Melsitt; Minutil†; Prontocid N†; Sekucid konz†; Sekusept Extra N; Sekusept forte \$; Sekusept forte†; Sporcid; Ultrasol-F; **Hal.**: Bergon†; Citrosteril Impronte; Dianl†; Eso Din; Esoform 92; Incidin Spezial; Melsept; Melsept SF; Sekucid; Sekumatic; Sekusept Extra N**†; Thal**: Posequat with GA.

Glyoxal

Biformilo; Ethanedial; Glioxal; Oxalaldehyde. 1,2-Ethanedione. $C_2H_2O_2 = 58.04.$ CAS — 107-22-2

Profile

Glyoxal is an aldehyde used for the disinfection of surfaces and of medical and surgical instruments.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: Fr.: Aniospray 41; Bacterianos D†; Incidine†; Ger.: Buration 10 F; Desoform† Freka-Nol; Fugisept†; Incidin perfekt; Incidin Spezial; Incidiur; Lysoformin 3000; Meliseptol; Melsept SF; Melsept†; Minutil†; Sekusept forte†; Ultrasol-F; Ital.: Incidin Spezial; Indulfan; Melsept, Melsept SF; Melsept Spray.

Halazone (HNN)

Halazona; Halazonum; Pantocide. 4-(Dichlorosulphamoyl)benzoic acid.

Галазон

 $C_7H_5Cl_2NO_4S = 270.1.$ CAS - 80-13-7.

Pharmacopoeias. In US.

USP 31 (Halazone). A white crystalline powder with a characteristic odour of chlorine. Soluble 1 in more than 1000 of water and of chloroform, 1 in 140 of alcohol, and 1 in more than 2000 of ether; soluble in glacial acetic acid. It dissolves in solutions of alkali hydroxides and carbonates with the formation of a salt. Store in airtight containers. Protect from light.

Profile

Halazone is a disinfectant with the general properties of chlorine (p.1638) in aqueous solution and is used for the disinfection of drinking water (p.1623). It contains about 52% of 'available chlorine' (see p.1638). One tablet containing 4 mg of halazone, stabilised with sodium carbonate and sodium chloride, may be sufficient to treat about 1 litre of water in about 30 minutes to 1 hour. The taste of residual chlorine may be removed by adding sodium thiosulfate.

Preparations

USP 31: Halazone Tablets for Solution

Proprietary Preparations (details are given in Part 3) *Ital.*: Steridrolo a rapida idrolisi†; **Port.**: Speton†.

Hexachlorophene (BAN, rINN)

G-II; Heksaklorofeeni; Hexachlorofen; Hexachlorophane; Hexachlorophène; Hexachlorophenum; Hexaclorofeno; Hexaklorofen. 2,2'-Methylenebis(3,4,6-trichlorophenol).

Гексахлорофен

 $C_{13}H_6CI_6O_2 = 406.9.$

CAS — 70-30-4. ATC — D08AE01

ATC Vet - QD08AE01; QP52AG02.

Pharmacopoeias. In Br. and US.

BP 2008 (Hexachlorophene). A white or pale buff, odourless or almost odourless, crystalline powder. Practically insoluble in water: freely soluble in alcohol: very soluble in acetone and in ether. It dissolves in dilute solutions of alkali hydroxides. Protect from light.

USP 31 (Hexachlorophene). A white or light tan, crystalline powder which is odourless or has a slight phenolic odour. Insoluble in water; freely soluble in alcohol, in acetone, and in ether; soluble in chloroform and in dilute solutions of fixed alkali hydroxides. Store in airtight containers. Protect from light.

Incompatibility. The activity of hexachlorophene may be reduced in the presence of blood or other organic material. It retains some activity in the presence of soap.

The activity has been reported1 to be reduced by alkaline media and by nonionic surfactants such as polysorbate 80. It is extremely sensitive to iron, and to avoid discoloration due to traces of this metal in hexachlorophene detergent solutions, it is advisable to incorporate a sequestrant such as disodium edetate.2

- Walter G, Gump W. Effect of pH on hexachlorophene. Soap Chem Spec 1963; 39: 55-6.
- Bell M. Hexachlorophene-based skin cleansers. Specialities 1965; 1: 16–18.

