

Uses and Administration

Phosgene is used in the chemical industry. It has been used as a war gas.

References

- Borak J, Diller WF. Phosgene exposure: mechanisms of injury and treatment strategies. *J Occup Environ Med* 2001; **43**: 110–9.

Phosphatidyl Choline

Fosfatidilcolina; Phosphatidylcholine.

Profile

Phosphatidyl choline is a phospholipid and a constituent of lecithin (p.2332). Phosphatidyl choline is an ingredient of preparations that have been promoted for liver disorders, peripheral vascular disorders, hyperlipidaemias, and fat emboli. Some injection preparations of phosphatidyl choline have been promoted for use in cosmetic surgery to remove subcutaneous fat deposits, but this use is not licensed in the UK.

Ulcerative colitis. Phosphatidyl choline is a component of mucus and plays a key role in mucosal defence. Since a disturbed mucosal barrier is believed to be a factor in the pathogenesis of ulcerative colitis, exogenous phosphatidyl choline has been investigated to improve the protective effects of colonic mucus. Controlled-release oral phosphatidyl choline was beneficial compared with placebo in patients with ulcerative colitis in 2 small short-term studies.^{1,2}

- Stremmel W, et al. Retarded release phosphatidylcholine benefits patients with chronic active ulcerative colitis. *Gut* 2005; **54**: 966–71.
- Stremmel W, et al. Phosphatidylcholine for steroid-refractory chronic ulcerative colitis: a randomized trial. *Ann Intern Med* 2007; **147**: 603–10.

Preparations

Proprietary Preparations (details are given in Part 3)

Ital.: Essentiale†; Lipostabil†; **Singapore:** Hepakur; **USA:** PhosChol.

Multi-ingredient: **Arg.:** Ix Gel Reductor; **Austral.:** Tyroseng†; **Ger.:** Repithel; **India:** Livage; **Indon.:** Liposerin; **Ital.:** Essaven; Zeroac; **Singapore:** Memoloba†.

Phosphatidyl Serine

Fosfatidilserina; Phosphatidylserine.

Profile

Phosphatidyl serine is a phospholipid that has been tried in the treatment of organic psychiatric syndromes and investigated as a cognition adjuvant. Phosphatidyl serine is a constituent of lecithin (p.2332).

Phosphoserine, which lacks the lipid and glycerol groups of phosphatidyl serine, has been used similarly; both (+)-L-phosphoserine (dexfosfosferine) and the racemic form (DL-phosphoserine) have been used. Phosphoserine has sometimes been used as a synonym for phosphatidyl serine.

References

- Pepping J. Phosphatidylserine. *Am J Health-Syst Pharm* 1999; **56**: 2038, 2043–4.

Preparations

Proprietary Preparations (details are given in Part 3)

Braz.: Bros; **UK:** Cognito.

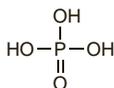
Multi-ingredient: **Ger.:** Vitasprint B †; **India:** Livage; **Indon.:** Liposerin; **Ital.:** Acutil Fosforo; Briogen†; Fosfo Plus; Glutamin Fosforo; Memovisus†; Memovit B12; NeoBros; NeoBros 10; NeoBros C; Vitasprint Complex†; Vitasprint†; **Spain:** Agudil; Nucleserina; **Switz.:** Vitasprint Complex.

Phosphoric Acid

Acide phosphorique; Acido Fosfórico; Acidum phosphoricum; Concentrated Phosphoric Acid; E338; Fosfato rūgštis; Fosfórico, ácido; Fosforihappo; Fosforsyra; Fosforsav; Kwas fosforowy; Kyselina fosforečná; Orthophosphoric Acid; Phosph. Acid; Phosphorsäure.

H₃PO₄ = 98.00.

CAS — 7664-38-2.



Pharmacopoeias. *Eur.* (see p.vii) includes various concentrations. Also in *USNF*.

Ph. Eur. 6.2 (Phosphoric Acid, Concentrated; Phosphoric Acid BP 2008). It contains 84 to 90% w/w of H₃PO₄. A clear, colourless, corrosive, syrupy liquid. When stored at a low temperature it may solidify, forming a mass of colourless crystals which do not melt until the temperature reaches 28°. Miscible with water and with alcohol. Store in glass containers.

Ph. Eur. 6.2 (Phosphoric Acid, Dilute). It contains 9.5 to 10.5% w/w H₃PO₄ and is prepared by mixing phosphoric acid 115 g with water 885 g.

