

brittle and shows a crystalline fracture. When exposed to air it rapidly absorbs moisture and carbon dioxide. Soluble 1 in 1 of water; freely soluble in alcohol. Store in airtight containers.

#### Adverse Effects

Sodium hydroxide is strongly alkaline and corrosive, and rapidly destroys organic tissues.

The ingestion of caustic alkalis causes immediate burning pain in the mouth, throat, substernal region, and epigastrum, and the lining membranes become swollen and detached. There is dysphagia, hypersalivation, vomiting with the vomitus becoming blood-stained, diarrhoea, and shock. In severe cases, abdominal pain, asphyxia due to oedema of the glottis, circulatory failure, oesophageal or gastric perforation, peritonitis, or pneumonia may occur. Stricture of the oesophagus can develop weeks or months later.

Caustic alkali on contact with the skin can produce full thickness burns leading to extensive damage. Alkali burns to the eyes cause conjunctival oedema and corneal destruction; damage may be irreversible.

#### Treatment of Adverse Effects

Ingestion should not be treated by lavage or emesis. Dilution with water or milk is generally considered controversial for management of corrosive ingestion. However, early dilution therapy of alkalis may reduce oesophageal injury; large volumes of fluid should be avoided. Neutralisation of alkalis is contra-indicated. The airway should be maintained and shock and pain alleviated. In cases of skin contamination, clothing should be removed immediately and the skin flooded with copious amounts of water for at least 15 minutes. Excision or skin grafting of burnt areas may be necessary in severe cases. Contaminated eyes should be irrigated thoroughly with water or 0.9% sodium chloride until the conjunctival sac pH is normal, which may require irrigation for up to an hour.

#### Uses and Administration

Sodium hydroxide is a powerful caustic. A 2.5% solution in glycerol has been used as a cuticle solvent. An escharotic preparation of sodium hydroxide and calcium oxide was known as London paste. Sodium hydroxide is also used for adjusting the pH of solutions.

**Disinfection.** For reference to the possible use of sodium hydroxide for the disinfection of material contaminated by the agent causing Creutzfeldt-Jakob disease, see p.1622.

#### Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **Austria:** Leberinfusion; Sulfo-Schweifelbad; **Ger.:** Glutarsin E<sup>†</sup>; **Switz.:** Saltrates<sup>‡</sup>.

#### Sodium Iodoheparinate

Iodoheparinate Sodium; Iodoheparinato de sodio.

ATC — S01XA09.

ATC Vet — Q501XA09.

#### Profile

Sodium iodoheparinate is a derivative of heparin (p.1301) that has been used topically for the treatment of corneal burns and ulceration.

#### Sodium Methylarsinate

Metylarsinato de sodio; Natrium Methylarsonicum; Sodium Metharsinato. Disodium monomethylarsonate hexahydrate.

CH<sub>3</sub>AsNa<sub>2</sub>O<sub>3</sub>,6H<sub>2</sub>O = 292.0.

CAS — 5967-62-4.

#### Profile

Sodium methylarsinate is an organic arsenic compound with adverse effects similar to those of arsenic trioxide (p.2260). It was formerly included in some vitamin and mineral preparations. It has also been used as a herbicide.

#### Sodium Morrhuate (rINN)

Morrhuate de Sodium; Morrhuate Sodium; Morruato de sodio; Natrii Morrhuas; Natriummorrhuatti; Natriummorruat. Натрия Моррутат.

CAS — 8031-09-2.

**Pharmacopeias.** Chin. and US include the injection.

#### Profile

Sodium morrhuate consists of the sodium salts of the fatty acids of cod-liver oil. It is a sclerosant that has been used in the treatment of varicose veins (p.2347). Usual doses are 50 to 100 mg for small or medium veins or 150 to 250 mg for large veins given as a 5% solution by intravenous injection.

#### Preparations

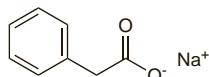
**USP 31:** Morrhuate Sodium Injection.

