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Pulmonary hypertension of the newborn. Preliminary studies have suggested that intravenous magnesium sulfate may be effective in treating persistent pulmonary hypertension of the newborn, as mentioned on p.1179.

Respiratory disorders. Magnesium sulfate, given intravenously over 20 minutes in doses of 1.2 g to patients with acute exacerbations of chronic obstructive pulmonary disease (p.1112) who had received inhaled salbutamol, appeared to have moderate efficacy.¹

Infusion of magnesium has been reported to be of benefit in some patients with acute asthma (p.1108), but results have been conflicting.^{2–5} meta-analyses of these and other studies concluded that its routine use was not justified, but that it may benefit some patients with severe exacerbations.^{6,7} A meta-analysis of 5 studies in children concluded that intravenous magnesium sulfate is likely to be an effective adjunct to standard therapy in the symptomatic treatment of moderate to severe acute childhood asthma.⁸ Inhalation of magnesium has also been investigated, either alone or with salbutamol; another meta-analysis considered that it improved pulmonary function, particularly in combination with a beta₂ agonist, with the best results seen in more severe cases.⁹

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Stroke. Intravenous magnesium sulfate has been investigated for a neuroprotective effect in stroke (p.1185), but results have been largely disappointing.¹

- Intravenous Magnesium Efficacy in Stroke (IMAGES) Study Investigators. Magnesium for acute stroke (Intravenous Magnesium efficacy in Stroke trial): randomised controlled trial. *Lancet* 2004; **363**: 439–45.

Tetanus. Magnesium sulfate has been found to minimise tonic disturbance in ventilated patients and control spasms in non-ventilated patients when used in the treatment of tetanus (p.1901).

References

- Attygalle D, Rodrigo N. Magnesium as first line therapy in the management of tetanus: a prospective study of 40 patients. *Anaesthesia* 2002; **57**: 811–17.
- William S. Use of magnesium to treat tetanus. *Br J Anaesth* 2002; **88**: 152–3.

Preparations

BP 2008: Magnesium Chloride Injection; Magnesium Sulphate Injection; Magnesium Sulphate Mixture; Magnesium Sulphate Paste;

USP 31: Magnesium Gluconate Tablets; Magnesium Sulfate in Dextrose Injection; Magnesium Sulfate Injection.

Proprietary Preparations (details are given in Part 3)

Arg.: Biomag; Magnebe; Magnesoid; **Austral.:** Celloids MP 65; Mag 50; Magmin; **Austria:** Cormagnesin; Emgecard; FX Passage; Magium; Magnesium Diapsoral; Magnesulf; Magivital; Mg 5-Longoral; Solumag; Ultra-Mag; **Belg.:** Magnespasmyl; Ultra-Mg; **Braz.:** Mag-Tab; Magnolat; Magnoston; Pidomag; Sal Amargo Purificado; **Canada:** Maglucate; Magnolex; Magnorol; Profalvanol C; Slow-Mag; **Chile:** Mag-Tab; **Cz.:** Coradol; Cormagnesin; Magnerot; Magnesium Diapsoral; Mg 5-Granulat; Mg 5-Longoral; **Fr.:** Efmag; Ionimag; Mag 2; Magnespasmyl; Magnogene; Megamag; Solumag; Spasmag; Top-Mag; Vivamag; **Ger.:** Basti-Mag; Cormagnesin; FX Passage; Magium; Magnaspart; Magnerot; Magnerot A; magnerot Classic; Magnesio-card; Magnesium Diapsoral; Magnesium Verla; Magnesium Verla N; Magnesorot; metamagnesol; Mg 5-Granulat; Mg 5-Longoral; Mg 5-Sulfat; Mg-nor; Nourymag; Power Orot; Retspersitz Darmreinigungspulver ST; **Gr.:** Mag 2; Solumag; Trofocard; **Hung.:** Astat; Cormagnesin; Magnerot; Magnesio-card; **India:** Mag; **Ir.:** Magnesium Verla; **Ital.:** Actimag; Mag 2; MG 50; Oilmag; Solumag; **Mex.:** Conducat; Ifupetol Magnesiado; Magnesufin; **Pol.:** Asmag; Biomag; Laktomag; Laktomag B; Magnefar; Slow-Mag; **Port.:** Cormagnesin; Magnesio-card; Magnosona; Magnespasmyl; Magnorol;

Metabol-Mg; **Rus.:** Cormagnesin (Кормagneзин); Magnerot (Магнерот); **S.Afr.:** Be-Lax; Magnesit; SB Laxative Mixture; Slow-Mag; **Spain:** Actimag; Magnesio-bi; Sulmetin; **Switz.:** Mag 2; Mag-Min; Magneson; Magnesio-card; Magnesium Biomed; Magnesium Vital; Magnesium-Sandoz; Magnes-pasmyl; Magnogene; Mg 5-Granoral; Mg 5-Longoral; Mg 5-Oraleff; Mg 5-Sulfat; Solmag; **UK:** Kest; **USA:** Almorat; Chloromag; Mag-G; Mag-SR; Mag-Tab; Magtrate; Slow-Mag.

