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

Ph. Eur. 6.2 (Thiomersal). A white or almost white crystalline powder. Freely soluble in water; sparingly soluble or soluble in alcohol; practically insoluble in dichloromethane. A 0.8% solution in water has a pH of 6.0 to 8.0. Protect from light.

USP 31 (Thimerosal). A light cream-coloured crystalline powder with a slight characteristic odour. Soluble 1 in 1 of water and 1 in 12 of alcohol; practically insoluble in ether. A 1% solution in water has a pH of about 6.7. Store in airtight containers. Protect from light.

Incompatibility. Thiomersal is incompatible with acids, metal ions, and iodine. It forms precipitates with many alkaloids. The rate of oxidation of thiomersal in solution is greatly increased by traces of copper ions. In slightly acid solution thiomersal may be precipitated as the corresponding acid which undergoes slow decomposition with the formation of insoluble products. The activity of thiomersal may also be reduced by boric acid, edetic acid, or sodium thiosulfate or by the presence of blood or organic matter. Thiomersal may be adsorbed by plastic or rubber packaging materials.

References.

1. Richards RME, Reary JME. Changes in antibacterial activity of thiomersal and PMN on autoclaving with certain adjuvants. *J Pharm Pharmacol* 1972; **24** (suppl): 84P–89P.
2. Reader MJ. Influence of isotonic agents on the stability of thimerosal in ophthalmic formulations. *J Pharm Sci* 1984; **73:** 840–1.
3. Morton DJ. EDTA reduces antimicrobial efficacy of thiomersal. *Int J Pharmaceutics* 1985; **23:** 357–8.

Adverse Effects, Treatment, and Precautions

As for Mercury, p.2341.

Hypersensitivity reactions occasionally occur. Allergic conjunctivitis has been reported.

◊ General references.

1. Risher JF, *et al.* Organic mercury compounds: human exposure and its relevance to public health. *Toxicol Ind Health* 2002; **18:** 109–60.

Hypersensitivity. Both delayed (allergic contact) and immediate (including anaphylaxis and immune complex mediated disorders) hypersensitivity reactions have been associated with thiomersal.[1] The frequency of positive patch tests varies, with a Canadian centre reporting[2] an average incidence of 4.53% and a centre in the USA an incidence of 8.7%.[3] Most reactions are local and mild, involving application sites or blepharoconjunctivitis from ocular preparations,[1,4] although there has been a report of acute laryngeal obstruction in a patient previously sensitised to the substance who used a throat spray preserved with thiomersal.[5] A case of occupational allergic contact dermatitis has been reported in a nurse as a result of contact with thiomersal as a preservative in childhood vaccines.[6] A generalised maculopapular eruption from an influenza vaccine containing thiomersal has also been reported.[7] The main source of sensitisation is thought to be thiomersal-preserved vaccines. Most people with patch tests positive to thiomersal are able to tolerate thiomersal-containing vaccines, although some individuals may experience reactions ranging from mild to serious.[1] If there is a definite history of anaphylaxis to thiomersal in any product, vaccines containing thiomersal should not be given. However, while anaphylaxis has not been shown to occur as a result of thiomersal in vaccines, it remains a theoretical risk.[1]

1. National Advisory Committee on Immunization (NACI). Statement on thimerosal. *Can Commun Dis Rep* 2003; **29:** 1–10.
2. Freiman A, *et al.* Patch testing with thimerosal in a Canadian center: an 11-year experience. *Am J Contact Dermat* 2003; **14:** 138–43.
3. Suneja T, Belsito DV. Thimerosal in the detection of clinically relevant allergic contact reactions. *J Am Acad Dermatol* 2001; **45:** 23–7.
4. Wilson LA, *et al.* Delayed hypersensitivity to thiomersal in soft contact lens wearers. *Ophthalmology* 1981; **88:** 804–9.
5. Maibach H. Acute laryngeal obstruction presumed secondary to thiomersal (merthiolate) delayed hypersensitivity. *Contact Dermatitis* 1975; **1:** 221–2.
6. Kiec-Swierczynska M, *et al.* Occupational allergic contact dermatitis due to thimerosal. *Contact Dermatitis* 2003; **48:** 337–8.
7. Lee-Wong M, *et al.* A generalized reaction to thimerosal from an influenza vaccine. *Ann Allergy Asthma Immunol* 2005; **94:** 90–4.

Poisoning. Serious adverse effects have followed parenteral and topical use of thiomersal.

