

proline emits toxic nitrogen oxides.⁽⁶⁾ Wear suitable protective clothing to avoid inhalation of dust and contact with eyes. Keep away from heat and sources of ignition. Evaporate residue from empty containers under a fume hood as they may otherwise pose a fire risk.

16 Regulatory Status

Included in the FDA Inactive Ingredients Database (infusions/injections) and the Canadian Natural Health Products Ingredients Database. Also included in parenteral products licensed in the UK.

17 Related Substances

Glycine; DL-Proline.

DL-Proline

CAS number [609-36-9]

Melting point 190°C when anhydrous, decomposes at 205°C.

Solubility Soluble in water and ethanol; sparingly soluble in acetone, chloroform and benzene; insoluble in ether.

Comments The EINECS number for DL-proline is 210-189-3. The PubChem Compound ID (CID) for DL-proline is 614.

18 Comments

Proline is also used in the cosmetics industry in hair and skin conditioning products.⁽⁷⁾

A specification for proline is included in the *Food Chemicals Codex* (FCC).⁽⁸⁾

The EINECS number for proline is 205-702-2. The PubChem Compound ID (CID) for proline is 145742.

19 Specific References

- 1 Bolli R, *et al.* L-Proline reduces IgG dimer content and enhances the stability of intravenous immunoglobulin (IVIg) solutions. *Biologicals* 2010; 38: 150–157.

- 2 Sun A, *et al.* IgG stabilization in glycine or L-proline formulated immunoglobulin intravenous 10% (IGIV) solutions: 24-month data to support equally effective stabilization. Presented at: *Clinical Immunology Society Annual Meeting: Primary Immune Deficiency North America Conference*. Chicago, IL, USA, 18 May 2012.
- 3 Berger M. L-Proline-stabilized human IgG: Privigen[®] 10% for intravenous use and Hizentra[®] 20% for subcutaneous use. *Immunotherapy* 2011; 3(2): 162–176.
- 4 Dantal J. Intravenous Immunoglobulins: In-depth review of excipients and acute kidney injury risk. *Am J Nephrol* 2013; 38: 275–284.
- 5 Xing W, Na R. Amino acids excess increase SCEs in human lymphocytes. *Mut Res* 1996; 372: 75–78.
- 6 Lewis RJ, ed. *Sax's Dangerous Properties of Industrial Materials*, 12th edn. New York: Wiley, 2013. <http://onlinelibrary.wiley.com/book/10.1002/0471701343> (accessed 27 September 2013).
- 7 European Commission. *CosIng Cosmetic Ingredients and Substances*. <http://ec.europa.eu/enterprise/cosmetics/cosing> (accessed 27 September 2013).
- 8 *Food Chemicals Codex*. [online] Bethesda, MD: United States Pharmacopeia. <http://publications.usp.org> (accessed 31 March 2017).

20 General References

- Science Lab. Material Safety Data Sheet: *L-Proline*. May 2013.
- O'Neil MJ *et al.* eds. *The Merck Index: An Encyclopedia of Chemicals, Drugs, and Biologicals*, 15th edn. Whitehouse Station, NJ: Merck, 2012.
- Hazardous Substances Data Bank*. US National Library of Medicine (2013). <http://toxnet.nlm.nih.gov> (accessed 25 September 2013).

21 Author

ES Foan.

22 Date of Revision

4 May 2017.

P

Propionic Acid

1 Nonproprietary Names

USP–NF: Propionic Acid

2 Synonyms

Carboxyethane; ethanecarboxylic acid; E280; ethylformic acid; metacetic acid; methylacetic acid; propanoic acid; pseudoacetic acid.

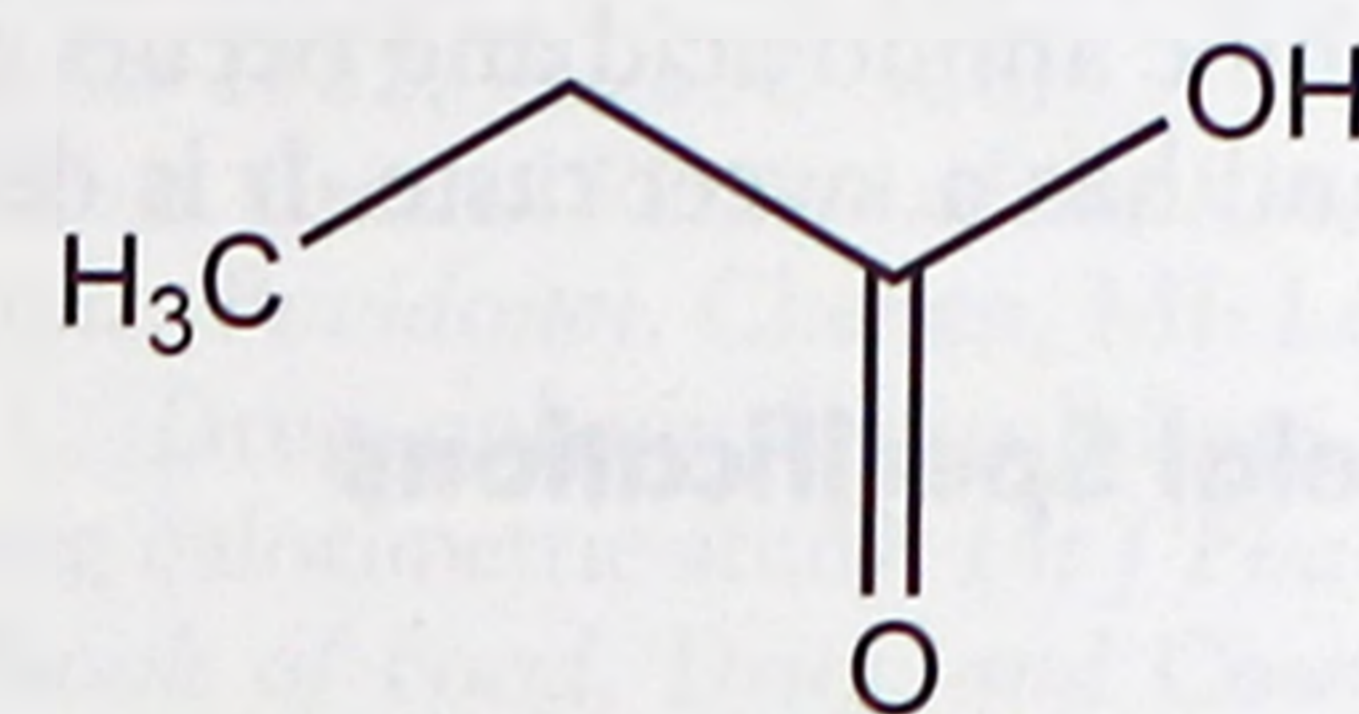
3 Chemical Name and CAS Registry Number

Propionic acid [79-09-4]

4 Empirical Formula and Molecular Weight

C₃H₆O₂ 74.08

5 Structural Formula



6 Functional Category

Acidulant; antimicrobial preservative; antioxidant.

7 Applications in Pharmaceutical Formulation or Technology

Propionic acid is primarily used as an antioxidant and antimicrobial preservative in oral and topical pharmaceutical applications.

8 Description

Propionic acid occurs as a corrosive, oily liquid having a slightly pungent, disagreeable, rancid odor. It is flammable.