**Proprietary Preparations** (details are given in Part 3)

**USA:** Scleromate.

#### Sodium Phenylacetate (USAN)

Fenilacetato de sodio. C<sub>8</sub>H<sub>7</sub>NaO<sub>2</sub> = 158.1. CAS — 114-70-5.



#### Profile

Sodium phenylacetate is used as adjunctive treatment for acute hyperammonaemia and associated encephalopathy in patients with enzymatic deficiencies in the urea cycle (p.1929). It is given with sodium benzoate (p.1630) as a combined preparation for intravenous infusion in which 1 mL contains 100 mg of each component. The preparation is diluted in sterile glucose injection 10% at ≥25 mL/kg before infusion. Other similar therapies (e.g. oral sodium phenylbutyrate, see below) should be stopped before starting the infusion. A loading dose is infused over 90 to 120 minutes followed by an equivalent maintenance dose infused over 24 hours. Doses of sodium phenylacetate (together with the same amount of sodium benzoate) are 250 mg/kg for patients weighing 20 kg or less, and 5.5 g/m<sup>2</sup> for those over 20 kg. Maintenance infusions are continued until plasma ammonia concentrations are normal or oral nutrition and therapy can be tolerated. Sodium phenylacetate has also been given by mouth.

#### References

1. The Urea Cycle Disorders Conference Group. Consensus statement from a conference for the management of patients with urea cycle disorders. *J Pediatr* 2001; **138** (suppl 1): S1–S5.
2. Summar M. Current strategies for the management of neonatal urea cycle disorders. *J Pediatr* 2001; **138** (suppl 1): S30–S39.
3. Batshaw ML, et al. Alternative pathway therapy for urea cycle disorders: twenty years later. *J Pediatr* 2001; **138** (suppl 1): S46–S55. Correction. *ibid.* 2002; **140**: 490.
4. MacArthur RB, et al. Pharmacokinetics of sodium phenylacetate and sodium benzoate following intravenous administration as both a bolus and continuous infusion to healthy adult volunteers. *Mol Genet Metab* 2004; **81** (suppl 1): S67–S73.
5. Enns GM, et al. Survival after treatment with phenylacetate and benzoate for urea-cycle disorders. *N Engl J Med* 2007; **356**: 2282–92.

#### Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **USA:** Ammonul; Ucephane.

#### Preparations

**Proprietary Preparations** (details are given in Part 3)

**Cz.:** Ammonaps; **Fr.:** Ammonaps<sup>†</sup>; **Ger.:** Ammonaps<sup>†</sup>; **Ital.:** Ammonaps; **Neth.:** Ammonaps; **Pol.:** Ammonaps; **Port.:** Ammonaps; **Spain:** Ammonaps; **UK:** Ammonaps; **USA:** Buphenyl.

#### Sodium Polymetaphosphate

E452 (sodium polyphosphates); Polimetafosfato de sodio.

CAS — 50813-16-6.

NOTE. Although Sodium hexametaphosphate has been used as a synonym for the polymetaphosphate, the latter also exists in much higher degrees of polymerisation.

#### Profile

Sodium polymetaphosphate has been used as a 5% dusting powder in hyperhidrosis and bromhidrosis, and as a prophylactic against athlete's foot.

Sodium polymetaphosphate combines with calcium and magnesium ions to form complex soluble compounds and is used as a water softener.

#### Sodium Pyrophosphate (USAN)

Sodu pirofosforan; Tetrasodium Pyrophosphate; TSPP.

Na<sub>4</sub>P<sub>2</sub>O<sub>7</sub> = 265.9.

CAS — 7722-88-5.

#### Profile

Sodium pyrophosphate acts as a calcium chelator and is used in products for dental care to reduce tartar formation. It is also used as a food additive, and as a water softener in detergents and for industrial applications. Potassium pyrophosphate (tetrapotassium pyrophosphate) and sodium acid pyrophosphate (disodium pyrophosphate) are used similarly.

Sodium pyrophosphate is also used in kits for the preparation of technetium-99m pyrophosphate.