Adverse Effects and Treatment

After ingestion, anorexia, nausea, vomiting, diarrhoea, abdominal cramps, dehydration, shock, and confusion may occur. Convulsions and death may follow. CNS stimulation, convulsions, and death have also occurred after absorption of hexachlorophene from burns and damaged skin. There have been reports showing that hexachlorophene can be absorbed through the skin of infants in amounts sufficient to produce spongy lesions of the brain, sometimes fatal.

Photosensitivity and skin sensitisation have occasionally occurred after repeated use of hexachlorophene.

Treatment of adverse effects is as for Phenol, p.1656. Effects on the respiratory system. Asthma developed in a 43-year-old nurse after long-term exposure to hexachlorophene

powder.1 1. Nagy L, Orosz M. Occupational asthma due to hexachlorophene. Thorax 1984; 39: 630-1.

Precautions

Hexachlorophene should not be applied to mucous membranes, large areas of skin, or to burnt, damaged, or denuded skin and should not be used vaginally, applied under occlusive dressings, or applied to areas affected by dermatoses. It should be used with caution on infants, especially premature and low birth-weight neonates. Its use is not advised in pregnancy.

Preparations of hexachlorophene are liable to contamination, especially with Gram-negative bacteria.

Breast feeding. The American Academy of Pediatrics¹ considers that, while no effects on the infant have been reported, there is a possibility of contamination of breast milk with hexachlorophene used by breast-feeding mothers for nipple washing.

1. American Academy of Pediatrics. The transfer of drugs and other chemicals into human milk. *Pediatrics* 2001; **108:** 776–89. Correction. *ibid.*; 1029. Also available at: http://aappolicy.aappublications.org/cgi/content/full/pediatrics%3b108/3/776 (accessed 15/03/06)

Neonates. Spongiform encephalopathy has occurred in neonates who were treated topically with hexachlorophene. Neonates with a birth-weight of 1.4 kg or less appeared to be most susceptible, whereas those weighing over 2 kg were not considered to be at risk.^{1,2} Also most of the reports involved hexachlorophene applied in a concentration of 3%.

- Anonymous. Hexachlorophene today. *Lancet* 1982; i: 87–8.
 Plueckhahn VD, Collins RB. Hexachlorophene emulsions and antiseptic skin care of newborn infants. *Med J Aust* 1976; 1:

Pregnancy. Hexachlorophene is absorbed from the skin and crosses the placenta, but whether it has produced teratogenic effects is subject to debate. 1.2 However, it is considered best to avoid its use during pregnancy.

- Halling H. Suspected link between exposure to hexachlorophene and malformed infants. Ann NY Acad Sci 1979; 320: 426–35.
- Baltzar B, et al. Pregnancy outcome among women working in Swedish hospitals. N Engl J Med 1979; 300: 627–8.

Pharmacokinetics

Hexachlorophene is absorbed from the gastrointestinal tract after accidental ingestion, and through intact and denuded skin. Percutaneous absorption may be significant in premature infants and through damaged skin. Hexachlorophene crosses the placenta.

Uses and Administration

Hexachlorophene is a chlorinated bisphenol antiseptic with a bacteriostatic action against Gram-positive organisms, but much less effective against Gram-negative organisms. It is most active at pH 5 to 6.

Hexachlorophene is mainly used in soaps and creams in a concentration of 0.23 to 3% and is an ingredient of various preparations used for skin disorders. After repeated use of these preparations for several days there is a marked diminution of the bacterial flora due to accumulation of hexachlorophene in the skin. This residual effect is rapidly lost after washing with unmedicated soap or alcohol.

A preparation containing 3% is used for the disinfection of the hands of surgeons and other health-care personnel. Thorough rinsing is recommended before drying. Hexachlorophene has been applied as a 0.33% dusting powder to the umbilical cord stump for the control of staphylococcal infection in the newborn. However, care is necessary when using hexachlorophene in neonates (see above).

Hexachlorophene sodium has also been used.

Disinfection. Eradication of an outbreak of infection with meticillin-resistant Staphylococcus aureus in a neonatal intensive care unit was achieved by use of hexachlorophene soap for hand washing. Previous infection-control measures including the use of chlorhexidine had failed.1 For a discussion of staphylococcal infections and their treatment, see p.195.

