WORMS. Sodium hypochlorite in aqueous solution at a concentration of 3.75% (or greater) is an effective ovicide for *Echinococcus* and may be used on hard surfaces, glassware, and sinks.[1]

1. Craig PS, Macpherson CNL. Sodium hypochlorite as an ovicide for Echinococcus. *Ann Trop Med Parasitol* 1988; **82:** 211–13.

WOUNDS. Hypochlorite solutions are now generally considered to be too irritant for use in the management of wounds (p.1585). Studies suggest that they may delay wound healing if repeatedly applied to open wounds.[1,2] It has been suggested that they may be of use in debriding burns (p.1578) or necrotic chronic wounds,[3] but also that any benefit that might be seen from the desloughing of necrotic tissue might be produced by damage of the superficial cell layer leading to separation[4] or from tissue hydration produced by wet dressing packs.[5] However, some burns units have found that hypochlorite as Dakin's solution (see Chlorinated Lime, p.1638) produces better healing than other antibacterials.[6]

See also p.1624.

1. Thomas S, Hay NP. Wound healing. *Pharm J* 1985; **235:** 206.
2. Lineweaver W, *et al.* Topical antimicrobial toxicity. *Arch Surg* 1985; **120:** 267–70.
3. Leaper DJ. Eusol. *BMJ* 1992; **304:** 930–1.
4. Anonymous. Local applications to wounds—I: cleansers, antibacterials, debriders. *Drug Ther Bull* 1991; **29:** 93–5.
5. Thomas S. Milton and the treatment of burns. *Pharm J* 1986; **236:** 128–9.
6. Murphy KD, *et al.* Current pharmacotherapy for the treatment of severe burns. *Expert Opin Pharmacother* 2003; **4:** 369–84.

Preparations

BP 2008: Dilute Sodium Hypochlorite Solution; Strong Sodium Hypochlorite Solution;
USP 31: Sodium Hypochlorite Solution; Sodium Hypochlorite Topical Solution.

Proprietary Preparations (details are given in Part 3)
Arg.: Antibacter†; ***Austral.:*** Milton; ***Belg.:*** Dakincooper; ***Braz.:*** Liquido de Dakin†; ***Canad.:*** Dakin's Solution; Hygeol; ***Fr.:*** Dakin; ***Ger.:*** Maranon H†; ***Israel:*** Chlorasol; ***Ital.:*** Amukine Med; Milton; ***Singapore:*** Milton Anti-Bacterial; ***UK:*** Chlorasol†; Milton.

Multi-ingredient: ***Fr.:*** Amukine; ***Mex.:*** Amuchina†; ***Switz.:*** Amuchina Med.

Sodium Nitrate

E251; Natrii Nitras; Natrium Nitricum; Nitrato sódico; Sodu azotan.

$NaNO_3$ = 84.99.
CAS — 7631-99-4.

NOTE. Crude sodium nitrate is known as Chile Saltpetre.

Profile

Sodium nitrate has similar actions to potassium nitrate (p.1658) and is used as a preservative in foods, particularly in meat products.

Crude sodium nitrate is used as a fertiliser.

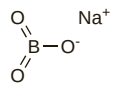
Handling. Sodium nitrate has been used for the illicit preparation of explosives or fireworks; care is required with its supply.

Poisoning. Cyanosis and methaemoglobinaemia has been reported[1] in 3 patients after eating sausages that had been preserved mistakenly with a mixture of sodium nitrate and sodium nitrite rather than with potassium nitrate (saltpetre). The name saltpetre is used as a generic term for a number of potassium- or sodium-based preservatives used in food manufacture.

1. Kennedy N, *et al.* Faulty sausage production causing methaemoglobinaemia. *Arch Dis Child* 1997; **76:** 367–8.

Sodium Perborate Monohydrate *(USAN)*

$NaBO_3,H_2O$ = 99.81.
CAS — 7632-04-4 (anhydrous sodium perborate); 10332-33-9 (sodium perborate monohydrate).
ATC — A01AB19.
ATC Vet — QA01AB19.



(anhydrous)

Sodium Perborate

Natrii perboras; Natrio perboratas; Natriumperboraatti; Natriumperborat; Nátrium-perborát; Perborato sódico; Perboritan sodný; Sod. Perbor.; Sodium, perborate de; Sodium Perborate Tetrahydrate.

$NaBO_3,4H_2O$ = 153.9.
CAS — 10042-94-1.
ATC — A01AB19.
ATC Vet — QA01AB19.

Pharmacopoeias. In *Eur.* (see p.vii).
Ph. Eur. 6.2 (Sodium Perborate, Hydrated; Sodium Perborate BP 2008). Colourless prismatic crystals or a white or almost white powder, stable in crystalline form. Sparingly soluble in water, with slow decomposition. It dissolves in dilute mineral acids. Store in airtight containers.

