Ghogare Shubham Shivaji *et al*, Int. Journal of Pharmaceutical Sciences and Medicine (IJPSM), Vol.8 Issue. 5, May- 2023, pg. 92-104

ISSN: 2519-9889
Impact Factor: 5.9

Review on Chloramphenicol Antibiotic

Ghogare Shubham Shivaji; Prof. Sul Komal Tanaji

Baramati College of Pharmacy, Barhanpur, Baramati, Maharashtra

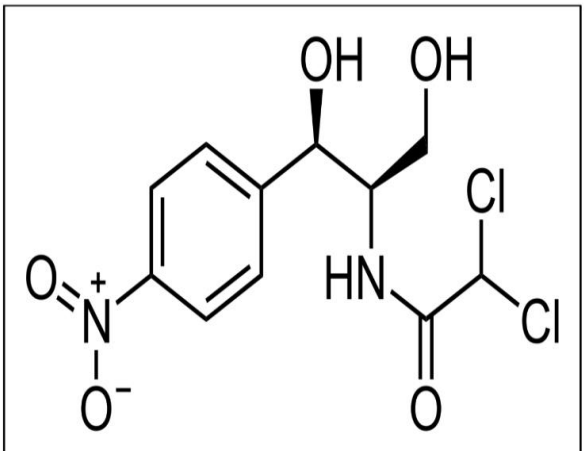
DOI: 10.47760/ijpsm.2023.v08i05.012

Abstract:- The Chloramphenicol is d-threo-2,2-dichloro-N-[β-hydroxy-α-(hydroxymethyl)]-n-nitropheny-lacetamide, a bacterioststic and highly effective antibacterial against $ (+) and gr (-) ocular pathogenic bacteria causing conjunctivitis or corneal ulcers. Chloramphenicol is used in the treatment of bacterial infections. It is used to treat certain types of serious infections caused by bacteria when other antibiotics cannot be used Chloramphenicol is used to treat serious infections in different parts of the body. It is sometimes given with other antibiotics. However, chloramphenicol should not be used for colds, flu, other virus infections, sore throats or other minor infections, or to prevent infections. Chloramphenicol widely used in Chloramphenicol is a medication used in the management and treatment of superficial eye infections such as bacterial conjunctivitis, and otitis externa. It has also been used for the treatment of typhoid and cholera. Chloramphenicol is an antibiotic and is in the class of antimicrobials that inhibits protein synthesis. Chloramphenicol is evaluated for Haemophilus influenzae infections, anaerobic infections, salmonellosis, Rocky Mountain spotted fever, and eye infections.

Introduction:

Chloramphenicol is a broad spectrum antibiotic introduced into clinical practice in 1948, but which was subsequently shown to cause serious and fatal aplastic anemia and is now used rarely and reserved for severe, life-threatening infections for which other antibiotics are not available. Action of Chloramphenicol stops bacterial growth by binding to the bacterial ribosome (blocking peptidyl transferase) and inhibiting protein synthesis. Chloramphenicol is lipid- soluble, allowing it to diffuse through the bacterial cell membrane.[1,5]

ISSN: 2519-9889
Impact Factor: 5.9



Pharmacodynamics:-

Chloramphenicol is a broad-spectrum antibiotic that was derived from the bacterium Streptomyces venezuelae and is now produced synthetically. Chloramphenicol is effective against a wide variety of microorganisms, but due to serious side-effects (e.g., damage to the bone marrow, including aplastic anemia) in humans, it is usually reserved for the treatment of serious and life-threatening infections (e.g., typhoid fever). Chloramphenicol is bacteriostatic but may be bactericidal in high concentrations or when used against highly susceptible organisms. Chloramphenicol stops bacterial growth by binding to the bacterial ribosome (blocking peptidyl transferase) and inhibiting protein synthesis.[4,13]

Mechanism of action:-

Chloramphenicol is lipid-soluble, allowing it to diffuse through the bacterial cell membrane. It then reversibly binds to the L16 protein of the 50S subunit of bacterial ribosomes, where transfer of amino acids to growing peptide chains is prevented (perhaps by suppression of peptidyl transferase activity), thus inhibiting peptide bond formation and subsequent protein synthesis.[11]