Multi-ingredient Arg.: Anartrit; Antikatarata; Drenocol; Magnesia Phosphorica I Oligopex; Magnesia Incaico; Mylanta Extra; Nervigenol Magnesiano; Noacid Diates; Sigmafem; Sigmafem; Total Magnesiano con Ginseng; Verald; **Austral.:** Aspartol; Bio Magnesium; Bioglan Bioage Peripherat; Caprilate; Cardioplegia A; Cardioplegia Concentrate; Celloid Compounds Magcal Plus; Chelated Cal-Mag; Citri Slim+Trim; Duo Celloids CPMP; Duo Celloids PCMP; Duo Celloids PMP; Duo Celloids PSMP; Duo Celloids SPMP; Duo Celloids SSMP; Extralife Migrat-Care; Extralife Sleep-Care; K-Mag; Kali Mag; Machlor; Mag-Oro; Magnesium Plus; Magnoplasm; ML 20; Pro-Shape; Salvat; Zinvit; Zinvit C; Zinvit G; **Austria:** Cascara-Salax; Centramin; Corozell; Elozell; Elozell special; Gladixol; Illings Bozner Maycur-Teef; Mag Kottas May-Cur-Teef; Maycardin K; Trommcardin; Trommgallol; **Braz.:** Alcafehol; Sal de Andrews; **Canada:** Osmopak-Plus; **Chile:** Cholingo; **Cz.:** Acne Lotio; Cardilan; Magne-B; Solutio Thomas cum Procaino; Tromcardin; **Fin.:** Wicelact; **Fr.:** Biopause; Cataridol; Cemaflo-vone; Chloro-Magnesium; Cristopal; Decramp; Delbiasef; Iony; Kaologe-ais; Karalay; Magne-B; Osmogel; Phosphoneuros; Prefagyl; Revitalose; Spasmag; Supro; Thalgo Tonic; Tryptonan; Uvimag B; **Ger.:** Ardeycordal N; Bascardil; Biomagnesin; Cardio-Kreislauf-Longoral; Cardioplegin N; Cordesin; Galacordin; Geo-magnit; Kalium-Magnesium; Lacoerdin Mg Plus; Magium K; Magnerot N; Magnesium compositum; Movicard; rohasal; Scordal; Septacord; Tromcardin; Trophicard; **Gr.:** Cardioplegia; Magnesium Sandoz; **Hong Kong:** Cardioplegia; Osteocare; **Hung.:** Asparcardin; Magne-B; Osteocare; Panangin; Tromcardin; Viton; **India:** Calcinol; Cotaryl; **Indon.:** Cardioplegia; Osteocare; **Ir.:** Andrews; Bio-Calcium + D; **Ital.:** Brioivata; Calmason; Fertomycin-U; Fisiovere; Hiperopyn; Polase; Reocoll; Sedofit; Vagostabil; **Malaysia:** Adult Citrex Cal-Mag-D3; Cardioplegia; Junior Citrex Cal-Mag-D3; **Mex.:** Chofabiol; Cidetox; Diceritil; Gavidif; Hepedren; Peptochof; Ulgel; **Philipp.:** Osteocare; **Pol.:** Aspargin; Bemag Filomag B; Maglek B; Magne-B; Magne-Balans Plus; Magnefar B; Magnezylki; Magnokal; Magsovit B; Magvit B; Osteogel; Slow-Mag B; **Vnamag. Port.:** Actilan; Miosstelin; Polase; **Rus.:** Magne B6 (Марне Б6); Panangin (Панангин); **S.Afr.:** Phytopase B5F; Ultimig; **Singapore:** Cardioplegia; Vita Calmag Znt; **Spain:** Darnen Salt; Depurativo Richelet; Eupiptina; Lebersal; Magnesium Pyre; Magnogene; Salmagne; Sugarbi; Sulmetin Papaver; Sulmetin Papaverin; **Switz.:** Acne Lotio; Activital Forte; Kawaifort; Klyx Magnum; Magnesium Complex; Siesta-I; Vigoran; **Thai.:** Calcioday-D; Cardioplegia; **Turk.:** Osteocare; **UK:** Andrews; Pegna; **USA:** Chlor-3; Mag-Cal Mega; Mag-SR plus Calcium; Magonate; **Venez.:** Calciner D; Fugras; Kalsis.