1. Reboli AC, et al. Epidemic methicillin-gentamicin-resistant Staphylococcus aureus in a neonatal intensive care unit. Am J Dis Child 1989; **143:** 34–9.

Preparations

BP 2008: Hexachlorophene Dusting Powder; USP 31: Hexachlorophene Cleansing Emulsion; Hexachlorophene Liquid

Proprietary Preparations (details are given in Part 3)
Cz.: Aknefug-Simplex†; Gen.: Aknefug simplex†; Indon.: Dermisan;
Switz.: Acne-Med Wolff Simplex†; UK: Ster-Zac†; USA: Septisol†; Venez.:

Multi-ligredient: Braz.: Micosan†; Canad.: pHisoHex; Cz.: Aknefug†, Hexadecyl†; Septonex; Ger.: Aknefug-Emulsion†; Hung:: Phlogosol; Indon:: Topicide: Inl.: Torbetol; Israel: Acnext† Port.: Anacal; Spain: Cresophene; Switz.: Acerbine†; Thal.: Cibis; USA: pHisoHex; Venez.: Permucal.

Hexamidine Isetionate (BANM, rINNM)

Heksamidino diizetionatas; Hexamidin-diisetionát; Hexamidin-diizetionát; Hexamidine Diisetionate; Hexamidine, diisétionate d'; Hexamidine Isethionate; Hexamidine, Isétionate d'; Hexamidini diisetionas; Hexamidini Isetionas; Isetionato de hexamidina. 4,4'-(Hexamethylenedioxy)dibenzamidine bis(2-hydroxyethanesulphonate).

Гексамидина Изетионат

 $C_{20}H_{26}N_4O_2, 2C_2H_6O_4S = 606.7$

– 38 l I -75-4 (hexamidine); 659-40-5 (hexamidine isetionate).

D08AC04; R01AX07; R02AA18; S01AX08; S03AA05.

QD08AC04; QR01AX07; QR02AA18; Vet QS01AX08; QS03AA05.

NOTE. The name Hexamidinum has been used for primidone (p.503)

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

Ph. Eur. 6.2 (Hexamidine Diisetionate; Hexamidine Isetionate BP 2008). A white or slightly yellow hygroscopic powder. Sparingly soluble in water; slightly soluble in alcohol; practically insoluble in dichloromethane. Store in airtight containers.

Profile

Hexamidine isetionate has antibacterial and antifungal properties and is available in preparations for the local treatment of minor

Acanthamoeba keratitis. Hexamidine was suggested¹ as a possible alternative to propamidine for the treatment of Acanthamoeba keratitis (p.822) due to the poor cysticidal activity, chronic conjunctival infection, and resistance of some *Acan-thamoeba* strains seen with propamidine. ^{1,2} Cures have been reported with 0.1% hexamidine used either as monotherapy^{2,3} with polihexanide.²

 Perrine D. et al. Amoebicidal efficiencies of various diamidines against two strains of Acanthamoeba polyphaga. *Antimicrob Agents Chemother* 1995; **39:** 339–42. Seal DV. Acanthamoeba keratitis update—incidence, molecular epidemiology and new drugs for treatment. Eye 2003; 17:

Adverse effects. A systemic allergic reaction in a patient after use of a topical antiseptic cream was confirmed, by skin prick tests, to be caused by hexamidine.1

Mullins RJ. Systemic allergy to topical hexamidine. Med J Aust 2006; 185: 177.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg.: Desomedine†, Belg.: Hexomedine; Ophtamedine; Fr.: Desomedine; Hexaseptine; Hexomedine; Ger.: Hexamedin N†; Laryngomedin N; Singapore: Desomedine; Spain: Hexomedin; Switz.: Desomedine; Venez.: Hexomedin; Switz.: Desomedine; Venez.: Hexomedin; Switz.: Desomedine; Venez.: Hexomedin; Switz.: Desomedine; Venez.: Hexomedin; Venez.: Hexomedine; Venez.