Medical uses:-

The original indication of chloramphenicol was in the treatment of typhoid, but the presence of multiple drug-resistant Salmonella Typhi has meant it is seldom used for this indication except when the organism is known to be sensitive.[2][medical citation needed] In low-income countries, the WHO no longer recommends only chloramphenicol as first-line to treat meningitis, but recognises it may be used with caution if there are no available alternatives.[8] During the last decade chloramphenicol has been re-evaluated as an old agent with potential against systemic infections due to multidrug-resistant gram positive microorganisms (including vancomycin resistant enterococci). In vitro data have shown an

ISSN: 2519-9889
Impact Factor: 5.9

activity against the majority (> 80%) of vancomycin resistant E. faecium strains. In the context of preventing endophthalmitis, a complication of cataract surgery, a 2017 systematic review found moderate evidence that using chloramphenicol eye drops in addition to an antibiotic injection (cefuroxime or penicillin) will likely lower the risk of endophthalmitis, compared to eye drops or antibiotic injections alone.[8,12]

Examples of chloramphenicol:-

Description and Brand Names

Ak-Chlor.

Chloromycetin.

Chloroptic.

Fenicol.

Isopto Fenicol.

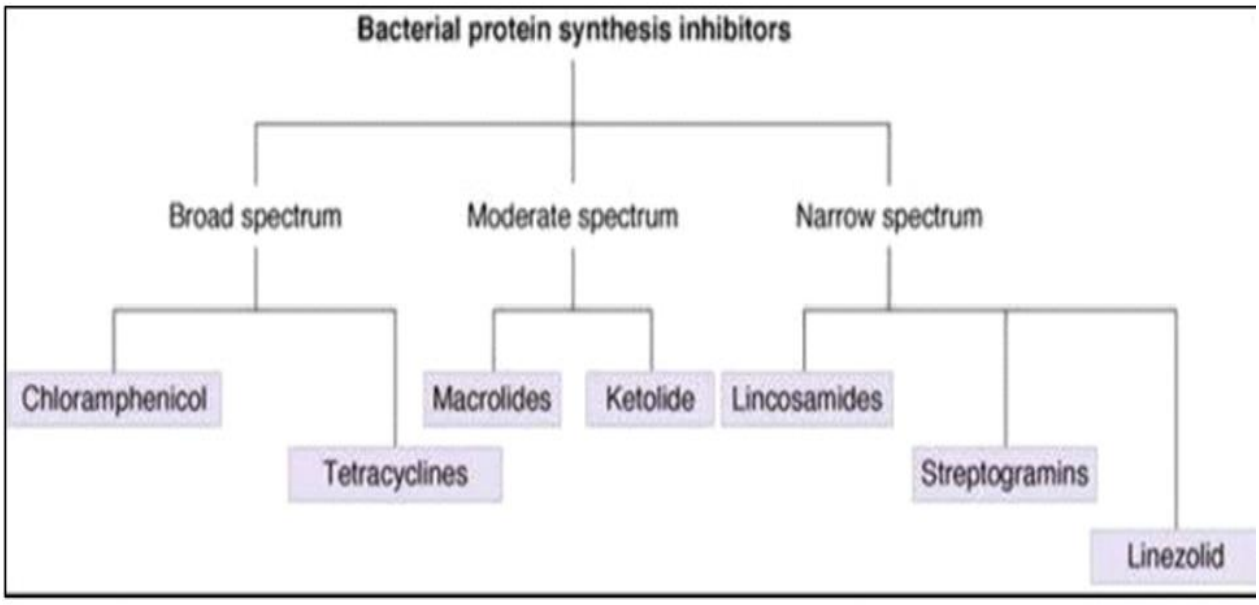
Minims Chloramphenicol 05.

Ophtho-Chloram.

Pentamycetin Ophthalmic Solution 025.[16]

Antibiotic classification of chloramphenicol:-

Antibiotics: Antibiotics are the chemical therapeutic agents of microbial or synthetic or semi-synthetic origin which in lower concentration inhibit the growth of other microorganisms.



ISSN: 2519-9889
Impact Factor: 5.9

Category of chloramphenicol:- Antibiotic activity.

Assay of the chloramphenicol:-

Determine by liquid chromatography.

