



QUININE SALT & DERIVATIVES



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COMPANY PROFILE



PT Sinkona Indonesia Lestari (PT SIL) is a Quinine (and its derivatives) and Essential Oils producing company, jointly owned by two Indonesia's State Owned Corporations PT Kimia Farma Tbk. And PT Perkebunan Nusantara I.

Established in 25 October 1986 with notary certificate Irene Ratnaningsih, SH. No. 33 updated in 5th of March 1998, No. 9 dan No. 86 dated 29th of August 1999, and already approved also legalized in Decree of Ministry of Justice of Republic of Indonesia No: C- 8286 HT.01.04.TH.99 dated 9th of March 1999 and appears in the Republic charter No. 87 dated 30th of October 1987 and No. 65 dated 13th of August 1999.

Established by Republic of Indonesia's Minister of Health in 31st of Agustus 1991. PT. Sinkona Indonesia Lestari factory is located in area tea plantation area owned by PT Perkebunan Nusantara I.



Corporate Vision

Becoming a leading Global Natural Healthcare Company.

Corporate Missions

- Increase the reliability of Human Resources Capability for optimization and company growth acceleration.
- Building collaborative culture and innovation within the organization.
- Creating a business ecosystem that provides benefit and sustainability.



CINCHONA BARK



WHAT IS CINCHONA BARK?

Cinchona bark is a medicinal herb used for centuries to treat various ailments. The bark of the cinchona tree is the part that is used in herbal medicine and is sourced for drugs. Cinchona bark is best known as the used for a source of anti-malarial. Cinchona bark has been used to treat malaria, neuralgia, muscle cramps, cardiac fibrillation, and other ailments. The medicinally active compounds in cinchona bark are mostly alkaloids. In addition to the familiar antimalarial alkaloid quinine, there is its stereoisomer quinidine, used in cardiac medicine, as well as other pairs of alkaloids that are useful building blocks in synthetic chemistry : Cinchonine and Cinchonidine, and Dihydroquinidine and Dihydroquinine. Cinchona bark also contains tannin, cinchonic acid, used to perform protein assays in laboratory work.

QUININE HYDROCHLORIDE

Used as beverage ingredients.

OUR PRODUCT



MARKET SEGMENT



Beverage

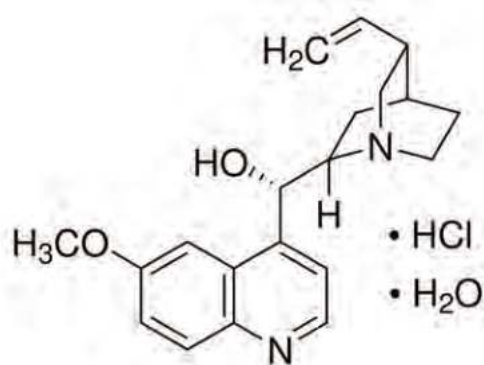
STANDARD PRODUCT SPECIFICATIONS

Product	Quinine Hydrochloride
Formula	$C_{20}H_{24}N_2O_2 \cdot HCl \cdot 2H_2O$ MW = 396.9
Synonym	(R)-[(2S,4 S,5R)-5-ethenyl-1-azabicyclo [2.2.2]oct-2-yl](6-methoxyquinolin-4-yl)-methanol hydrochloride
CAS* Number	CAS # 6119-47-7
Test Result According To	BRITISH PHARMACOPOEIA 2014
Appearance	White or almost white or colourless, fine, silky needles, often in clusters.
Solubility	Soluble in water, freely soluble in ethanol 96%

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

CHEMICAL DATA

Formula : $C_{20}H_{24}N_2O_2 \cdot HCl \cdot 2H_2O$



FUNCTION OF QUININE HYDROCHLORIDE

- Tonic water is a carbonated soft drink containing Quinine that may contain sugar and has been added as a flavoring agent.

EFFECT OF QUININE HYDROCHLORIDE

- Quinine provides a distinctive taste and aroma that can enhance the drinking experience and provide unique characteristics.

STORAGE TEMPERATURE

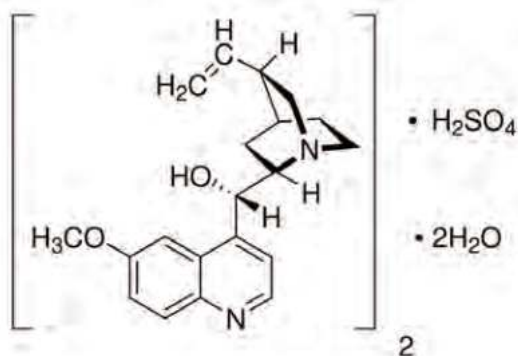
Storage Temp : 23°-27°C

QUININE SULPHATE

Base medicine for Antiarrhythmic,
Anti-Malaria and for Leg Cramps Treatment.

CHEMICAL DATA

Formula : $(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 \cdot 2H_2O$



FUNCTION OF QUININE SULPHATE

- Base medicine for Antiarrhythmic.
- Base medicine for Anti Malaria usually Quinine Sulphate for oral use.
- Quinine Sulphate is widely used to treat nocturnal leg cramps.