Multi-ingredient: Austral.: Medi Creme; Medi Pulv; Belg.: Colludol; Fraz: Hexomedine; Z.: Cyteal; Imacort; Imazol Plus; Fr.: Aurigoutte; Colludo; Cyteal; Hexomedine; Otomide; Pulvo 47†; Solutricine Maux de Gorge; Ger.: Imazol; Imazol comp; Pulvo; Gr.: Octrene; Hong Kong: Medicreme; Medipulv†; NZ: Medicreme; Medipulv†; NZ: Medicreme; Medipulv†; NZ: Medicreme; Medipulv†; NZ: Mazol; Spain: Tantum; Switz.: Imacort; Imazol; Thai.: Pulvo 47; Turk.: Imazol; Pulvo 47; UK: Cyteal.

Hexetidine (BAN, rINN)

Heksetidini; Heksetidin; Heksetidinas; Hexetidina; Hexetidina; Hexétidine; Hexetidinum. 5-Amino-1,3-bis(2-ethylhexyl)hexahydro-5-methylpyrimidine.

Гексэтилин

 $C_{21}H_{45}N_3 = 339.6.$

CAS - 141-94-6. ATC — AOIABI2.

ATC Vet - QA01AB12.

$$H_3C$$
 N
 N
 CH_3
 CH_3
 CH_3

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

Ph. Eur. 6.2 (Hexetidine). An oily, colourless or slightly yellow liquid. Very slightly soluble in water; very soluble in alcohol, in acetone, and in dichloromethane. It dissolves in dilute mineral acids. Protect from light.

Adverse Effects

Allergic contact dermatitis, alterations in taste, and transient anaesthesia have occasionally been reported.

Uses and Administration

Hexetidine is a bactericidal and fungicidal antiseptic. It is used for minor infections of mucous membranes, and in particular as a 0.1% mouthwash for local infections and oral hygiene.

Oral hygiene. A mouthwash containing 0.1% hexetidine was no more effective than placebo in the management of patients with aphthous ulceration (see Mouth Ulceration, p.1700) and provided no additional benefits to oral hygiene or gingival health.1 However, such a mouthwash does appear to be of benefit in reducing supragingival plaque and gingival inflammation.2

- 1. Chadwick B, et al. Hexetidine mouthrinse in the management of minor aphthous ulceration and as an adjunct to oral hygiene. *Br Dent J* 1991; **171:** 83–7.
- 2. Sharma NC, et al. Antiplaque and antigingivitis effectiveness of a hexetidine mouthwash. J Clin Periodontol 2003; 30: 590-4.

Preparations

Proprietary Preparations (details are given in Part 3)

Arg.: Duranii, Austria: Hexoral; Isozid-H; Belg.: Hextrii; Canad.: Steri/Sol; Chile: Duranii; Muramyl†; Cz.: Dr Rentschler Rachenspray†; Dr Rentschler Rachenspulung†; Fr.: Collu-Hextrii; Hextrii; Ger.: Doreperol N†; Hexoral; Ngi-Hex, Gr.: Hexalen; Inir; Hong Kong: Bactidol; Indon.: Bactidol; Hexadol; Inl.: Oraldene; Ital.: Oraseptic; Malaysia: Bactidol†; Neth.: Hextrii; Philipp.: Bactidol; Port.: Collu-Hextrii; Hextrii; Russ.: Hexoral (「excopay): Stomatidine (Cromaruayuh); S.Afr.: Oraldine; Singapore: Bactidol; Spain: Hextrii; Switz.: Drossadin; Hextrii; Vagi-Hex; Turk.: Heksoral; Hekzoton; UK: Oraldene; Venez.: Oraldine†;

Multi-ingredient: Arg.: Buchex; Mantus; Pentadent†; Austria: Gurfix; Belg.: Givalex; Cz.: Stopangin; Fr.: Givalex; Ger.: Givalex†; Hong Kong: Anso; Rus.: Stopangin (Стопангин); Spain: Abrasone Rectal; Mentamida.

Hexylresorcinol (BAN)

Esilresorcina; Heksilrezorcinolis; Heksyyliresorsinoli; Hexilresorcinol: Hexilrezorcin: Hexvlresocinolum: Hexvlresorc: Hexvlrésorcinol; Hexylresorcinolum. 4-Hexylbenzene-1,3-diol.

 $C_{12}H_{18}O_2 = 194.3.$

CAS — 136-77-6. ATC — RO2AA12.

ATC Vet - QR02AA12.

