

1 Nonproprietary Names

BP: Virgin Castor Oil

JP: Castor Oil

PhEur: Castor Oil, Virgin

USP–NF: Castor Oil

2 Synonyms

Crystal; *EmCon CO*; *Lipovol CO*; oleum ricini; ricini oleum virginale; ricinoleum; ricinus communis; ricinus oil; tangantangan.

3 Chemical Name and CAS Registry Number

Castor oil [8001-79-4]

4 Empirical Formula and Molecular Weight

Castor oil is a triglyceride of fatty acids. The fatty acid composition is approximately ricinoleic acid (87%); oleic acid (7%); linoleic acid (3%); palmitic acid (2%); stearic acid (1%) and trace amounts of dihydroxystearic acid.

5 Structural Formula

See Section 4.

6 Functional Category

Emollient; oleaginous vehicle; solvent.

7 Applications in Pharmaceutical Formulation or Technology

Castor oil is widely used in cosmetics, food products, and pharmaceutical formulations. In pharmaceutical formulations, castor oil is most commonly used in topical creams and ointments at concentrations of 5–12.5%. However, it is also used in oral tablet and capsule formulations, ophthalmic emulsions, and as a solvent in intramuscular injections.^(1–3)

See also Section 18.

8 Description

Castor oil is a clear, almost colorless or pale yellow-colored viscous oil. It has a slight odor and a taste that is initially bland but afterwards slightly acrid.

9 Pharmacopeial Specifications

See Table I.

10 Typical Properties

Autoignition temperature 449°C

Boiling point 313°C

Density 0.955–0.968 g/cm³ at 25°C

Flash point 229°C

Melting point –12°C

Moisture content ≤0.25%

Refractive index

$n_D^{25} = 1.473–1.477$;

$n_D^{40} = 1.466–1.473$.

Solubility Miscible with chloroform, diethyl ether, ethanol, glacial acetic acid, and methanol; freely soluble in ethanol (95%) and petroleum ether; practically insoluble in water; practically insoluble in mineral oil unless mixed with another vegetable oil.

See also Section 11.

Table I: Pharmacopeial specifications for castor oil.

Test	JP XVII	PhEur 9.2	USP 40–NF 35 S1
Identification	+	+	–
Characters	+	+	–
Specific gravity	0.953–0.965	≈0.958	0.957–0.961
Heavy metals	–	–	≤10 ppm
Iodine value	80–90	–	83–88
Saponification value	176–187	–	176–182
Hydroxyl value	155–177	≥160	160–168
Acid value	≤1.5	≤1.5	–
Peroxide value	–	≤10.0	–
Refractive index	–	≈1.479	–
Optical rotation	–	+3.5° to +6.0°	–
Water	–	≤0.3%	–
Absorbance	+	≤0.7	–
Composition of fatty acids	–	+	–
Purity	+	–	–
Distinction from most other fixed oils	–	–	+
Free fatty acids	–	–	+
Unsaponifiable matter	–	≤0.8%	–

Spectroscopy

IR spectrum *see* Figure 1.

Raman spectrum *see* Figure 2.

Surface tension

39.0 mN/m at 20°C;

35.2 mN/m at 80°C.

Viscosity (dynamic)

1000 mPa s (1000 cP) at 20°C;

200 mPa s (200 cP) at 40°C.

11 Stability and Storage Conditions

Castor oil is stable and does not turn rancid unless subjected to excessive heat. On heating at 300°C for several hours, castor oil polymerizes and becomes soluble in mineral oil. When cooled to 0°C, it becomes more viscous.

Castor oil should be stored at a temperature not exceeding 25°C in well-filled airtight containers protected from light.

12 Incompatibilities

Castor oil is incompatible with strong oxidizing agents.

13 Method of Manufacture

Castor oil is the fixed oil obtained by cold-expression of the seeds of *Ricinus communis* Linné (Fam. Euphorbiaceae). No other substances are added to the oil.

14 Safety

Castor oil is used in cosmetics and foods and orally, parenterally, and topically in pharmaceutical formulations. It is generally regarded as a relatively nontoxic and nonirritant material when used as an excipient.⁽⁴⁾

Castor oil has been used therapeutically as a laxative and oral administration of large quantities may cause nausea, vomiting,