Six poisonings (5 fatal) resulted from the use of 1000 times the normal concentration of thiomersal in a preparation of chloramphenicol for intramuscular injection.[1] There has also been a case report[2] of mercury poisoning associated with the intravenous use of high-dose hepatitis B immunoglobulin, preserved with thiomersal, after liver transplantation. Initial symptoms were paranoia, which rapidly progressed to severe dysarthria, static tremor, chorea, and decreased motor strength, as well as haemorrhagic gastritis. The patient responded well to chelation therapy.

Thiomersal used in topical antiseptic preparations was found to be toxic to epidermal cells.[3] After the death of 10 of 13 children as a result of treatment of omphaloceles (umbilical hernia) with a tincture of thiomersal, it was recommended that organic mercurial disinfectants be heavily restricted or withdrawn from hospital use as absorption occurred readily through intact membranes.[4]

A 44 year-old man who drank 83 mg/kg of a thiomersal-containing solution in an attempted suicide, spontaneously vomited after 15 minutes.[5] On admission to hospital a gastric lavage was performed and chelating drugs given. Despite this he developed gastritis, renal failure, dermatitis, gingivitis, delirium, polyneuropathy, respiratory failure, and coma. The patient was treated symptomatically, and 148 days after ingestion had recovered fully, except for sensory defects in two toes.

1. Axton JHM. Six cases of poisoning after a parenteral organic mercurial compound (Merthiolate). *Postgrad Med J* 1972; **48:** 417–21.
2. Lowell JA, *et al.* Mercury poisoning associated with high-dose hepatitis-B immune globulin administration after liver transplantation for chronic hepatitis B. *Liver Transpl Surg* 1996; **2:** 475–8.
3. Anonymous. Topical antiseptics and antibiotics: organic mercurials. *Med Lett Drugs Ther* 1977; **19:** 83.
4. Fagan DG, *et al.* Organ mercury levels in infants with omphaloceles treated with organic mercurial antiseptic. *Arch Dis Child* 1977; **52:** 962–4.
5. Pfab R, *et al.* Clinical course of severe poisoning with thiomersal. *J Toxicol Clin Toxicol* 1996; **34:** 453–60.

Vaccines. The use of thiomersal as a preservative in vaccines and its role as a possible cause of autism and neurodevelopmental disorders has been a controversial topic since 1999[1] when the regulatory authorities in both Europe[2] and the USA[3] issued statements recommending that the use of thiomersal in vaccines be phased out. This was based on the fact that the cumulative amount of mercury in the infant immunisation schedule potentially exceeds the recommended maximum level set by the US government for methyl mercury. More recently, however, a number of studies[4] have indicated a lack of association between thiomersal-containing vaccines and neurodevelopmental disorders such as autism and speech disorders. These findings were supported by the fact that thiomersal is metabolised to ethylmercury, which has substantially different pharmacokinetics to methylmercury. Ethylmercury is more rapidly excreted and does not accumulate in the body. The EMEA has issued a further statement[5] in which it confirmed that thiomersal could be used as a preservative when no alternative was available, subject to certain labelling requirements regarding hypersensitivity. The UK CSM[6] and the US FDA[7] have similarly concluded that there is no evidence of neurological adverse effects caused by the small amounts of thiomersal present in some vaccines; despite this, both endorse the view that the use of vaccines without thiomersal would be a prudent precautionary measure. WHO states[8,9] that there is no compelling scientific evidence of safety problems and advises that thiomersal-containing vaccines may continue to be used for global immunisation programmes because the benefit outweighs any theoretical risk of toxicity.

