

# Triacetin

## 1 Nonproprietary Names

BP: Triacetin  
PhEur: Glycerolum tricacetas  
USP: Triacetin

## 2 Synonyms

*Captex 500*; E1518; glycerol triacetate; glyceryl triacetate; triacetyl glycerine.

## 3 Chemical Name and CAS Registry Number

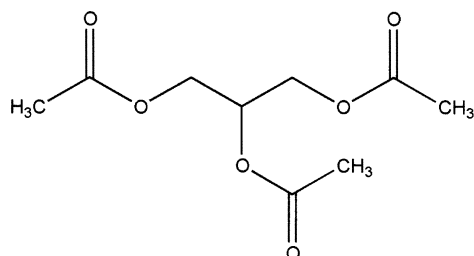
1,2,3-Propanetriol triacetate [102-76-1]

## 4 Empirical Formula Molecular Weight

C<sub>9</sub>H<sub>14</sub>O<sub>6</sub>

218.21

## 5 Structural Formula



## 6 Functional Category

Humectant; plasticizer; solvent.

## 7 Applications in Pharmaceutical Formulation or Technology

Triacetin is mainly used as a hydrophilic plasticizer in both aqueous and solvent-based polymeric coating of capsules, tablets, beads, and granules; typical concentrations used are 10–35% w/w.<sup>(1,2)</sup>

Triacetin is used in cosmetics, perfumery, and foods as a solvent and as a fixative in the formulation of perfumes and flavors.

## 8 Description

Triacetin is a colorless, viscous liquid with a slightly fatty odor.

## 9 Pharmacopeial Specifications

See Table I.

Table I: Pharmacopeial specifications for triacetin.

Test	PhEur 2002	USP 25
Appearance	+	—
Characters	+	—
Identification	+	+
Specific gravity	1.159–1.164	1.152–1.158
Refractive index	1.429–1.432	1.429–1.430
Acidity	+	+
Water	≤0.2%	≤0.2%
Assay (anhydrous basis)	97.0–100.5%	97.0–100.5%

## 10 Typical Properties

Autoignition temperature: 432 °C

Boiling point: 258 °C

Density: 1.16 g/cm<sup>3</sup> at 25 °C

Explosive limits:

1.05% at 189 °C lower limit

7.73% at 215 °C upper limit

Flash point: 153 °C (open cup)

Freezing point: 3.2 °C (supercools to about –70 °C)

Melting point: –78 °C

Refractive index:  $n_D^{25}$  = 1.4296

Solubility: see Table II.

Table II: Solubility of triacetin.

Solvent	Solubility at 20 °C
Carbon disulfide	Miscible
Chloroform	Miscible
Ethanol	Miscible
Ethanol (95%)	Miscible
Ether	Miscible
Toluene	Miscible
Water	1 in 14

Vapor density (relative): 7.52 (air = 1)

Vapor pressure: 133 Pa (1 mmHg) at 100 °C

Viscosity (dynamic):

1111 mPa s (1111 cP) at –17.8 °C

107 mPa s (107 cP) at 0 °C

17.4 mPa s (17.4 cP) at 25 °C

1.8 mPa s (1.8 cP) at 100 °C

## 11 Stability and Storage Conditions

Triacetin is stable and should be stored in a well-closed, nonmetallic container, in a cool, dry place.

## 12 Incompatibilities

Triacetin is incompatible with metals and may react with oxidizing agents. Triacetin may destroy rayon fabric.

**13 Method of Manufacture**

Triacetin is prepared by the esterification of glycerin with acetic anhydride.

**14 Safety**

Triacetin is used in oral pharmaceutical formulations and is generally regarded as a relatively nontoxic and nonirritant material at the levels employed as an excipient.

LD<sub>50</sub> (dog, IV): 1.5 g/kg<sup>(3)</sup>  
 LD<sub>50</sub> (mouse, IP): 1.4 g/kg  
 LD<sub>50</sub> (mouse, IV): 1.6 g/kg  
 LD<sub>50</sub> (mouse, oral): 1.1 g/kg  
 LD<sub>50</sub> (mouse, SC): 2.3 g/kg  
 LD<sub>50</sub> (rabbit, IV): 0.75 g/kg  
 LD<sub>50</sub> (rat, IP): 2.1 g/kg  
 LD<sub>50</sub> (rat, oral): 3 g/kg  
 LD<sub>50</sub> (rat, SC): 2.8 g/kg

**15 Handling Precautions**

Observe normal precautions appropriate to the circumstances and quantity of material handled. Triacetin may be irritant to the eyes; eye protection and gloves are recommended.

**16 Regulatory Status**

GRAS listed. Accepted in Europe as a food additive in certain applications. Included in the FDA Inactive Ingredients Guide (oral capsules and tablets and gels). Included in nonparenteral medicines licensed in the UK.

**17 Related Substances**

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**18 Comments**

The EINECS number for triacetin is 203-051-9.

**19 Specific References**

- 1 Shah PS, Zatz JL. Plasticization of cellulose esters used in the coating of sustained release solid dosage forms. *Drug Dev Ind Pharm* 1992; 18: 1759–1772.
- 2 Williams RO, Wheatley TA, Liu J. Influence of plasticization and curing conditions on the mechanical properties of aqueous based cellulose acetate films. *STP Pharma Sci* 1999; 9(6): 545–553.
- 3 Lewis RJ, ed. *Sax's Dangerous Properties of Industrial Materials*, 10th edn. New York: Wiley, 2000: 3503.

**20 General References**

- Gutierrez-Rocca JC, McGinity JW. Influence of aging on the physical-mechanical properties of acrylic resin films cast from aqueous dispersions and organic solutions. *Drug Dev Ind Pharm* 1993; 19: 315–332.
- Johnson K, Hathaway R, Leung P, Franz R. Effect of triacetin and polyethylene glycol 400 on some physical properties of hydroxypropyl methylcellulose free films. *Int J Pharm* 1991; 73: 197–208.
- Lehmann KOR. Chemistry and application properties of polymethacrylate coating systems. In: McGinity JW, ed. *Aqueous Polymeric Coatings for Pharmaceutical Dosage Forms*. New York: Marcel Dekker, 1989: 224.
- Lin S-Y, Lee C-J, Lin Y-Y. The effect of plasticizers on compatibility, mechanical properties, and adhesion strength of drug-free Eudragit E films. *Pharm Res* 1991; 8: 1137–1143.
- Rowe RC. Materials used in the film coating of oral dosage forms. In: Florence AT, ed. *Critical Reports on Applied Chemistry*, vol. 6. Oxford: Blackwell Scientific, 1984: 1–36.

**21 Author**

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**22 Date of Revision**

19 June 2002.