USNF 26 (Phosphoric Acid). It contains 85 to 88% w/w of

H₃PO₄. A colourless, odourless liquid of syrupy consistency. Miscible with water and with alcohol. Store in airtight containers.

USNF 26 (Diluted Phosphoric Acid). It contains 9.5 to 10.5% w/v H₃PO₄ and may be prepared by mixing phosphoric acid 69 mL with purified water to 1000 mL. A clear, colourless, odourless liquid. Store in airtight containers.

Adverse Effects and Treatment

As for Hydrochloric Acid, p.2322.

Toxicity from mixing cleaning agents. For reference to the adverse effects of mixing phosphoric acid-based and hypochlorite-based cleaning agents see Sodium Hypochlorite, p.1661.

Uses and Administration

Phosphoric acid has industrial uses. Dilute phosphoric acid has been used well diluted in preparations intended for the management of nausea and vomiting (p.1700); it has also been included in preparations for vaginal infections. Phosphoric acid is used in dentistry to etch tooth enamel.

Homoeopathy. Phosphoric acid has been used in homoeopathic medicines under the following names: Acidum phosphoricum; Phosphoricum acidum; Ac. phos.

Preparations

USP 31: Sodium Fluoride and Phosphoric Acid Gel.

Proprietary Preparations (details are given in Part 3)

Fr.: Phosforme†.

Multi-ingredient: **Arg.:** Plus & White†; **Austral.:** Emetrol†; **Braz.:** Paratonic; **Chile:** Homeofortin III†; **Fr.:** Actiphos†; Biotone†; Ionyl; Marinol; Phosphoneuros; **Gr.:** Enter-Out; Kathargon; Mineralin; Phospho-Laxat; Phosphoclean; Trifalac; **Israel:** Peptical; **S.Afr.:** Emetrol; Emex; **Spain:** Oximer; **Thai.:** Quinradon-N; **USA:** Emetrol; Formula EM; Nausetrol.

Phosphorus

Fósforo; Fósforo amarillo; Fósforo blanco; Phosphor; Phosphore; White Phosphorus; Yellow Phosphorus.

P = 30.973762.

CAS — 7723-14-0.

Handling. Phosphorus has been used for the illicit preparation of explosives or fireworks; care is required with its supply.

Stability and storage. Phosphorus is unstable in air and should be stored under water.

Adverse Effects

Acute poisoning by yellow (white) phosphorus, a general protoplasmic poison, occurs in three distinct stages. The first stage represents local gastrointestinal irritation with intense thirst, pain, nausea, vomiting, and diarrhoea. The vomitus and stool may smell of garlic and are luminescent. Shock, delirium, convulsions, coma, and death may occur. In patients who survive, a second, asymptomatic stage may be present lasting for up to several days or even weeks. The third stage represents systemic toxicity characterised by hepatic and renal damage, cardiovascular collapse, and CNS involvement including confusion, convulsions, and coma. Death may occur during either the first or third stages.

The fatal dose is about 1 mg/kg.

Symptoms of chronic poisoning are associated with defective tissue repair, including necrosis of the mandible ('phossy jaw').

Externally, phosphorus causes severe burns to the skin. Phosphorus is absorbed after skin contamination and systemic symptoms may occur.

Treatment of Adverse Effects

Gastric lavage may be considered after ingestion of elemental yellow (white) phosphorus, although the risks versus potential benefits must be considered in order to prevent spontaneous combustion. Activated charcoal may be used, although there is no clear evidence of benefit. Induction of emesis is contra-indicated. Potassium permanganate solution 1 in 5000 has been instilled into the stomach in an attempt to convert elemental phosphorus to an oxide, but there is no sound clinical reason to recommend this.

Further treatment is symptomatic and supportive and may include fluid and electrolyte replacement, and management of convulsions and renal and hepatic dysfunctions.

Contaminated areas on skin should be immersed in water or irrigated with copious amounts of warm water. Solutions containing copper sulfate have also been suggested for dermal irrigation to convert elemental phosphorus to copper phosphate, although concerns have been raised due to its potential to cause lethal haemolysis through inhibition of G6PD. Eyes contaminated with phosphorus should be irrigated with copious amounts of tepid water for at least 15 minutes. Exposed areas should be covered with wet dressings or compresses to prevent spontaneous combustion. It is essential that all particles of unoxidised phosphorus are removed from the skin. Lipid or oil-based topical preparations may increase the absorption of phosphorus through the skin and should not be used.