1. Bigham M, Copes R. Thiomersal in vaccines: balancing the risk of adverse effects with the risk of vaccine-preventable disease. *Drug Safety* 2005; **28:** 89–101.
2. European Agency for the Evaluation of Medicinal Products (EMEA). EMEA public statement on thiomersal containing medicinal products (July 1999). EMEA publication no. 20962/99. Full version: http://www.emea.europa.eu/pdfs/human/press/pus/2096299EN.pdf (accessed 27/08/08)
3. American Academy of Pediatrics, United States Public Health Service. Thimerosal in vaccines: a joint statement of the American Academy of Pediatrics and the Public Health Service. *MMWR* 1999; **48:** 563–5.
4. Parker SK, *et al.* Thimerosal-containing vaccines and autistic spectrum disorder: a critical review of published original data. *Pediatrics* 2004; **114:** 793–804.
5. European Agency for the Evaluation of Medicinal Products (EMEA). EMEA public statement on thiomersal in vaccines for human use—recent evidence supports safety of thiomersal-containing vaccines (March 2004). EMEA publication no. 1194/04. Full version: http://www.emea.europa.eu/pdfs/human/press/pus/119404en.pdf (accessed 27/08/08)
6. Committee on Safety of Medicines/Medicines and Healthcare Products Regulatory Agency. Safety of thiomersal-containing vaccines. *Current Problems* 2003; **29:** 9. Also available at: http://www.mhra.gov.uk/home/idcplg?IdcService=GET_FILE&dDocName=CON007450&RevisionSelectionMethod=LatestReleased (accessed 16/03/06)
7. FDA. Thimerosal in vaccines (updated June 2008). Available at: http://www.fda.gov/cber/vaccine/thimerosal.htm (accessed 11/08/08)
8. WHO. Guidelines on regulatory expectations related to the elimination, reduction or replacement of thiomersal in vaccines. *WHO Tech Rep Ser 926* 2004. Available at: http://www.who.int/biologicals/publications/trs/areas/vaccines/thiomersal/Annex%204%20(95-102)TRS926thiomersal.pdf (accessed 16/03/06)
9. WHO. Statement on thiomersal (issued July 2006). Available at: http://www.who.int/vaccine_safety/topics/thiomersal/statement_jul2006/en/print (accessed 11/08/08)

Interactions

Tetracyclines. Nine patients using a contact lens solution containing 0.004% thiomersal developed varying degrees of ocular irritation after taking oral *tetracyclines* concurrently. Exposure to either the tetracyclines or thiomersal alone did not cause the response.[1]

1. Crook TG, Freeman JJ. Reactions induced by the concurrent use of thimerosal and tetracycline. *Am J Optom Physiol Opt* 1983; **60:** 759–61.

Uses and Administration

Thiomersal is a bacteriostatic and fungistatic mercurial antiseptic that has been applied topically usually in a concentration of 0.1%. Its antibacterial action results from the release of ethylmercury after breakdown to thiosalicylate and ethylmercury.

Thiomersal, 0.001 to 0.01%, is used as a preservative in biological and pharmaceutical products. It has also been used to preserve solutions used in the care of contact lenses (p.1622).

Preparations

USP 31: Thimerosal Tincture; Thimerosal Topical Aerosol; Thimerosal Topical Solution.

Proprietary Preparations (details are given in Part 3)
Arg.: Lithiorsan; Merthiolate; ***Chile:*** Intrasept; ***Mon.:*** Vitaseptol; ***S.Afr.:*** Merthiolate; Thiomersalate; ***Thai.:*** Merthiolate†; ***USA:*** Aeroaid; Mersol; ***Venez.:*** Merthiolate.

Multi-ingredient: ***Spain:*** Proskin; ***Venez.:*** Thimerfesa†.

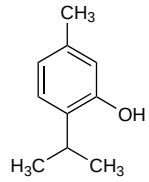
Thymol

Acido Timico; Isopropylmetacresol; Thymolum; Timol; Timolis; Tymol; Tymoli. 2-Isopropyl-5-methylphenol.

$C_{10}H_{14}O$ = 150.2.

CAS — 89-83-8.

ATC Vet — QP53AX22.



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

Ph. Eur. 6.2 (Thymol). Colourless crystals. The melting range is 48° to 52°. Very slightly soluble in water; very soluble in alcohol; freely soluble in volatile and in fixed oils; sparingly soluble in glycerol; dissolves in dilute solutions of alkali hydroxides. Protect from light.

USNF 26 (Thymol). Colourless, often large, crystals or a white crystalline powder with an aromatic thyme-like odour. The melting range is 48° to 51°; when melted it remains liquid at a considerably lower temperature. Soluble 1 in 1000 of water, 1 in 1 of alcohol and of chloroform, 1 in 1.5 of ether, and 1 in 2 of olive oil; soluble in glacial acetic acid and in fixed and volatile oils. Store in airtight containers. Protect from light.

Incompatibility. The antimicrobial activity of thymol is reduced by combination with protein.

Adverse Effects, Treatment, and Precautions

As for Phenol, p.1656.

When ingested, thymol is less toxic than phenol. It is irritant to the gastric mucosa. Fats and alcohol increase absorption and aggravate the toxic symptoms.

Hypersensitivity. Contact allergy to a heparinoid cream was due to an allergen formed by the reaction between thymol and the degradation products of a triazine derivative, both present as preservatives.[1]

1. Smeenk G, *et al.* Contact allergy to a reaction product in Hirudoid cream: an example of compound allergy. *Br J Dermatol* 1987; **116:** 223–31.