Test solution:- Dilute a suitable volume of the 50 mg of chloramphenicol to 100.0 ml with the mobile phase. Dilute 5.0 ml of this solution to 25.0 ml with the mobile phase and filter through a 0.5 µm or finer porosity filter and use the clear filtrate.

Reference solution:- A 0.01 per cent w/v solution of chloramphenicol RS in the mobile phase. Filter this solution through a 0.5 µm or finer porousity filter and use the clear filtrate.

Chromatographic system

a stainless steel column 25 cm x 4.6 mm, packed with octadecylsilane bonded to porous silica (5 µm), mobile phase: a mixture of 55 volumes of water,45 volumes of methanol and 0.1 volume of glacial aceticacid, flow rate: 1 ml per minute, spectrophotometer set at 280 nm, injection volume: 20 µl.

Inject the reference solution and the test solution. Calculate the content of $CH2Cl2N_2O$, in the drops.

Storage:- Store in light resistant containers at a temperature not exceeding 30°.[23]

Chloramphenicol formulation:-

Eye drop

Ear drop

Eye ointment

Eye capsule

Eye tube

Eye drop:-

Chloramphenicol is still ‘gold standard’ for conjunctivitis in every age. However, chloramphenicol eye caps and eye drops have no satisfactory results. The objective of the study was to screen oil, evaluate solubility of chloramphenicol in them for ophthalmic formulation. Spectrum and calibration curve of chloramphenicol was prepared. Oils were subjected to scan between 200–400 nm. Those oils had no absorbance considered for equilibrium solubility study. The solubility of chloramphenicol was evaluated in different short listedoils by equilibrium solubility study. One-way ANOVA following Tukey-Kramer multiple comparisons test was used for statistical analysis. Absorbance maximum of chloramphenicol was found to be 274 nm in methanol. Chloramphenicol was exhibited linearity in the range of 10–30µG/mL of methanol. Neem oil, heavy liquid paraffin, light liquid paraffin, olive oil, isopropyl myristate, peppermint oil, oleic acid, Jasminumsambacoil, mentha oil, isopropyl palmitate, and triacetin were selected for equilibrium solubility studies. Oils had significantly less solubility of chloramphenicol than water. Use of oil and water both phases i.e. emulsion or emulgel of chloramphenicol could be an appropriate formulation for the ophthalmic administration.

ISSN: 2519-9889
Impact Factor: 5.9

[2

Aim and Objectives:-

Aim

Review on chloramphenicol antibiotic eye drop.

Objectives

1 It will used to treat the bacterial eye infection and growth of bacteria.

2 It is widely used antibiotic in various infection.

3 To formulate chloramphenicol eye drop preparation.

Plan of Work

1 Exhaustive literature survey.

2 Review on chloramphenicol antibiotic.

3 Formulation of chloramphenicol eye drop.

Material and Method

Chloramphenicol eye drop

Chloramphenicol

Propylene glycol

Polyethylene glycol

EDTA

Cetrimide

Sodium chloride

ISSN: 2519-9889
Impact Factor: 5.9

Boric acid
Borax
Distilled water

Sr.No	Ingredients	Quantity
1	Chloramphenicol	0.04g
2	Propylene glycol	1.0g
3	Polyethylene glycol	1.0g
4	EDTA	0.01g
5	Cetrimide	0.01g
6	Sodium Chloride	0.08g
7	Boric Acid	0.02g
8	Borax	0.05g
9	Distilled water	Upto 10ml

Procedure of chloramphenicol eye drop:
The process of formulation was done by three stages:
Stage 1:
One gram of each of the ingredients (propylene) glycol with glycol polyethylene 1500) are mixed stir until homogenous. Raise the temperature about 70°C for the mixture.
Add the active ingredient (chloramphenicol) and stir until dissolve and homogenous
Stage 2:
A 0.01 g) of the agent (EDTA) was added to quantity of Distilled water and stir until dissolve.
Add preservative agent (cetrimide) and stir until dissolve. Add the isotonic agent (sodium chloride) and stir until dissolve.
Add the buffering agent (boric acid) and stir until dissolve.
Adjust the pll with (borax) at (pH-6.6) [the limits of pH (6.0-7.5)].
Stage 3:
Add the mixture from Stage 1 into the solution of stage 2 and stir until homogenous. Complete the volume to the mark with Distilled water. Filter the solution and fill in polyethylene bottles.[7,16]