Adverse Effects

Frequent use of toothpowders containing sodium perborate may cause blistering and oedema. Hypertrophy of the papillae of the tongue has also been reported. The effects of swallowed sodium perborate are similar to those of boric acid (p.2268).

Uses and Administration

Sodium perborate is a mild disinfectant and deodorant. It readily releases oxygen in contact with oxidisable matter and has been used in aqueous solutions for purposes similar to weak solutions of hydrogen peroxide.

Sodium perborate is used for tooth whitening and has also been used, with calcium carbonate, as a toothpowder. A freshly prepared solution is used as a mouthwash.

The monohydrate is used similarly.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Hifamonil; ***Canad.:*** Amosan; ***India:*** Steradent; ***Ital.:*** Kavosan†; ***Neth.:*** Bocasan; ***USA:*** Amosan.

Multi-ingredient: ***Arg.:*** Oral-B Enjuague Bucal Amosan†; ***Austral.:*** Amosan; ***Belg.:*** Amosan; ***Braz.:*** Anginotricin; Malvatricin Branqueador; Oticerim; ***Fr.:*** Bactident; Hydralin; ***Hong Kong:*** Hydralin; ***Spain:*** Lema C; ***Switz.:*** Saltrates Rodell†; ***USA:*** Trichotine; ***Venez.:*** Novafix.

Sodium Percarbonate

Percarbonato sódico; Sodium Carbonate Peroxide.

$Na_2CO_3,1½H_2O_2$ = 157.0.
CAS — 15630-89-4.

Profile

Sodium percarbonate has similar uses to sodium perborate (above).

Preparations

Proprietary Preparations (details are given in Part 3)
Multi-ingredient: ***Arg.:*** Oxoxal†; ***Austral.:*** Ascoxal; ***Fin.:*** Ascoxal†; ***Mex.:*** Ascoxal; ***Norw.:*** Ascoxal†; ***Swed.:*** Ascoxal†; ***Switz.:*** Desaquick forte†.

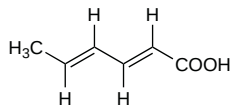
Sorbates

Sorbatos.

Sorbic Acid

Acide sorbique; Acidum sorbicum; E200; Kwas sorbowy; Kyselina sorbová; Sórbico, ácido; Sorbiinihappo; Sorbinsyra; Sorbo rūgštis; Szorbinsav. (*E,E*)-Hexa-2,4-dienoic acid.

$C_6H_8O_2$ = 112.1.
CAS — 22500-92-1.



Pharmacopoeias. In *Chin.* and *Eur.* (see p.vii). Also in *USNF.*
Ph. Eur. 6.2 (Sorbic Acid). A white or almost white, crystalline powder. Slightly soluble in water; freely soluble in alcohol. Protect from light.
USNF 26 (Sorbic Acid). A free-flowing white crystalline powder with a characteristic odour. Soluble 1 in 1000 of water, 1 in 10 of alcohol, 1 in 8 of dehydrated alcohol, 1 in 15 of chloroform, 1 in 30 of ether, 1 in 8 of methyl alcohol, and 1 in 19 of propylene glycol. Store in airtight containers at a temperature not exceeding 40°. Protect from light.

Incompatibility. The incompatibility of sorbates is discussed under Potassium Sorbate, below.

Potassium Sorbate

E202; Kalii sorbas; Kalio sorbatas; Kaliumsorbaatti; Kaliumsorbat; Kalium-sorbát; Kálium-szorbát; Potassium, sorbate de; Sorbato potásico. Potassium (*E,E*)-hexa-2,4-dienoate.

$C_6H_7KO_2$ = 150.2.
CAS — 590-00-1; 24634-61-5.

Pharmacopoeias. In *Eur.* (see p.vii). Also in *USNF.*
Ph. Eur. 6.2 (Potassium Sorbate). White or almost white granules or powder. Very soluble in water; slightly soluble in alcohol. Protect from light.
USNF 26 (Potassium Sorbate). White crystals or powder with a characteristic odour. Soluble 1 in 4.5 of water, 1 in 35 of alcohol, and 1 in more than 1000 of chloroform and of ether. Store in airtight containers at a temperature not exceeding 40°. Protect from light.

Incompatibility. Sorbic acid can be inactivated by oxidation and to some extent by nonionic surfactants and plastics. Activity of the sorbates may be reduced by increases in pH.[1]

1. Cook W. Sorbic acid. In: Rowe RC, *et al.*, eds. *Handbook of pharmaceutical excipients.* 5th ed. London and Chicago: The Pharmaceutical Press and the American Pharmaceutical Association, 2006: 710–12.