Uses and Administration

Thymol is a phenolic antiseptic with antibacterial and antifungal activity. It is more powerful than phenol but its use is limited by its low solubility in water, irritancy, and susceptibility to protein.

Thymol is used chiefly as a deodorant in mouthwashes and gargles such as Compound Thymol Glycerin (BP 1988), an aqueous mixture of thymol 0.05% and glycerol 10% with colouring and flavouring, which may be used diluted with about 3 times its volume of warm water before use. Thymol has been used topically in the treatment of skin disorders and is also inhaled, with other volatile substances, for colds, coughs, and associated respiratory disorders.

Thymol 0.01% is added as an antoxidant to halothane, trichloroethylene, and tetrachloroethylene.

Thymol iodide is used in preparations for dental hygiene.

Preparations

Proprietary Preparations (details are given in Part 3)
Ger.: Medophyll†; ***S.Afr.:*** Cool Mint Listerine; Freshburst Listerine.

Multi-ingredient: ***Arg.:*** Fungicida†; Listerine Clasico; Listerine Cool Mint; Listerine Fresh Burst; Manzan; Novobroncol†; Periobacter Prof Avio; Vagicural; ***Austral.:*** SM-33; Vicks Vaporub; ***Austria:*** Alpicort; Criniton; DDD; Gingivan; Kinder Luuf; Luuf Balsam; Pe-Ce; Spasmo Claim; Thrombocid; Wick Vaporub; ***Belg.:*** Borostyrol; Dentophar; Perubore; Vicks Vaporub; ***Braz.:*** Anestesiol†; Angino-Rub; Cloraseptic; Cutisanol; Fluomint; Frixodon†; Gargotan†; Gyrol†; Lenidor†; Passaja†; Relampago†; Tabletes Valda†; Valda†; Vick Vaporub; ***Canad.:*** Antiseptic Mouthwash; Boil Ease†; Buckley's White Rub†; Carboseptol†; Lipsorex Plus; Lipsorex†; Listerine; Listerine Antiseptic Tartar Control; Mouthwash Antiseptic & Gargle†; Nasal Jelly†; Thermo-Gel; Valda; Vaporisateur Medicamente; Vaporizing Ointment; ***Chile:*** Balsamo Leon†; Galutec†; Hansaplast Descongestionante; Listerine; Listermint Con Fluor; Oralfresh Citrus; Oralfresh Clasico; Polisep†; ***Cz.:*** Parodontal F5†; Pinosol; Septolete; ***Fin.:*** Vicks Vaporub; ***Fr.:*** Borostyrol; Listerine; Listerine protection dents et gencives; Moustidose; Nisacalm; Pastilles Medicinales Vicks; Perubore; Valda; Vicks Vaporub; ***Ger.:*** Alferm†; Criniton†; Em-medical†; Nasentropfen-ratiopharm†; Oestrugol N†; Pulmotin; Retterspitz Ausserlich; Retterspitz Quick; Salviathymol N; Thrombocid; ***Gr.:*** Oulogram; ***Hong Kong:*** Burn Cream†; Cool Mint Listerine; Gly Thymol; Kamistad; Listerine; Listerine Tartar Control; Listerine Teeth and