#### Preparations

**Proprietary Preparations** (details are given in Part 3)

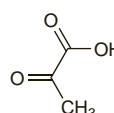
**Multi-ingredient:** **Arg.:** Esmedent Dientes Sens Blanq + Ctrol Sarro; Fluorident PX; Odol Control Sarro<sup>†</sup>; **Braz.:** Malvaticrin Antiplaca; **Chile:** FKD; **Ital.:** AZ Tartar Control; **USA:** Plax.

#### Sodium Pyruvate

Pyruvato de sodio. Sodium α-ketopropionate; sodium 2-oxopropanoate.

C<sub>3</sub>H<sub>4</sub>NaO<sub>3</sub> = 111.1.

CAS — 127-17-3 (pyruvic acid); 113-24-6 (sodium pyruvate).



(pyruvic acid)

#### Profile

Sodium pyruvate has been given intravenously in the diagnosis of disorders of pyruvate metabolism.

◊ Relative serum concentrations of lactate and pyruvate after a 10-minute intravenous infusion of sodium pyruvate 500 mg/kg have been used as an aid to the diagnosis of disorders of pyruvate metabolism.<sup>1</sup> Death shortly after pyruvate loading in a 9-year-old child with restrictive cardiomyopathy suggests that the test should not be performed when cardiac function is decreased.<sup>2</sup>

1. Dijkstra U, et al. Friedreich's ataxia: intravenous pyruvate load to demonstrate a defect in pyruvate metabolism. *Neurology* 1984; **34**: 1493–7.

2. Matthys D, et al. Fatal outcome of pyruvate loading test in child with restrictive cardiomyopathy. *Lancet* 1991; **338**: 1020–1.

#### Sodium Silicate

Silicato de sodio; Soluble Glass; Water Glass.

CAS — 1344-09-8.

#### Profile

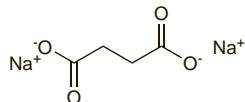
Concentrated aqueous solutions of sodium silicate are commercially available and have many industrial uses. The solutions vary in composition, viscosity, and density; the greater the ratio of Na<sub>2</sub>O to SiO<sub>2</sub> the more tacky and alkaline the solution.

## Sodium Succinate

E363 (succinic acid); Succinato de sodio.

$C_4H_4Na_2O_4 \cdot 6H_2O = 270.1$ .

CAS — 150-90-3 (anhydrous sodium succinate); 6106-21-4 (sodium succinate hexahydrate).



## Profile

Sodium succinate is an ingredient of topical preparations tried for the treatment of cataract. It is also used as a food additive.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** Fr.: Cristopal†; Spain: Vitaphakol.

## Solidago

Aranyvessző (solidaginis herba); Echtes Goldrutenkraut (*S. virgaurea*); European Goldenrod (*S. virgaurea*); Golden Rod; Goldrutenkraut (*S. gigantea* or *S. canadensis*); Gullris, europeisk (solidaginis virgaureae herba); Gullris (solidaginis herba); Herba Virgaureae (*S. virgaurea*); Kultapiisku, euroop-palaainen (solidaginis virgaureae herba); Kultapiisku (solidaginis herba); Nat' zlatobýlová obecného (solidaginis virgaureae herba); Paprastujų rykštenų žolė (solidaginis virgaureae herba); Rykštenų žolė (solidaginis herba); Solidage; Solidage verge d'or (*S. virgaurea*); Solidaginis Herba (*S. gigantea* or *S. canadensis*); Solidaginis virgaureae herba (*S. virgaurea*); Solidago Virga Aurea (*S. virgaurea*); Verge d'or; Ziele nawłoci (*S. virgaurea*); Ziele nawłoci pospolitej (*S. virgaurea*); Zlatobýlová nat' (solidaginis herba).

NOTE. The name Aaron's Rod has been applied to a number of plants including *Solidago* spp., *Verbascum* spp., and *Sempervivum tectorum*.

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

**Ph. Eur. 6.2** (Goldenrod; European; Solidaginis virgaureae herba). The whole or cut dried, flowering aerial parts of *Solidago virgaurea*. It contains not less than 0.5% and not more than 1.5% flavonoids, expressed as hyperoside ( $C_{21}H_{20}O_{12} = 464.4$ ) with reference to the dried drug.