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

Ph. Eur. 6.2 (Hexylresorcinol). A colourless, yellowish or reddish crystalline powder or needles, turning brownish-pink on exposure to light or air. It exhibits polymorphism. M.p. 66° to 68°; melting may occur at about 60° followed by solidification and a second melting at 66° to 68°. Very slightly soluble in water; freely soluble in alcohol and in dichloromethane. Store in airtight containers. Protect from light.

USP 31 (Hexylresorcinol). M.p. 62° to 67°. Store in airtight containers. Protect from light.

Incompatibility. Hexylresorcinol is incompatible with alkalis and oxidising agents.

Profile

Hexylresorcinol is a phenolic antiseptic that is used topically for the treatment of minor infections of the skin and mucous membranes, and in the form of lozenges for the treatment of sore throat. It has also been used in vaginal spermicidal preparations.

High concentrations of hexylresorcinol are irritant and corrosive to skin and mucous membranes. Alcoholic solutions are vesicant.

It was formerly used as an anthelmintic.

Preparations

USP 31: Hexylresorcinol Lozenges.

Proprietary Preparations (details are given in Part 3)

Austral.: Nyal Medithroat Anaesthetic Lozenges†; Strepsils Extra; Canad.: Antiseptic Throat Lozenges; Bradosol; Bronchodex Pastilles Antiseptiques; Soothe Aid; Strepsils Anesthetic Formula; Sucrets Extra Strength; Cz.: Strepsinol; Irl.: Strepsils Extra; Israel: Sucrets†; Malaysia: Strepsils Pain Relief; Mic Benylin Sore Throat Lozengef†, Halls Soothers Triple Action; Lensip Sore Throat; Soothers Triple Action; Strepsils Extra; TCP; USA: ST 37; Sucrets Original Formula Sore Throat Coricial Mich. Original Mint.

Multi-ingredient: Arg.: Algiodent; Apracur Bucofaringeo†; Bagociletas sin Anestesia†; Balsamina: Caramelos Antibioticos Caramelos Antibioticos Bucoangin†; Caramelos Antibioticos Lefmar; Caramelos Oriental; Collubiazo!; Dottnir, Fanaletas; Fungicida†; kana; No-Tos Adultos; No-Tos Pocket; Pastillas Medex Refenax Caramelos Expectorantes; Suavisan N; Suavisan†; Brazz.: Andriodermo!; Micoz†; Chile: Fittig; Lady Fittig†; Cz.: Coldrex Laryplus; Ger: Hexamon; Mycatox†; Hung.: Coldrex Laryplus†; India: Tytin; Ital: Golamed Due†; Pol.: Coldrex; UK: Beechams Max Strength Sore Throat Relief; Beechams Throat-Plus.

Hydrargaphen (BAN, rINN)

Hidrargafeno; Hydrargaphen; Hydrargaphenum; Hygraphen; Phenylmercuric Dinaphthylmethanedisulfonate. μ -(2,2'-Binaphthalene-3-sulphonyloxy)bis(phenylmercury).

Гидраргафен

 $C_{33}H_{24}Hg_2O_6S_2 = 981.9.$ CAS - 14235-86-0

Hydrargaphen is a mercurial antiseptic with antibacterial and antifungal properties. It has been used in the treatment of vaginitis, wounds, burns, and infections of the skin.

Preparations

Proprietary Preparations (details are given in Part 3)

Multi-ingredient: Hong Kong: Penotran+

Hydrogen Peroxide

Hidrojen Peroksit; Hydrogène, peroxyde d'; Hydrogenii peroxidum; Peróxido de hidrógeno.

Перекись Водорода

 $H_2O_2 = 34.01$.

CAS — 7722-84-1. ATC - A01AB02; D08AX01; S02AA06.

ATC Vet - QA01AB02; QD08AX01; QS02AA06.

NOTE. The BP 2008 directs that when Hydrogen Peroxide is prescribed or demanded, Hydrogen Peroxide Solution (6 per cent) shall be dispensed or supplied.

Incompatibility. Hydrogen peroxide solutions are incompatible with reducing agents, including organic matter and oxidisa-ble substances, and with some metals, metallic salts, alkalis, iodides, permanganates, and other stronger oxidising agents.