Gum Defence; Salomethyl; Valda†; ***India:*** Anaebell†; ***Indon.:*** Dactylen; Listerine; Listerine Coolmint; Skintex; Vital Ear Oil; ***Irl.:*** Karvol; Valda†; ***Israel:*** Gargol; Garonsept; Karvol; Pronestin; Rectozorin; ***Ital.:*** Eucalipto Composto†; Eugenol-Guaiacolo Composto; Listerine Fresh Citrus; Listerine Tartar Control; Pinselina Knapp; Rinostil; ***Malaysia:*** Listerine†; Salonpas; ***Mex.:*** Dermacid; Listerine; ***Neth.:*** Vicks Vaporub; ***NZ:*** Listerine; Listerine Tartar Control; Thymol Mouthwash Red†; Vicks Vaporub; ***Philipp.:*** Calmoseptine; Listerine Coolmint; Listerine Fresh Citrus; Listerine Freshburst; Listerine Original; Listerine Tartar Control; Listerine Teeth & Gum Defense; Mentopas; ***Pol.:*** Afronis; Bronchosol; Derhotili; Icy Rub; Pinosol; Pulmonil; Rub-Arom; Septolete; Sonol; Wick Vaporub; ***Port.:*** Edoltar†; Freimax†; Listerine†; Thrombocid; Valda†; ***Rus.:*** Bioprost (Биопрост); Doktor Mom (Доктор Мом); Efcamon (Эфкамон); Pinosol (Пиносол); Septogal (Септогал); Septolete (Септолете); Suprima-Plus (Суприма-Плюс); ***S.Afr.:*** Karvol; Listerine Antiseptic; Prep; Tartar Control Listerine Antiseptic; Vicks Vaporub; ***Singapore:*** Kamistad; Karvol; Listerine; Listerine Cool Mint; Listerine Fresh Burst; Listerine Tartar Control; ***Spain:*** Balsamo Kneipp†; Co Bucal; Mentobox; Pastillas Antisep Garg M; Piorlis; Vicks Vaporub; ***Swed.:*** Vicks Vaporub†; ***Switz.:*** Asphaline†; Borostyrol N†; Butaparin; Cresophene†; Ederphyt; Furodermal; GU Eau†; Huile analgesique "Temple of Heaven" contre les maux de tete†; Penta; Perubare†; Rapura; Sedasept†; Sedotussin†; Thrombocid; Vicks Vaporub N; ***Thai.:*** Burnol Plus; Flavinol; Kamistad; Stopain; ***Turk.:*** Kataljin; Mentimol; Mentolin; Otaci Meyanbali; Otaci Oka Mentol; Otaci Salvia; Vicks Vaporub; ***UK:*** Antiseptic Mouthwash; DDD; Dragon Balm; Karvol; Listerine Antiseptic Mouthwash; No-Sor Vapour Rub; Potter's Catarrh Pastilles; ***USA:*** BFI; Boil Ease; Listerine; Massengill; Vicks Menthol Cough Drops; Zonite; ***Venez.:*** Amicets; Lafarcaina.

Tosylchloramide Sodium *(BAN, rINN)*

Chloramidum; Chloramina; Chloramine; Chloramine T; Chloraminum; Cloramina; Klóramin; Mianin; Natrium Sulfaminochloratum; Tosilchloramido natrio druska; Tosilcloramida sódica; Tosylchloramid sodná sůl trihydrát; Tosylchloramide sodique; Tosylchloramidum natricum; Tosylchloramidum Natricum Trihydricum; Tosylkloramidnatrium; Tosyylikloramidinatrium. Sodium *N*-chlorotoluene-*p*-sulphonimidate trihydrate.

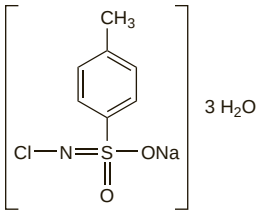
Тозилхлорамид Натрий

$C_7H_7ClNNaO_2S,3H_2O$ = 281.7.

CAS — 144-86-5 (tosylchloramide); 127-65-1 (tosylchloramide sodium).

ATC — D08AX04.

ATC Vet — QD08AX04.



NOTE. The name Chloramin has also been formerly used for a preparation of chlorphenamine maleate (p.571).

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

Ph. Eur. 6.2 (Tosylchloramide Sodium). A white or slightly yellow, crystalline powder. Freely soluble in water; soluble in alcohol. A 5% solution in water has a pH of 8.0 to 10.0. Store in airtight containers. Protect from light.

Adverse Effects and Treatment

Vomiting, cyanosis, circulatory collapse, frothing at the mouth, and respiratory failure can occur within a few minutes of tosylchloramide sodium ingestion. Fatalities have occurred. Tosylchloramide sodium in tap water has caused methaemo

globinaemia and haemolysis in patients undergoing dialysis. Bronchospasm has occurred after inhalation.

Treatment of adverse effects is similar to that for Sodium Hypochlorite, p.1661.

Effects on the lungs. A study in Finland in dental staff who had reported occupational respiratory hypersensitivity between 1990 and 1998 found that 1 of 28 cases of rhinitis and 3 of 28 cases of asthma could be attributed to tosylchloramide sodium.[1] For further reference to respiratory effects associated with tosylchloramide sodium gas, see under Sodium Hypochlorite: Toxicity from mixing cleaning agents, p.1661.

1. Piirilä P, *et al.* Occupational respiratory hypersensitivity in dental personnel. *Int Arch Occup Environ Health* 2002; **75:** 209–16.

Uses and Administration

Tosylchloramide sodium is an organic chlorine-releasing compound. It has general properties similar to those of chlorine (p.1638) but is more stable. It contains about 25% w/w of 'available chlorine' (see p.1638). It is stable at an alkaline pH although it is much more active in acid media. It is more slowly active than hypochlorite solutions.

