

2.1.3.5. Chloroxylenol

Chloroxylenol (or *para*-chloro-meta-xylene) has antiseptic and disinfectant properties, and therefore is used for skin disinfection and cleansing of surgical instruments.

Molecular Formula: C_8H_9OCl

IUPAC Nomenclature: 4-chloro-3,5-dimethylphenol

Properties: Chloroxylenol occurs as a white to buff coloured crystalline powder with a slightly phenolic odour. It is stable in hot water. It is soluble in 1 part in 95% alcohol, ether, benzene, terpene, fixed oils, and in solutions of alkaline hydroxides.

Uses: Chloroxylenol is used in antibacterial soaps, in household antiseptics, and for cleansing wounds. It is indicated to be applied on the skin for use in cuts, bites, stings, abrasions, and as an antiseptic hand cleaner.

Stability and Storage Conditions: Chloroxylenol is light-sensitive, thus should be stored in well-closed containers.

Types of Pharmaceutical Formulations: Jelly, solution, soap, liquids, lotion, ointment, sponge, and gel.

Popular Brand Names: Dettol and Fairgenol plain.

2.1.3.6. Formaldehyde Solution

Formaldehyde (or methanol) is the simplest aldehyde. It is used in large amounts in various chemical manufacturing processes.

Molecular Formula: $HCHO$

IUPAC Nomenclature: Methanal

Properties: Formaldehyde occurs as a colourless liquid at room temperature with a pungent, suffocating odor.

Uses: Formaldehyde is used as an embalming agent, disinfectant, for preserving cells and tissues, and for manufacturing glues and resins.

Stability and Storage Conditions: Formaldehyde should be stored in a cool, dry, well-ventilated area and should be properly labeled.

2.1.3.7. Hexachlorophene

Hexachlorophene is a chlorinated bisphenol antiseptic. It acts as a bacteriostatic against gram-positive organisms; however they show less activity against gram-negative organisms.

Molecular Formula: $C_{13}H_6Cl_6O_2$

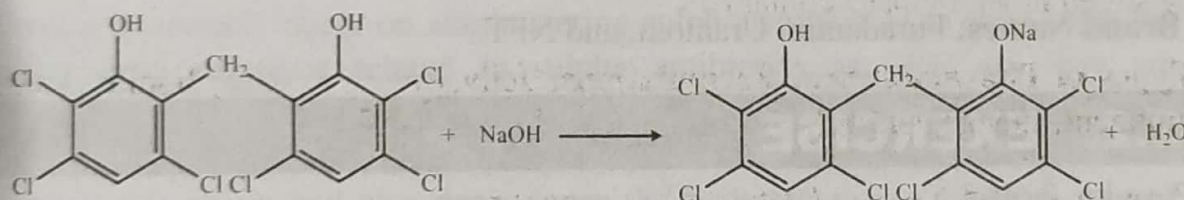
IUPAC Nomenclature: 3,4,6-trichloro-2-[(2,3,5-trichloro-6-hydroxyphenyl)methyl]phenol

Chemistry: Hexachlorophene is a biphenolic compound having two phenol rings joined via methylene group ($-CH_2-$), through C_2 of each. It has 6 chlorine atoms attached to 3, 3', 5, 5', 6, and 6' carbon atoms. It has a high chlorine content and less water solubility, thus, is effective as an antiseptic in low concentrations and has prolonged activity. It is more active than monophenols and is active between pH 5 and 6.

Physical Properties: Hexachlorophene occurs as a white or pale buff crystalline powder with a slightly phenolic odour or no odour at all. It is soluble in dilute solution of alkali hydroxides; and insoluble in water.

Chemical Properties

- 1) Hexachlorophene converts into monosodio derivative on being treated with sodium hydroxide at pH 9.



- 2) Hexachlorophene attains a transient purple colour on being reacted with ferric chloride.

Uses: Due to its antibacterial properties, hexachlorophene is used in soap forms for reducing bacterial flora on skin.

It is used as dusting powder for reducing bacterial infections on umbilical stump. It is used by the surgeons for disinfecting their hands.

Stability and Storage Conditions: Hexachlorophene is light-sensitive, thus is stored in tightly-closed light-resistant containers.

Types of Pharmaceutical Formulations: Concentrated solution, dusting powder, mixture, cleansing emulsion, and liquid soap.

Brand Names: Sterac and Zalpon.

2.1.3.8. Nitrofurantoin

Nitrofurantoin is effective against certain gram-positive organisms, e.g., *epidermidis*, *S. aureus*, *S. saprophyticus*, *Enterococcus faecalis*, *S. agalactiae*, group D *Streptococci*, *Viridians Streptococci*, and *Corynebacterium*.

Molecular Formula: $C_8H_6N_4O_5$

IUPAC Nomenclature: 1-[(E)-[(5-nitrofur-2-yl)methylidene] amino]imidazolidine-2,4-dione

Chemistry: Nitrofurantoin contains nitro and azomethine ($-CH = N$) group which are required for its antibacterial activity. It also contains furan and imidazolidine-2, 4-dione heterocycles.

Properties: Nitrofurantoin occurs as yellow crystals or crystalline powder with no odour and bitter taste. It is slightly soluble in water.

Uses: Nitrofurantoin acts as a broad spectrum antibacterial agent. It is effective in the treatment of urinary tract infections.

Stability and Storage Conditions: Nitrofurantoin is light sensitive, thus stored in a tightly-closed light-resistant below $25^{\circ}C$ containers temperature.

Types of Pharmaceutical Formulations: Suspensions, capsules, and tablets.

Brand Names: Furadantin, Urantoin, and NFT.