Phosphate

Fosfat.

Description. Phosphate is an anion given as various potassium or sodium salts.

Incompatibility. Phosphates are incompatible with calcium salts; the mixing of calcium and phosphate salts can lead to the formation of insoluble calcium-phosphate precipitates. Incompatibility has also been reported with magnesium salts.

Monobasic Potassium Phosphate

Dihydrogenfosforečan draselny; E340; Kali dihydrogenofosphas; Kalio-divandenilio fosfatas; Kálium-dihidrogen-foszfát; Kaliumdivátéfosfat; Kaliumdivetyfosfaati; Monopotassium Phosphate; Phosphate monopotassique; Potasio, dihydrogenofosfato de; Potassium Acid Phosphate; Potassium Biphosphate; Potassium Dihydrogen Phosphate; Potasu diwodorofoforan. Potassium dihydrogen orthophosphate.

$\text{KH}_2\text{PO}_4 = 136.1$
 CAS — 7778-77-0.

Pharmacopoeias. In *Eur.* (see p.vii). Also in *USNF*.

Ph. Eur. 6.2 (Potassium Dihydrogen Phosphate). A white or almost white, crystalline powder or colourless crystals. Freely soluble in water; practically insoluble in alcohol. A 5% solution in water has a pH of 4.2 to 4.5.

USNF 26 (Monobasic Potassium Phosphate). Colourless crystals or a white granular or crystalline powder. Is odourless. Freely soluble in water; practically insoluble in alcohol. pH of a 1% solution in water is about 4.5. Store in airtight containers.

Equivalence. Each g of monobasic potassium phosphate represents about 7.3 mmol of potassium and of phosphate.

Dibasic Potassium Phosphate

Dikalij fosphas; Dikalio fosfatas; Dikaliumfosfaati; Dikaliumfosfat; Dikálium-hidrogén-foszfát; Dipotasio, hidrogenofosfato de; Dipotassium Hydrogen Phosphate; Dipotassium Phosphate; Dipotasu wodorofoforan; E340; Hydrogenfosforečan draselny; Kalij Hydrogenofosphas; Phosphate dipotassique; Potassium Phosphate. Dipotassium hydrogen orthophosphate.

$\text{K}_2\text{HPO}_4 = 174.2$
 CAS — 7758-111-4.

Pharmacopoeias. In *Eur.* (see p.vii) and *US*.

Ph. Eur. 6.2 (Dipotassium Phosphate; Dipotassium Hydrogen Phosphate BP 2008). A very hygroscopic, white or almost white powder or colourless crystals. Very soluble in water; very slightly soluble in alcohol. Store in airtight containers.

USP 31 (Dibasic Potassium Phosphate). Colourless or white, somewhat hygroscopic, granular powder. Freely soluble in water; very slightly soluble in alcohol. pH of a 5% solution in water is between 8.5 and 9.6.

Equivalence. Each g of dibasic potassium phosphate represents about 11.5 mmol of potassium and 5.7 mmol of phosphate.

Monobasic Sodium Phosphate

Dihydrogenfosforečan sodny; E339; Monobazik Sodyum Fosfat; Natrij dihydrogenofosphas; Natrio-divandenilio fosfatas; Natrium Phosphoricum Monobasicum; Natrium-dihidrogen-foszfát; Natriumdivátéfosfat; Natriumdivetyfosfaati; Phosphate monosodique; Sodio, dihydrogenofosfato de; Sodium Acid Phosphate; Sodium Biphosphate; Sodium Dihydrogen Phosphate; Sodu diwodorofoforan; Sodyum Dihidrogen Fosfat. Sodium dihydrogen orthophosphate.

$\text{NaH}_2\text{PO}_4 \cdot x\text{H}_2\text{O}$
 CAS — 7558-80-7 (anhydrous monobasic sodium phosphate); 10049-21-5 (monobasic sodium phosphate monohydrate); 13472-35-0 (monobasic sodium phosphate dihydrate).

ATC — A06AD17; A06AG01.

ATC Vet — QA06AD17; QA06AG01.

Pharmacopoeias. In *Eur.* (see p.vii) (with 2H₂O); in *Chin.* (with 1H₂O). *Br.* also includes monographs for the anhydrous and monohydrate forms. *US* permits the anhydrous, monohydrate, and dihydrate forms.