Tosylchloramide sodium is used for the treatment of minor wound infections and as a skin and hard surface disinfectant. It is also used for the treatment of drinking water (p.1623). It was formerly used as a spermicide.

Tosylchloramide sodium B (chlorogenium; sodium *N*-chlorobenzenesulphonimidate sesquihydrate) has been used similarly to tosylchloramide sodium.

Preparations

Proprietary Preparations (details are given in Part 3)
Belg.: Chloraseptine; Chlorazol; Chloronguent; Clonazone; ***Fr.:*** Hydroclonazone; ***Ger.:*** Chloramin T; Clorina; Trichlorol; ***Hung.:*** Neomagnol; ***Ital.:*** Amuclor Med; Citromed Chlor; Dermedal; Euclorina; Minachlor; Ottoclor†; Steridrolo; ***Spain:*** Clorina.

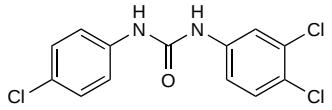
Triclocarban *(USAN, rINN)*

NSC-72005; TCC; 3,4,4′-Trichlorocarbanilide; Triclocarbán; Triclocarbanum. 1-(4-Chlorophenyl)-3-(3,4-dichlorophenyl)urea.

Триклокарбан

$C_{13}H_9Cl_3N_2O$ = 315.6.

CAS — 101-20-2.



Adverse Effects and Precautions

When subjected to prolonged high temperatures triclocarban can decompose to form toxic chloroanilines, which can be absorbed through the skin and cause methaemoglobinaemia. Mild photosensitivity has been seen in patch testing.

Uses and Administration

Triclocarban is an anilide antiseptic. It is bacteriostatic against Gram-positive organisms but is not effective against Gram-negative organisms. It inhibits growth of some fungi. It is used in antiperspirants and soaps for disinfection of skin and mucous membranes.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Jabobip†; Sodorant; Ungel; ***Braz.:*** Derso TCC†; ***Fr.:*** Cutisan; Nobacter; Solubacter; ***Gr.:*** Antibacter Forte; ***Ital.:*** Citrosil Sapone; Sangen Sapone Disinfettante; ***Mex.:*** Nutegen A†; ***UK:*** Valderma; ***USA:*** Cuticura†.

Multi-ingredient: ***Arg.:*** Bacteroskin†; LB Jabon con Purcelin†; Sodorant; ***Braz.:*** Soapex; ***Fr.:*** Septosan; Spray du Marcheur; ***Ger.:*** Ansudor†; ***Mex.:*** Septosan; ***Switz.:*** Septivon N.

Triclosan *(BAN, USAN, rINN)*

CH-3565; Cloxifenol; Triclosán; Triclosanum. 5-Chloro-2-(2,4-dichlorophenoxy)phenol; 2,4,4′-Trichloro-2′-hydroxydiphenyl ether.

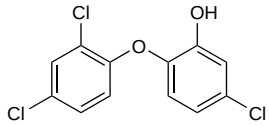
Триклозан

$C_{12}H_7Cl_3O_2$ = 289.5.

CAS — 3380-34-5.

ATC — D08AE04; D09AA06.

ATC Vet — QD08AE04; QD09AA06.



Pharmacopoeias. In *US.*

USP 31 (Triclosan). A fine whitish crystalline powder. M.p. about 57°. Practically insoluble in water; soluble in alcohol, in acetone, and in methyl alcohol; slightly soluble in petroleum spirit. Store in airtight containers. Protect from light.

Profile

Triclosan is a chlorinated bisphenol antiseptic, effective against Gram-positive and most Gram-negative bacteria but with variable or poor activity against *Pseudomonas* spp. It is also active against fungi. It is used in soaps, creams, and solutions in concentrations of up to 2% for disinfection of the hands and wounds and for disinfection of the skin prior to surgery, injections, or venepuncture. It is also used in oral hygiene products and in preparations for acne. There have been isolated reports of contact dermatitis.