**Ph. Eur. 6.2** (Goldenrod; Solidaginis herba). The whole or cut dried, flowering aerial parts of *Solidago gigantea* or *S. canadensis*. It contains not less than 2.5% of flavonoids, expressed as hyperoside ( $C_{21}H_{20}O_{12} = 464.4$ ) with reference to the dried drug.

## Profile

*Solidago virgaurea* (Asteraceae) has diuretic and anti-inflammatory activity. It is mainly used in inflammatory disorders of the bladder and kidneys and for the treatment of renal stones. It is also included in herbal preparations used for a variety of disorders.

*S. gigantea* (Early golden-rod) and *S. canadensis* were once considered to be adulterants of *S. virgaurea* but are now recognised as having similar activity.

**Homoeopathy.** Solidago has been used in homoeopathic medicines under the following names: Solidago virgaurea; Sol. vir.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Cz.:** Zlatobýlova Nat; **Ger.:** Calcufel Aquat; Canephron S; Cytinol Long; Cystinol Solidago; Cysto Fink Mono†; Grani Fink Durchspülungen†; Kalkurel Goldrute; Nephrolith mono; Nephrolith mono†; Nieral; Solidagogen mono; Stromic; Urol; Uroplant†.

**Multi-ingredient:** **Austral:** Bioglan Cranbiotic Super; Euphrasia complex; Euphrasia Compound; Extralife Fluid-Care; Phytopolar; **Austria:** Heumann's Blasen- und Nierentee; Phytopolar; Solubritat; Ureum Neu; **Cz.:** Antiretrivrátky Caj; Epilobin; Phytopolar; Stoffwechseltee NH; Urcyston Planta; **Fr.:** Solution Stago Dilutee; **Ger.:** Aqualibra; BioCyst; Canephron novo†; Cefabasol; Cystinol N; Dr. Scheffler Bergischer Krauterthee Blasen- und Nierentee; Hamtee 400 N; Hamtee STADA; Hamtee-Steiner; Heumann Blasen- und Nierentee; Solubritat S†; Heumann Blasen- und Nieren-tee Solubritat uro; Hewenberrol-Tee; Hewenephron duo†; Inconturina†; nephro-logs; Nephro-Pasc†; Nephromed med†; Nephropur tri†; Nephroselect M; Nephro-Tee; Nierlon Blasen- und Nieren-Tee Vf†; Nierlon S†; Nieroxin NT†; Phytopolar; Presselin Nieren-Blasen K 3†; Prostamed; Renob Blasen- und Nieren Tee; Rivoval†; Solidagoren N; Uriodil phyto†; **Ital.:** Flavion; Granimania (Specie Composta)†; **Pol.:** Diuron; Fitover; Nefrobonisol; Nefrol; Nefrospet; NeoFitolizyna; Prostaprol; Reumacor; Urofort; Uromix; Uroprost; **Port.:** Prostamed†; **Rus.:** Prostanorm (Простанорм); **Spain:** Natusor Artlane†; Natusor Renal†; Renusor†; **Switz.:** Demutorin; Dragees pour les reins et la vessie; Dragees S pour les reins et la vessie; Gem; Nephrosolid; Phytomed Nephrot†; Phytomed Prosta†; Urinex.

## Sorrel

Acedera Común; Azeda-Brava; Garden Sorrel; Herba Rumicis Acetosae; Oseille; Sorrel Dock; Sour Dock; Vinagrera; Wiesen-sauerampfer.

NOTE. The name sour dock has also been used for yellow dock (p.2416).