ISSN: 2519-9889
Impact Factor: 5.9

Evaluation test:-
Sterility test
Clarity test
Leaker test
Metal particles in ophthalmic eye drop

1) Sterility test:-
Two basic methods for sterility testing:
a) Direct Inoculation Method:
It involves the direct introduction of product test samples into the culture media
b) Membrane filtration Method:
It involves filtering test sample through membrane filter, washing the filter with fluid to remove inhibitory property and transferring the membrane aseptically to appropriate culture media.
Detection of contamination used to two culture media:
A) Soybean-casein digest medium:- Incubated at 20to 25°C
B) fluid thioglycollate medium:- Incubated at 30 to 35°C
2) Clarity test:-
Opthalmic Solution by definition contain no undissolved ingredients and are essentially free from foreign particles.
a) Visual Inspection:
Under a good light, baffled against reflection into the eye and viewed against a black and white background with contect set in motion with swilling action.
b) Instrumental method: It is utilizing the principle of light scattering, light absorption and electrical resistance to obtain particle count and size distribution destruction of product units only for quality control testing.
Instrumental method utilizing video image projection detects moving particles without destruction of product units-used for inline detection.

3. Leaker test:-
Select 10 tubes of the ointment with seals applied when specified.
Thoroughly clean and dry the exterior surfaces of each tube with an absorbent cloth.
Place the tubes in horizontal position on a sheet of absorbent blotting paper in an oven maintained at temperature of 60 ± 3 for 8 hours. > No significant leakage occurs during or at the completion of the test.
If leakage is observed from one, but more than one of the tubes repeat the test with 20 additional tubes of the ointment.

ISSN: 2519-9889
Impact Factor: 5.9

The requirement is met if no leakage is observed from the first 10 tubes tested or if leakage is observed from not more than one of 30 tubes tested.

4. Metal particle in ophthalmic eye drop:-

Extrude as completely as practicable the content of 10 tubes Individually into separate, clear, flat-bottom, 60-mm petridishes that are free from scratches.

Cover the dishes and heat at 85°C for 2 hours, increasing the temperature slightly if necessary to ensure that a fully fluid sate is obtained.

Taking precautions against disturbing the melted sample, allow each to cool to room temperature and to solidify.

Remove the covers and invert each petridish on the stage of suitable microscope adjusted to furnish 30 times magnification and equipped with an eye pieces micrometer disk that has been calibrated at the magnification being used.[9]

Drug Product Quality Tests Universal Tests:-

1 Identification:-

Identification tests should establish the identity of the drug or drugs present in the drug product and should discriminate between compounds of closely related structures that are likely to be present. Identity tests should be specific for the drug substance(s) (e.g., infrared spectroscopy).

2 Assay

A specific and stability-indicating test should be used to determine the strength (content) of the drug product.

3 PH

The pH and buffering capacity of an ophthalmic preparation are probably of equal importance to proper preservation, since the stability of most commonly used ophthalmic drugs is largely controlled by the pH of their environment.

4 Osmolarity

In formulating ophthalmic preparations, it is more important to consider the sterility, stability, and preservative aspects, and not jeopardize these aspects to obtain a precisely isotonic solution.

In practice, the tonicity limits may range from 0.5%-5% sodium chloride, equivalent to a range from about 171 mOsm/kg to about 1711 mOsm/kg. without marked discomfort to the eye.

▸ Bacterial Endotoxins

All injected ophthalmic drug products shall be prepared in a manner designed to minimize bacterial endotoxins as defined in Bacterial Endotoxins Test and Pyrogen Test.

ISSN: 2519-9889
Impact Factor: 5.9

4 Uniformity of Dosage Units:-

This test is applicable for dosage forms packaged in single-unit containers. Uniformity of dosage units typically is demonstrated by one of two procedures: content uniformity or weight variation.[3]

Drug Product Quality Tests-Specific Tests:-

1 Viscosity

In the preparation of ophthalmic solutions a suitable thickening agent is frequently added to increase the viscosity. Although they reduce surface tension significantly, their primary benefit is to increase the ocular contact time, thereby decreasing the drainage rate and increasing drug bioavailability.

Viscosity for ophthalmic solutions is considered optimal in the range of 15-25 cp

2 For testing procedures Viscosity-

Capillary Viscometer Methods, Rotational Rheometer Methods, and Rolling Ball Viscometer Method .