Uses and Administration

Elemental phosphorus is no longer used in medicine. Inorganic phosphates are given in deficiency states and bone diseases (see Uses and Administration of Sodium Phosphate, p.1683). Phos-

phorus has been used in the manufacture of rat and cockroach poisons.

Homoeopathy. Phosphorus has been used in homoeopathic medicines.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Arg.:** Signaflex; **Singapore:** Lacto Calcium†.

Physalis

Alkékenge; Alkekengi; Alquequenje; Amour en cage; Bladder Cherry; Blasenkirscbe; Chinese Lantern; Coqueret; Ground Cherry; Judenkirscbe; Lamplionblume; Strawberry Tomato; Winter Cherry.

Pharmacopoeias. In *Chin.*

Profile

The berries of *Physalis alkekengi* (Solanaceae) are reputed to have diuretic properties.

Cape gooseberry is the edible fruit of *P. peruviana*.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: **Indon.:** Hyric.

Picibanil

OK-432.

ПИЦИБАНИЛ

CAS — 39325-01-4.

Profile

Picibanil is a lyophilised preparation of a low-virulence strain of *Streptococcus pyogenes* inactivated by heating with benzylpenicillin; it is reported to act as an immunomodulator. It has been given by injection in the treatment of malignant neoplasms.

References

- Luzzatto C, et al. Sclerosing treatment of lymphangiomas with OK-432. *Arch Dis Child* 2000; **82**: 316–18.
- Sakamoto J, et al. Meta-analysis of adjuvant immunotherapy using OK-432 in patients with resected non-small-cell lung cancer. *J Immunother* 2001; **24**: 250–6.
- Laranne J, et al. OK-432 (Picibanil) therapy for lymphangiomas in children. *Eur Arch Otorhinolaryngol* 2002; **259**: 274–8.
- Sakamoto J, et al. Efficacy of adjuvant immunotherapy with OK-432 for patients with curatively resected gastric cancer: a meta-analysis of centrally randomized controlled clinical trials. *J Immunother* 2002; **25**: 405–12.
- Giguere CM, et al. Treatment of lymphangiomas with OK-432 (Picibanil) sclerotherapy: a prospective multi-institutional trial. *Arch Otolaryngol Head Neck Surg* 2002; **128**: 1137–44.
- Watanabe M, et al. Randomized controlled trial of the efficacy of adjuvant immunotherapy and adjuvant chemotherapy for colorectal cancer, using different combinations of the intracutaneous streptococcal preparation OK-432 and the oral pyrimidines 1-hexylcarbamoyl-5-fluorouracil and uracil/tegafur. *Int J Clin Oncol* 2004; **9**: 98–106.
- Sato Y, et al. A randomized controlled study of immunotherapy with OK-432 after curative surgery for gastric cancer. *J Immunother* 2004; 394–7.
- Taniguchi T, et al. Clinical results of OK-432 injection therapy for ganglions. *J Dermatol* 2005; **32**: 262–5.
- Kasahara K, et al. Randomized phase II trial of OK-432 in patients with malignant pleural effusion due to non-small cell lung cancer. *Anticancer Res* 2006; **26**: 1495–9.
- Knipping S, et al. Sclerotherapy of cervical cysts with Picibanil (OK-432). *Eur Arch Otorhinolaryngol* 2007; **264**: 423–7.
- Nygaard U, et al. New treatment of early fetal chylothorax. *Obstet Gynecol* 2007; **109**: 1088–92.

Preparations

Proprietary Preparations (details are given in Part 3)

Jpn: Picibanil.

Pidotimod (†INN)

Pidotimodum. (R)-3-[(S)-5-Oxopropyl]-4-thiazolidinecarboxylic acid.

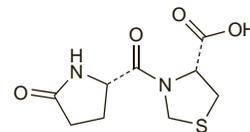
ПИДОТИМОД

C₉H₁₂N₂O₄S = 244.3.

CAS — 121808-62-6.

ATC — L03AX05.

ATC Vet — QL03AX05.



Profile

Pidotimod is an immunostimulant used in patients with cell-mediated immunodepression during respiratory- and urinary-tract infections. It is given orally in usual doses of 800 mg twice daily.

The symbol † denotes a preparation no longer actively marketed