

Glycerol

CAS: 56-81-5

MF: C₃H₈O₃

MW: 92.1

Major uses

Glycerol (synonym: glycerin) may be produced from various fats and oils and has a wide range of uses. It is one of the main ingredients in the production of nitroglycerin (dynamite). Glycerin is widely used in cosmetics, especially for production of soaps and lotions. Additionally, it is used as a solvent and emulsifier and may be found in inks, adhesives, pharmaceuticals (e.g. in laxatives; in eye drops), and binders. It is also used in the manufacture of plastics and resins [1].

Glycerin is often used as a negative control or vehicle for other substances in toxicological studies.

Human toxicity

Glycerin is slightly toxic chemical; it is not toxic after ingestion, except with very large doses.

Acute clinical effects: at high oral doses glycerin may cause acute renal failure, brain and lung edema, headache, dizziness, nausea, vomiting, diarrhea and confusion [2].

Glycerin may cause eye irritation if it comes in direct contact with the eye.

Normal oral dose is about 1-1.5 g/kg body weight. Oral ingestion of 50 g glycerin is not damaging for adults [1]. The toxic dose was estimated to be 87 g (range 70-105 g) [3].

Case of acute poisoning [4]

68-year old woman ingested 500 ml 80-90% solution of glycerin. Symptoms, 1 h after ingestion: hemoglobinuria (blood in urine). Day 9 – hemodialysis was applied. The patient died 10 days after ingestion. Histological analysis demonstrated necrosis of the kidney. Massive lung edema was also observed. No blood concentration data available.

Kinetic data

Absorption: glycerin is rapidly absorbed after oral ingestion [3].

There is a lack of other kinetic data.

Metabolism and excretion

Glycerol is sugar alcohol, and it is an important component of several lipids and lipoproteins. For example, it is a component of phosphoglycerides (glycerol-3-phosphates), which are the major components of cell membranes and of transport lipoproteins. Glycerol is also a component of acylglycerols (glicerides), also called for “neutral fats”.

The role of glycerol in metabolism of glucose, fatty acids, lipids, as well as in the Krebs tricarboxylic acid cycle is explained elsewhere [5].

Excretion: glycerol may be partly excreted unchanged to urine [3].

Toxicological mechanism

Toxicity of glycerin at the large doses may be due its strong osmotic effect, which can have damaging effect on kidney and other organs [3, 4]. .

Target organs: kidney (histopathological lesions) [4].

References

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4. Ranner, G., Dirnhofner, R., Maurer, H. (1986) Zur Toxikologie des Glycerins Ein Fallbericht. Beiträge Gerichtl Medizin XLIV:557-562.
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