Ph. Eur. 6.2 (Sodium Dihydrogen Phosphate Dihydrate; Natrij Dihydrogenofosphas Dihydricus). A white or almost white powder or colourless crystals. Very soluble in water; very slightly soluble in alcohol. A 5% solution in water has a pH of 4.2 to 4.5.

The BP 2008 gives Sodium Acid Phosphate as an approved synonym.

BP 2008 (Anhydrous Sodium Dihydrogen Phosphate). A white, slightly deliquescent, crystals or granules. Very soluble in water; very slightly soluble in alcohol. A 5% solution in water has a pH of 4.2 to 4.5.

BP 2008 (Sodium Dihydrogen Phosphate Monohydrate). A white powder or colourless crystals. Very soluble in water; very slightly soluble in alcohol. A 5% solution in water has a pH of 4.2 to 4.5.

USP 31 (Monobasic Sodium Phosphate). It contains one or two molecules of water of hydration, or is anhydrous. Colourless crystals or white crystalline powder. Is odourless and is slightly deliquescent. Freely soluble in water; practically insoluble in alcohol. Its solutions are acid to litmus and effervesce with sodium carbonate. pH of a 5% solution in water of the monohydrate form is between 4.1 and 4.5.

Equivalence. Each g of monobasic sodium phosphate (anhydrous) represents about 8.3 mmol of sodium and of phosphate. Each g of monobasic sodium phosphate (monohydrate) represents about 7.2 mmol of sodium and of phosphate. Each g of monobasic sodium phosphate (dihydrate) represents about 6.4 mmol of sodium and of phosphate.

Dibasic Sodium Phosphate

Dibazik Sodyum Hidrogen Fosfat; Dinatrij fosphas; Dinatrio fosfatas; Dinatriumfosfaati; Dinatriumfosfat; Dinátrium-hidrogén-foszfát; Disodio, hidrogenofosfato de; Disodium Hydrogen Phosphate; Disodium Phosphate; Disodu fosforan; Disodu wodorofoforan; Disodyum Hidrogen Fosfat; E339; Hydrogenfosforečan sodny; Natrij Hydrogenofosphas; Natrij Fosphas; Natrij Phosphatis; Natriumfosfaati; Natriumfosfat; Phosphate disodique; Sodium Phosphate. Disodium hydrogen orthophosphate.

$\text{Na}_2\text{HPO}_4 \cdot x\text{H}_2\text{O}$
 CAS — 7558-79-4 (anhydrous dibasic sodium phosphate); 10028-24-7 (dibasic sodium phosphate dihydrate); 7782-85-6 (dibasic sodium phosphate heptahydrate); 10039-32-4 (dibasic sodium phosphate dodecahydrate).
 ATC — A06AD17; A06AG01; B05XA09.
 ATC Vet — QA06AD17; QA06AG01; QB05XA09.

Pharmacopoeias. In *Eur.* (see p.vii), *Jpn.* and *US*. The pharmacopoeias may specify one or more states of hydration; monographs and specifications can be found for the anhydrous form ($\text{Na}_2\text{HPO}_4 = 142.0$), the dihydrate ($\text{Na}_2\text{HPO}_4 \cdot 2\text{H}_2\text{O} = 178.0$), the heptahydrate ($\text{Na}_2\text{HPO}_4 \cdot 7\text{H}_2\text{O} = 268.1$), and the dodecahydrate ($\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O} = 358.1$), although not necessarily all will be found in any one pharmacopoeia.

Ph. Eur. 6.2 (Disodium Phosphate, Anhydrous; Dinatrij Fosphas Anhydricus; Anhydrous Disodium Hydrogen Phosphate BP 2008). A white or almost white, hygroscopic powder. Soluble in water; practically insoluble in alcohol. A 5% solution in water is slightly alkaline. Store in airtight containers.

Ph. Eur. 6.2 (Disodium Phosphate Dihydrate; Dinatrij Fosphas Dihydricus; Disodium Hydrogen Phosphate Dihydrate BP 2008). A white or almost white powder or colourless crystals. Soluble in water; practically insoluble in alcohol. A 5% solution in water is slightly alkaline.

The BP 2008 gives Sodium Phosphate Dihydrate as an approved synonym.

Ph. Eur. 6.2 (Disodium Phosphate Dodecahydrate; Dinatrij Fosphas Dodecahydricus; Disodium Hydrogen Phosphate Dodecahydrate BP 2008). Colourless, transparent, very efflorescent crystals. Very soluble in water; practically insoluble in alcohol. A 10% solution in water is slightly alkaline.