3 Drop Size:-

The volume of a drop is dependent on the physicochemical properties of the formulation, particularly surface tension, the design and geometry of the dispensing orifice, and the angle at which the dispenser is held in relation to the receiving surface.

Drop sizes may typically range from 20-70 µL.[14]

Discussion:-

Chloramphenicol is one of the most chemically stable antibiotics in common use. It has good stability at room temperature (25 C) in the pH range 6.51- 2.71. [6] Chicramphenicol is administered into the eye to treat a type of eye infection called bacterial conjunctivitis, which can be caused by various types of bacteria. Putting the medicine directly into the eye allows the chloramphenicol to act directly on the bacteria that are causing different infections [7]. The eye drop preparation of chloramphenicol 0.4% used in Syria for the first time the preparation of this kind and the stability studies should be done on this new formulated eye drops. and known to be very active agents against different types of microorganisms. At this time only 0.4 % eye drop formulation of chloramphenicol solution have been prepared and tested for their physical. The testing for stability of drugs contain all appropriate physical, chemical and biological attribute validated stability including analytical procedures should be applied. Stability studies were conducted on chloramphenicol 0.4% eye drops incubated at 4, 25, 40 and 50 C, and 90 days following incubation. The accelented studies at different temperatures were employed to predict measured by the procedures provided high performance liquid chromatography techniques for assaying component. The rate constants of decay was determined.[6]

The photodegradation the chloramphenicol indicate that solutions should be protected from light, even an ordinary temperature. The glass amber color containers were found to afford the best light protected in various dispensing containers that were tested. At ordinary temperatures, chloramphenicol possesses

ISSN: 2519-9889
Impact Factor: 5.9

unusual stability over a wide pH range. At the same time, it is susceptible to general acid-base catalyst due to borax / boric acid butter at pl 6.47 has been recommended for dispensing chloramphenicol 0.4% solution, and keep the containers should be kept in dark and cold conditions.

Result

Sr.No	Test	Result
1	Colour	Colourless Liquid
2	Clarity Test	Free form particle
3	PH	7.2
4	Content	101.03%
5	Sterility test	The solution is sterile
6	Viscosity	Increase Viscosity
7	Drop Size	20-70microlitre

Summary and Conclusion:-

Chloramphenicol is a broad spectrum antibiotic with bacteriostatic activity. It is medication used in management and treatment of superficial eye infection such as conjunctivitis and otitis externa and also it is valuable agent in treatment of infection it is safe for most adults and children. chloramphenicol is widely used as treatment of infections caused by bacteria. all about action of chloramphenicol in eye infection is studied in this review article.

References

Iwalokun BA, Oluwadun A, Akinsinde KA, Niemogha MT, Nwaokorie FO. Bacteriologic and plasmid analysis of etiologic agents of conjunctivitis in Lagos, Nigeria. J OphthalInflamm Infect 2011; 1:95–103.

Bramantyo T, Roeslani RD, Andriansjah A, Sitorus RS. The efficacy of 1% chloramphenicol eye ointment versus 2.5% povidone-iodine ophthalmic solution in reducing bacterial colony in newborn conjunctivae. Asia Pac J Ophthalmol 2015; 4(3):180–183.

Hi-Media. Product information of Chloramphenicol; 2015 (Access on September 2015).

Cagini C, Piccinelli F, Lupidi M, Messina M, Cerquaglia A, Manes S, Fiore T, Pellegrino RM. Ocular penetration of topical antibiotics: study on the penetration of chloramphenicol, tobramycin and netilmicin into the anterior chamber after topical administration. ClinExpOphthalmol2013; 41(7):644–647.

Hvidberg J. Fusidic acid in acute conjunctivitis. Single-blind, randomized comparison of fusidic acid and chloramphenicol viscous eye drops. ActaOphthalmol (Copenh)1987; 65(1):43–47.

ISSN: 2519-9889
Impact Factor: 5.9

Rose PW, Harnden A, Brueggemann AB, Perera R, Sheikh A, Crook D, Mant D. Chloramphenicol treatment for acute infective conjunctivitis in children in primary care: Arandomised double-blind placebo-controlled trial. Lancet2005; 366(9479):37–43.