The symbol † denotes a preparation no longer actively marketed

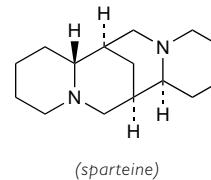
## Profile

Sorrel (*Rumex acetosa*, Polygonaceae) has been used for respiratory-tract disorders. It is also used as a culinary herb.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **Austria:** Sinupret; Solvporet; **Cz.:** Sinupret; **Ger.:** Sinupret; **Hong Kong:** Sinupret; **Hung.:** Sinupret; **Indon.:** Sinupret; **Mex.:** Bisolinsin; **Philipp.:** Sinupret; **Pol.:** Sinupret; **Rus.:** Sinupret (Синупрет); **Singapore:** Sinupret; **Switz.:** Sinupret; **Thai.:** Sinupret.



(sparteine)

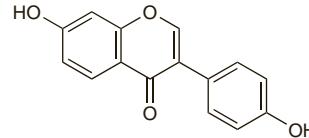
## Soya Isoflavones

### Daidzein

4',7-Dihydroxyisoflavone; 7-Hydroxy-3-(4-hydroxyphenyl)-4H-1-benzopyran-4-one.

$C_{15}H_{10}O_4 = 254.2$ .

CAS — 486-66-8.

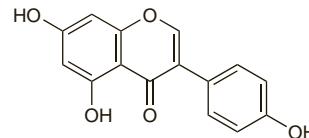


### Genistein

Cl-75610; Genisteol; Prunetol. 4',5,7-Trihydroxyisoflavone; 5,7-Dihydroxy-3-(4-hydroxyphenyl)-4H-1-benzopyran-4-one.

$C_{15}H_{10}O_5 = 270.2$ .

CAS — 446-72-0.



## Profile

Genistein and daidzein are soya isoflavones. Genistein, a tyrosine kinase inhibitor, is a phytoestrogen that has been tried for the relief of menopausal symptoms. It is also being investigated for its beneficial effect on blood lipids and for its proposed tumour-suppressing activity. Daidzein has been investigated similarly. Daidzein, mainly in the form of its glycoside daidzin, is a component of some herbal medicines traditionally used in the management of alcohol abuse.

**Effects on the endocrine system.** For a suggestion that isoflavones in soya-based formulas may exert biological effects, see p.1966.

**Hyperlipidaemias.** For a discussion of possible beneficial effects of soya isoflavones on blood lipids, see p.1967.

**Menopausal disorders.** Soya isoflavones have been investigated for their oestrogen-modulating effects, see p.1967.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Arg.:** Sojadol; Sojar Men; Tamvili Isoflavonas; **Braz.:** Buona; Flavon; Menop; Soy 50; Sofyem; **Fr.:** Flavonex; Inclim; **Hong Kong:** Phyto Soya; Phyto-Care; **Indon.:** Calvon; Promensi; **Ital.:** Soymen Gel; **Mex.:** Pausicaps†; **Port.:** Isogyn†; **S.Afr.:** Phytopause; **Singapore:** Isovon; **Venez.:** Climasoy.

**Multi-ingredient:** **Arg.:** Isaflavan; Sigmafen Free; Snella; Sojar Plus-Calcio; Sojaesterol; **Canad.:** Natural HRT; **Fr.:** Anapacs; Effia; Estrofort; Gynalpa Plus; **Hong Kong:** Caltrate + Soy; Palmetto Plus†; Phyto-Ease; Phytoestriol†; **Indon.:** Cal-95; Calboson; Femosa; Hi-Bone; Isolem; **Ital.:** Apogeo; Climil Gel; Evestrel; Fitogenome; Rinnova; **Port.:** Afron†; Femmet†; **S.Afr.:** Phytopause BSF; **Singapore:** Caltrate + Soy; Palmetto Plus; Phytoestrin; **UK:** Aria; SoyPlus; **USA:** Better Cholesterol; Fosteum; **Venez.:** Calcion D Soya.

## Sparteine Sulfate (USAN, rINN)

Spart. Sulph.; Spartéine, Sulfate de; Sparteine Sulphate; (—)-Sparteine Sulphate; l-Sparteine Sulphate; Spartéini Sulfas; Sparteinum Sulficum; Sulfato de esparteína. Dodecahydro-7,14-methano-2H,6H-dipyrido[1,2-a:1',2'-e][1,5]diazocine sulphate pentahydrate.

