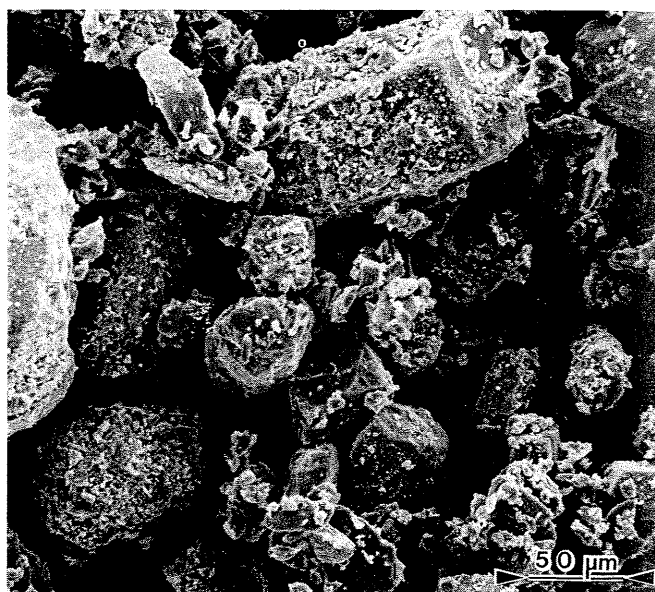
Test	PhEur 1983	USP XXII
Identification	+	+
Color of solution	+	+
Specific rotation	+ 52.5° to + 53.3°	+ 52.5° to + 53.5°
Acidity	+	+
Water (for monohydrate)	7.5-9.5%	7.5-9.5%

Continued

Test	PhEur 1983	USP XXII
Residue on ignition	≤ 0.1%	≤ 0.1%
Chloride	≤ 125 ppm	≤ 0.018%
Sulfate	≤ 200 ppm	≤ 0.025%
Arsenic	≤ 1 ppm	≤ 1 ppm
Barium	≤ 1 ppm	—
Calcium	≤ 200 ppm	—
Heavy metals	—	≤ 5 ppm
Lead	≤ 0.5 ppm	—
Dextrin	+	+
Soluble starch, and sulfites	+	+

SEM: 1.

Excipient: Dextrose anhydrous (granular)
Manufacturer: Mallinckrodt Speciality Chemicals Co
Lot No.: KLKZ
Magnification: 180x



10. Typical Properties

Data for dextrose monohydrate shown, *see* Section 18 and HPE Data for dextrose anhydrous data.

Acidity/alkalinity:

pH = 3.5-5.5 (20% w/v aqueous solution)

Compressibility: *see* HPE Data.

Density: 1.54 g/cm³

Flowability: *see* HPE Data.

Heat of solution: 105.4 J/g (25.2 cal/g)

Hygroscopicity: anhydrous dextrose absorbs significant amounts of moisture at 25°C and a relative humidity of about 85% to form the monohydrate. The monohydrate similarly only absorbs moisture at around 85% relative humidity and 25°C. *See* HPE Data.

Melting point: 83°C

Osmolarity: a 5.51% w/v aqueous solution is iso-osmotic with serum. However, it is not isotonic since dextrose can pass through the membrane of red cells and cause hemolysis.