Barequet IS, Harizman N, Ziv H, Rosner M. Healing rate of corneal erosions: comparison of the effect of chloramphenicol eye drops and ointment and high-concentration hyaluronic acid in an animal model. Cornea2014; 33(10):1080–1082.

USP. USP 36-NF 31, Ophthalmic Ointments 771. Rockville, MD: USP: 2013. > Vadlapudi AD, Patel A, Cholkar K, Mitra AK. Recent patents on emerging therapeutics for the treatment of glaucoma, age related macular degeneration and uveitis. Recent Patents Biomed Eng. 2012; 5(1):83-101.

Gaudana R, Ananthula HK, Parenky A, Mitra AK. Ocular drug delivery, AAPS J. 2010; 12(3):348-360.

Gaudana R, Jwala j, Boddu SHS, Mitra AK. Recent perspectives in ocular drug delivery, Pharm Res. 2009; 26(5):1197-1216. Wilson CG, Zhu YP, Kurmala P, Rao LS, Dhillon B. Ophthalmic drug delivery. In: Hillery AM, Lloyd AW, Swarbrick J. Drug Delivery and Targeting. New York: Taylor & Francis; 2001:329-354.

Reming.on The Science and Practice of Pharmacy 2009 21st Edition P52.

De Souza, M.VN., Recent Pat Anti-infective Drug Discovery.2006: 1:33-44.

Yoshioka, Sawie and Valentino Stelle (2001) Stability of Drugs and Dosage Forms 2001; Kluweracademic/ plenum publishersNY p180. Boer Y & pijnenburg HPLC determination

Bryshier. A.. In Antimicrobial Agents Antibacterials and Antifungals, Bryshier, A. (Ed.) ASM press, Washington, D. C, 2005:26:568-788

Jihan Av, Krishna Mohan C&Vimaladev M Development and evaluation of chloramphenicol hypertonic ophthalmic solution. Indian J. of Pharm Sci 2008;70(1):66-70 8- Kenneth AC Gordon LA& Valentino JS chemical stability of pharmaceuticals. A Handbook for pharmacists. 1987 John wiley-Interscience publication NY.. 1987: P328-335.

Van Bambeeke, F. Michot IM., Van Eldere. I, and Tulkens PM.Clin. Microbiol. Infect, 2005; 11: 256-280. 10- Agular A, Krel, Kinkel AW & Samyn JC. Effect of polymorphism on the absorption of chloramphenicol from chloramphenicol palmitate 1. Pharm Sci 1967, 36.847.

Lam RF, Lai JS, Ng JS, Rao SK, Law RW, Lam for eye DS. Topical chloramphenicol for infections. Hong Kong Med J 2002;8:44-7

Schwarz S, Kehrenberg C, Doublet B, Cloeckaert A. Molecular basis of bacterial resistance to chloramphenicol and florfenicol. FEMS Microbiol Rev 2004;28:519-42.

Zuorro A, Fidaleo M, Fidaleo M, Lavecchia R. Degradation and antibiotic activity reduction of chloramphenicol in aqueous solution by UV/H202 process. J Environ Manag 2014;133:302-8.

Hall AV, Das SS, Tabaqchali S. Is it time to stop using chloramphenicol on the eye? Risk is low in short courses [Letter]. Br Med J 1995;311:450-1.

De Souza MVN. Promising drugs against tuberculosis. Recent Pat Antiinfect Drug Discovery 2006;1:33-44.

ISSN: 2519-9889
Impact Factor: 5.9

https://www.google.com/search?q=chloramphenicol+eye+drop+structure HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618 HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"source=lnms HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"tbm=isch HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"sa=X HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw

ISSN: 2519-9889
Impact Factor: 5.9

TGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"biw=1366 HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"bih=657 HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"& HYPERLINK "https://www.google.com/search?q=chloramphenicol+eye+drop+structure&sxsrf=ALiCzsYaJPFW1gE23AMWJKWe9LmyI6rAow:1668603821618&source=lnms&tbm=isch&sa=X&ved=2ahUKEwjwoLvQ4bL7AhVdTGwGHX3YCpQQ_AUoAXoECAEQAw&biw=1366&bih=657&dpr=1"dpr=1#imgrc=SpPbXWSNEFTkFM