MRSA control. Control of meticillin-resistant *Staphylococcus aureus* (MRSA) infection in surgical units has been achieved by procedures including handwashing and bathing with triclosan.[1-3] In the UK, guidelines on the control of MRSA recommend it as one of several alternatives for such purposes,[4] although alcohol hand rubs (also mentioned in the guidelines) are currently preferred for general hand hygiene (see p.1624). However, triclosan resistance has been reported.[5-7]

1. Bartzokas CA, *et al.* Control and eradication of methicillin-resistant Staphylococcus aureus on a surgical unit. *N Engl J Med* 1984; **311:** 1422–5.
2. Bartzokas CA. Eradication of resistant Staphylococcus aureus on a surgical unit. *N Engl J Med* 1985; **312:** 858–9.
3. Brady LM, *et al.* Successful control of endemic MRSA in a cardiothoracic surgical unit. *Med J Aust* 1990; **152:** 240–5.
4. Coia JE, *et al.* Guidelines for the control and prevention of meticillin-resistant Staphylococcus aureus (MRSA) in hospitals (draft June 05). For the Joint Working Party of the British Society of Antimicrobial Chemotherapy, the Hospital Infection Society, and the Infection Control Nurses Association. Available at: http://www.bsac.org.uk/_db/_documents/mrsa_INFECTION_JUNE_05.pdf (accessed 08/03/06)
5. Cookson BD, *et al.* Transferable resistance to triclosan in MRSA. *Lancet* 1991; **337:** 1548–9.
6. Sasatsu M, *et al.* Triclosan-resistant Staphylococcus aureus. *Lancet* 1993; **341:** 756. Correction. *ibid.*; **342:** 248.
7. Suller MT, Russell AD. Triclosan and antibiotic resistance in Staphylococcus aureus. *J Antimicrob Chemother* 2000; **46:** 11–18.

Preparations

Proprietary Preparations (details are given in Part 3)
Arg.: Daewo; ***Austral.:*** Dettol Liquid Wash; Gamophen; Johnsons Clean & Clear Facial Cleansing Bar†; Johnsons Clean & Clear Foaming Facial Wash; Liquid Soap Pre-Op†; Microshield T; Neutrogena Acne Skin Cleanser; Oxy Skin Wash; pHisoHex Face Wash; Sapoderm; Solyptol†; ***Braz.:*** Clean & Clear Sabonete Liquido Facial; Fisohex†; Hygine; Johnson's Sabonete Liquido Anti-Septico; Soapelle; Soapex; Theracne; ***Canad.:*** Adasept; Clean & Clear Foaming Facial Cleanser; Clearasil Face Wash†; Clearskin Antibacterial†; Clearskin Medicated Cleanser†; Dermance†; Dial Complete; Noxzema Triple Clean; Oxy Daily Facial Cleanser Regular†; Oxy Medicated Soap†; Skin So Soft Antibacterial†; Tersaseptic; Trisan†; ***Chile:*** Antiseptin; Lavasept; Sanigermin; ***Cz.:*** Lipo Sol†; ***Fr.:*** Nobacter; ***Gr.:*** Ampitasol; ***Hong Kong:*** Oxy Daily Wash; pHisoHex Reformulated†; ***Indon.:*** pHisoHex Reformulated; ***Israel:*** Dermax; ***Ital.:*** Cetriderm con Triclosan; Derman Plus; Geroderm; Ippi Verde; Irgaman; Lactacyd Antibatterico; Oilatum AD†; Till; ***Malaysia:*** pHisoHex†; ***Mex.:*** Septosan†; ***NZ:*** Dalacin T Prewash; Liquid Soap Pre-Op; Oxy Daily Skin Wash†; ***Philipp.:*** Lipo Sol; ***S.Afr.:*** Acneclear; ***Singapore:*** Clearasil Facial Cleansing; ***Switz.:*** Cliniderm; Lipo Sol; Procoutol; Shampooing extra-doux; ***Thai.:*** Virulex; ***UK:*** Aquasept; Gamophen; Oxy Facial Wash; Ster-Zac; ***USA:*** Ambi 10; ASC; Clearasil Daily Face Wash; Oxy Medicated Soap; Septi-Soft†; Septisol†; Stri-Dex Antibacterial Cleansing; Stri-Dex Face Wash.