Stability. Aqueous solutions of hydrogen peroxide gradually decompose on standing and if allowed to become alkaline. Decomposition is increased by light, agitation, and heat. Incompatibility may also produce decomposition. Solutions are comparatively stable in the presence of a slight excess of acid. Strong solutions are considered to be more stable than weak solutions.

Storage. Solutions of hydrogen peroxide should be stored in airtight containers at 15° to 30° (but see Hydrogen Peroxide Solution (30 per cent), below). Solutions should not be stored for long periods. Those not containing a stabiliser should be stored at a temperature not exceeding 15°. Protect from light.

Hydrogen Peroxide Solution (3 per cent)

3 %-os hidrogén-peroxid-oldat; Dilute Hydrogen Peroxide Solution; Hydrogen Peroxide Solution (10-volume); Hydrogen Peroxide Topical Solution; Hydrogenii Peroxidum 3%; Hydrogenii Peroxidum 3 Per Centum; Oxydol; Peroxid vodíku 3%; Peróxido de hidrógeno, solución al 3%; Vandenilio peroksido 3% tirpalas; Väteperoxid 3%; Vetyperoksidi 3%; Wodoru nadtlenek 3%.

ATC - A01AB02; D08AX01; S02AA06. ATC Vet - QA01AB02; QD08AX01; QS02AA06.

Pharmacopoeias. In Chin., Eur. (see p.vii), Jpn, US, and Viet. Ph. Eur. 6.2 (Hydrogen Peroxide Solution (3 per cent)). A clear colourless liquid containing 2.5 to 3.5% w/w of H2O2 corresponding to about 10 times its volume of oxygen. It decomposes in contact with oxidisable organic matter and with certain metals and if allowed to become alkali. It may contain a suitable stabilising agent. Solutions not containing a stabilising agent should be stored at a temperature below 15°. Protect from light.

The BP 2008 directs that when Hydrogen Peroxide is prescribed or demanded, Hydrogen Peroxide Solution (6 per cent) shall be dispensed or supplied.

USP 31 (Hydrogen Peroxide Topical Solution). It contains 2.5 to 3.5% w/v of H_2O_2 . It may contain up to 0.05% of a suitable preservative or preservatives. Store in airtight containers at a temperature between 15° and 30°. Protect from light.

Hydrogen Peroxide Solution (6 per cent)

Hydrog. Perox. Soln; Hydrogen Dioxide Solution; Hydrogen Peroxide Solution; Hydrogen Peroxide Solution (20-volume); Liq. Hydrog. Perox.; Liquor Hydrogenii Peroxidi; Peróxido de hidrógeno, solución al 6%; Solución de Bióxido de Hidrogeno; Soluté Officinal d'Eau Oxygénée; Wasserstoffsuperoxydlösung.

ATC - A01AB02; D08AX01; S02AA06.

ATC Vet - QA01AB02; QD08AX01; QS02AA06.

Pharmacopoeias. In Br.

BP 2008 (Hydrogen Peroxide Solution (6 per cent)). A clear colourless aqueous liquid containing 5.0 to 7.0% w/v of H2O2 corresponding to about 20 times its volume of available oxygen. It decomposes in contact with oxidisable organic matter and with certain metals and if allowed to become alkali. It may contain a suitable stabilising agent. It should not be stored for long periods. Solutions not containing a stabilising agent should be stored at a temperature below 15°. Protect from light.

The BP directs that when Hydrogen Peroxide is prescribed or demanded, Hydrogen Peroxide Solution (6 per cent) shall be dispensed or supplied.

Hydrogen Peroxide Solution (27 per cent)

Hydrogenii Peroxidum; Perossido D'Idrogeno Soluzione; Peróxido de hidrógeno, solución al 27%; Solutio Hydrogenii Peroxydati; Strong Hydrog. Perox. Soln; Strong Hydrogen Peroxide Solution. ATC - A01AB02; D08AX01; S02AA06.

ATC Vet - QA01AB02; QD08AX01; QS02AA06.

Description. Hydrogen peroxide solution (27 per cent) is a clear, colourless aqueous solution containing 26 to 28% w/w of $\rm H_2O_2$, corresponding to about 100 times its volume of available oxygen. It may contain a suitable stabilising agent.