Спартеина Сульфат

$C_{15}H_{22}N_2 \cdot H_2SO_4 \cdot 5H_2O = 422.5$ .

CAS — 90-39-1 (sparteine); 299-39-8 (anhydrous sparteine sulfate); 6160-12-9 (sparteine sulfate pentahydrate).

ATC — C01BA04.

ATC Vet — Q01BA04.

**Pharmacopoeias.** In Fr. and Viet.

## Profile

Sparteine sulfate is a salt of the dibasic alkaloid, sparteine, which is obtained from scorpiarium (p.2384). Sparteine sulfate has been reported to lessen the irritability and conductivity of cardiac muscle and has been used in the treatment of cardiac arrhythmias. Small doses stimulate and large doses paralyse the autonomic ganglia. Peripherally, it has a fairly strong curare-like action, arresting respiration by paralysing the phrenic endings.

The metabolic oxidation of sparteine exhibits genetic polymorphism and this property has been exploited in *in-vitro* screening tests to identify other drugs that may be subject to similar genetic variations in their metabolism.

**Precautions.** Sparteine present in a herbal slimming preparation might cause adverse effects in slow metabolisers if excessive doses were ingested; pregnant women might be particularly at risk.<sup>1</sup>

1. Galloway JH, et al. Potentially hazardous compound in a herbal slimming remedy. *Lancet* 1992; 340: 179.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **Braz.:** Belacodid†.

## Spearmint

Menta; Mentha Viridis; Mentha Crispae Folium; Mint.

## Profile

Spearmint consists of the dried leaves and flowering tops of common spearmint, *Mentha spicata* (*M. viridis*) or of scotch spearmint (*M. cardiaca*) (Labiatae). Spearmint is the source of spearmint oil (below). It has carminative properties and is used as a flavour.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Braz.:** Giamebit†.

**Multi-ingredient:** **Chile:** Te Laxante; **Cz.:** Hertz- und Kreislauftee; **Fr.:** Mediflor Tisane Digestive No 3; **Switz.:** Gel a la consoude; Tisane antirhumatismale; Tisane pour l'estomac; Tisane pour le coeur et la circulation; Tisane pour le sommeil et les nerfs.

## Spearmint Oil

Huile Essentielle de Menthe Créepe; Menta, aceite esencial de; Oleum Menthae Crispae; Oleum Menthae Viridis.

## Pharmacopoeias. In Br. and Fr.

**BP 2008** (Spearmint Oil). It is obtained by distillation from fresh flowering plants of *Mentha spicata* or *Mentha × cardiaca*. A clear colourless, pale yellow or greenish-yellow liquid when freshly distilled, visibly free from water and with the odour of spearmint. It becomes darker and viscous on keeping. It contains not less than 55% w/w of carvone. Soluble 1 in 1 of alcohol (80%) at 20°; the solution may become cloudy when diluted. Store at a temperature not exceeding 25° in well-filled containers. Protect from light.

## Profile

Spearmint oil has similar properties to peppermint oil (p.1761) and is used as a carminative and as a flavour. It is also used in aromatherapy.

**Allergy.** Allergic contact cheilitis in a patient has been attributed to the spearmint oil present in tooth paste.<sup>1</sup>

1. Skrebova N, et al. Allergic contact cheilitis from spearmint oil. *Contact Dermatitis* 1998; 39: 35.

## Preparations

**Proprietary Preparations** (details are given in Part 3)

**Multi-ingredient:** **Austria:** Euka; **Chile:** Polvos Alcalinos; **Cz.:** Parodon-F5†; **Indon.:** Listerine Coolmint; **Ital.:** Dentosan Azione Intensiva; Dentosan Mese; **Philipp.:** Listerine Coolmint; **Switz.:** Alvogyl; **UK:** Fre-bre; Profelan.

## Spike Lavender

Lavande aspic.

## Profile

Spike lavender, *Lavandula latifolia* (Lamiaceae), is used similarly to lavender (p.2331) as a sedative and for biliary disorders. It is the source of spike lavender oil (below).

The symbol † denotes a preparation no longer actively marketed