Adverse Effects and Precautions

The sorbates can be irritant and have caused contact dermatitis.

Hypersensitivity. References to allergic-type skin reactions[1] and non-allergic irritant-type reactions[2,3] with potassium sorbate or sorbic acid.

1. Saihan EM, Harman RRM. Contact sensitivity to sorbic acid in 'Unguentum Merck'. *Br J Dermatol* 1978; **99:** 583–4.
2. Soschin D, Leyden JJ. Sorbic acid-induced erythema and edema. *J Am Acad Dermatol* 1986; **14:** 234–41.
3. Fisher AA. Erythema limited to the face due to sorbic acid. *Cutis* 1987; **40:** 395–7.

Uses

Potassium sorbate and sorbic acid possess antifungal, and to a lesser extent antibacterial, activity. They are relatively ineffective above a pH of about 6. They are used as preservatives in pharmaceutical preparations in concentrations of up to 0.2%, in enteral formulas, foods, and in cosmetic preparations.

Preparations

Proprietary Preparations (details are given in Part 3)
Multi-ingredient: ***Austral.:*** Caprilate; ***Ger.:*** Klysma Sorbit; Saseem; ***Ital.:*** Evasen Dischetti; Evasen Liquido; ***Mex.:*** Adapettes; ***UK:*** Relaxit; ***USA:*** Clear Eyes Contact Lens Relief; ***Venez.:*** Saxacid.

Sulfites and Sulfur Dioxide

Sulfitos y dióxido de azufre.

Potassium Bisulfite

Bisulfito potásico; E228; Potassium Bisulphite; Potassium Hydrogen Sulphite.

$KHSO_3$ = 120.2.
CAS — 7773-03-7.

Potassium Metabisulfite

Dipotassium Pyrosulphite; Disiřičitan draselný; E224; Kalii Disulfis; Kalii metabisulfis; Kalio metabisulfitas; Kaliummetabisulfiitti; Kaliummetabisulfit; Metabisulfito potásico; Potassium, métabisulfite de; Potassium Metabisulphite; Potassium Pyrosulphite; Potasu pirosiarczyn.

$K_2S_2O_5$ = 222.3.
CAS — 16731-55-8.

Pharmacopoeias. In *Eur.* (see p.vii). Also in *USNF.*
Ph. Eur. 6.2 (Potassium Metabisulphite). A white or almost white powder or colourless crystals. Freely soluble in water; slightly soluble in alcohol. A 5% solution in water has a pH of 3.0 to 4.5. Store in airtight containers. Protect from light.
USNF 26 (Potassium Metabisulfite). White or colourless, free-flowing crystals, crystalline powder, or granules, usually with an odour of sulfur dioxide. Gradually oxidises in air to the sulfate. Soluble in water; insoluble in alcohol. Its solutions are acid to litmus. Store in well-filled airtight containers at a temperature not exceeding 40°.

Incompatibility and stability. The incompatibility and stability of sulfites are discussed under Sulfur Dioxide, below.

Sodium Bisulfite

Bisulfito sódico; E222; Sodium Bisulphite; Sodium Hydrogen Sulphite.

$NaHSO_3$ = 104.1.
CAS — 7631-90-5.

Pharmacopoeias. In *Chin.* and *Jpn*, described in both as consisting of a mixture of sodium bisulfite and sodium metabisulfite.

Sodium Metabisulfite

Disiřičitan sodný; Disodium Pyrosulphite; E223; Metabisulfito sódico; Natrii Disulfis; Natrii metabisulfis; Natrii Pyrosulfis; Natrio metabisulfitas; Nátrium-diszulfit; Natriummetabisulfiitti; Natriummetabisulfit; Sodium Disulphite; Sodium, métabisulfite de; Sodium Metabisulphite; Sodium Pyrosulphite; Sodu pirosiarczyn.

$Na_2S_2O_5$ = 190.1.
CAS — 7681-57-4.

Pharmacopoeias. In *Chin., Eur.* (see p.vii), and *Jpn.* Also in *USNF.*
Ph. Eur. 6.2 (Sodium Metabisulphite). Colourless crystals or a white or almost white crystalline powder. Freely soluble in water; slightly soluble in alcohol. A 5% solution in water has a pH of 3.5 to 5.0. Protect from light.
USNF 26 (Sodium Metabisulfite). White crystals or a white to yellowish crystalline powder with an odour of sulfur dioxide. Freely soluble in water and in glycerol; slightly soluble in alcohol. Store in well-filled airtight containers at a temperature not exceeding 40°.