Multi-ingredient: ***Arg.:*** Bentophyto; Dettonjab; Emoform Total; Esmedent con Fluor; Esmedent Dientes Sensibles; Heduline; Hekabetol; Hydragenic†; Neoceuticals Gel de Limpieza Facial; Odol Med Antiplaca†; Odol Tratamiento de Encias†; Prurigel; Sebulex; Tersoderm Cabellos Grasos†; Ublosid†; ***Austral.:*** Clearasil Acne Treatment Cream; Dettol Cream; Oilatum Plus; ***Braz.:*** Fisohex II; Malvatricin Antiplaca; Malvatricin Branqueador; Malvatricin Dentes Sensiveis; Malvatricin Plus; Salisoap; Soapex; Suavederm; ***Canad.:*** Adasept; Oral Plan†; PanOxyl Clear Acne; Solarcaine; ***Chile:*** Ac-Sal; Cariamyl; Corninaj†; Gingilacer†; Hansaplast Antimicotico; Hansaplast Footcare; Kariax†; Ortodent†; Solarcaine Spray Aerosol; ***Cz.:*** Acne Cream†; Acne Lotio†; Oilatum Plus; ***Fin.:*** Wicne; Wicnecarb; Wicnelact; Wicnevit; ***Fr.:*** Clinogel; Delabarre Bio-adhesif; Oilatum AD†; Poudre du Marcheur; Sanytol†; Septiane; Septosan; Spray du Marcheur; ***Ger.:*** Rutisept extra; Sicorten Plus; ***Hong Kong:*** Dettol†; Oilatum Plus; Sicorten Plus†; ***Hung.:*** Aurobin; ***Indon.:*** Betiga; Oilatum Plus; Verile; ***Irl.:*** Dettol; Oilatum Junior Flare-Up; Oilatum Plus; ***Israel:*** Pedisol; Sicorten Plus†; ***Ital.:*** Aknicare Cleanser; Angstrom Viso; AZ Protezione Gengive; Colgate Total; Dopo Pik; Geroderm Zolfo†; Plax†; Steril Zeta; ***Malaysia:*** Clearasil Pimple Treatment; Dettol; Oilatum Plus Antibacterial; QV Flare Up; T3 Acne; ***Mex.:*** Cetaphil Antibacterial; Crema Axel†; Dermobras; Periodentyl; Prespir; Sebryl Plus; Septosan; ***NZ:*** Clearasil; Dettol; Oilatum Plus; Solarcaine; ***Philipp.:*** Oilatum Plus; Sebo Fluid; ***Pol.:*** Oilatum Plus; ***Port.:*** Aknicare; Alkagin; Antiacneicos Ac-Sal†; Bexident; Lambda; Sicorten Plus†; ***Rus.:*** Aurobin (Аурoбин); ***S.Afr.:*** Clearasil T; Oilatum Plus; ***Singapore:*** Burnaid; Clearasil Overnight Defence; Clearasil Pimple Treatment; Dettol; Oilatum Plus; pHisoHex Reformulated†; QV Flare Up; T3; Tinasolve†; Tri-Cidal†; ***Spain:*** Doctodermis; Sicorten Plus; Vaselatum; ***Switz.:*** Acne Creme; Acne Gel; Acne Lotion; Antebor N; Keroderm†; Pixor Stick Anti-acne N; Saltrates†; Sebo Creme; Sebo Shampooing; Sicorten Plus; Sulgan N; Turexan Emulsion†; ***Thai.:*** Dettol; Hand Joy; Oilatum Plus; ***UK:*** Clearasil Active Treatment Cream; Dentyl pH; Dettol; Manusept; Oilatum Junior Flare-Up†; Oilatum Plus; Oxy Clean Facial Scrub; Oxy Cleanser; Oxy Dots; Oxy Duo Pads; Sensodyne-F; Solarcaine; TCP; ***USA:*** Clearasil Antibacterial; Solarcaine; ***Venez.:*** Exfoliderm; Sicorten Plus†.

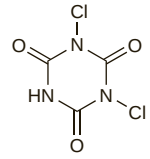
Troclosene *(rINNM)*

Dichloroisocyanuric Acid; Troclosène; Trocloseno; Troclosenum. 1,3-Dichloro-1,3,5-triazine-2,4,6(1*H*,3*H*,5*H*)-trione.

Троклозен

$C_3HCl_2N_3O_3$ = 198.0.

CAS — 2782-57-2.



Troclosene Potassium *(USAN, rINN)*

Potassium Dichloroisocyanurate; Potassium Troclosene; Troclosène Potassique; Trocloseno de potasio; Troclosenum Kalicum.

Троклозен Калий

$C_3Cl_2KN_3O_3$ = 236.1.

CAS — 2244-21-5.

Troclosene Sodium *(rINNM)*

Sodium Dichloroisocyanurate; Sodium Dichloro-*s*-triazinetrione; Sodium Troclosene; Troclosène Sodique; Trocloseno sódico; Troclosenum Natricum.

Троклозен Натрий

$C_3Cl_2N_3NaO_3$ = 219.9.

CAS — 2893-78-9.