EFFECT OF QUININE SULPHATE

- In humans, quinine is effective in suppressing both spontaneous and inducible ventricular arrhythmias without the proarrhythmic potential of QT prolongation, torsades de pointes, or heart block.
- Quinine Sulphate intercalates into DNA, disrupting the parasites replication and transcription to exert its antimalarial effects.
- Quinine Sulphate reduces the response of the motor end-plate to acetylcholine and tetanic stimulation, reducing its excitability.

STORAGE TEMPERATURE

Storage Temp : 23°–27°C

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Quinine Sulphate
Formula	$(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 \cdot 2H_2O$ MW = 783.0
Synonym	Bis[(R)-[(2S,4S,5R)-5-ethenyl-1-azabicyclo [2.2.2]oct-2-yl] (6-methoxyquinolin-4-yl) -methanol] sulfate
CAS* Number	CAS # 6119-70-6
Test Result According To	BRITISH PHARMACOPOEIA 2013
Appearance	White or almost white, crystalline powder or fine, colourless needles.
Solubility	Slightly soluble in water, sparingly soluble in boiling water and in ethanol 96%.

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

QUININE DIHYDROCHLORIDE

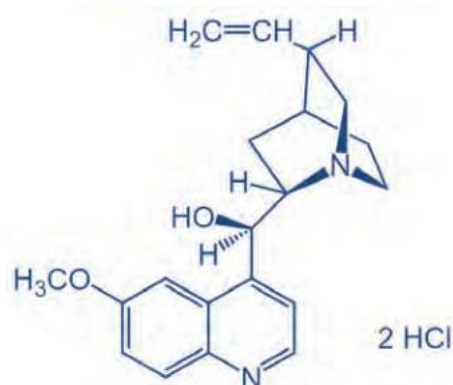
Generally used as Active Pharmaceutical Ingredients (API), Malaria Cure and Anti Diabetic.

OUR PRODUCT



CHEMICAL DATA

Formula : C₂₀H₂₄N₂O₂·2HCl



MARKET SEGMENT



Pharmaceutical

FUNCTION OF QUININE DIHYDROCHLORIDE

- Malaria medicine, usually Quinine Dihydrochloride for parenteral use.
- Quinine Dihydrochloride can be use as Anti Diabetic.

STANDARD PRODUCT SPECIFICATIONS

Product	Quinine Dihydrochloride
Formula	C ₂₀ H ₂₄ N ₂ O ₂ ·2HCl MW = 397.3
Synonym	(8S,9R)-6'-methoxycinchonan-9-ol dihydrochloride
CAS* Number	CAS # 60-93-5
Test Result According To	BRITISH PHARMACOPOEIA 2013
Appearance	A white or almost white powder.
Solubility	Very soluble in water, soluble in ethanol 96%

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

EFFECT OF QUININE DIHYDROCHLORIDE

- Quinine Dihydrochloride intercalates into DNA, disrupting the parasites replication and transcription to exert its antimalarial effects.
- Quinine Dihydrochloride appears a much more potent stimulus to insulin release than quinidine at equimolar tissue concentrations, producing a concentration-dependent response.

STORAGE TEMPERATURE

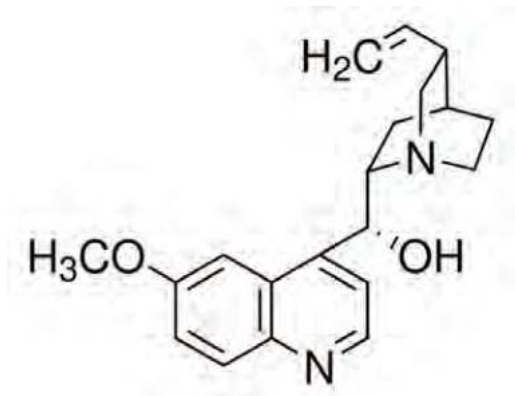
Storage Temp : 23°-27°C

QUININE BASE ANHYDROUS

Used as Hair Grow Stimulant,
Anticancer and Anti Fungal in plant.

CHEMICAL DATA

Formula : C₂₀H₂₄N₂O₂



FUNCTION OF QUININE BASE ANHYDROUS

- Hair Grow Stimulant.
- Anticancer.
- Anti Fungal.

EFFECT OF QUININE BASE ANHYDROUS

- Quinine have the activity/potential to protect hair cells from hair loss (hair cell death).
- As Anticancer, Quinine might show potent cytotoxicity effects on HEP-2 cancer cells, by inhibiting the growth of the cancer cells, through the apoptotic and cell cycle arrest.
- Had antifungal activity against 8 different types of fungi with inhibition levels ranging. However, there was no reduction in the antifungal activity of the simplified quinone and quinotoxine compounds (which tend to increase the antifungal activity).

STORAGE TEMPERATURE

Storage Temp : 23°-27°C

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Quinine Base Anhydrous
Formula	C ₂₀ H ₂₄ N ₂ O ₂ MW = 324.41
Synonym	Cinchonan-9-ol, 6'-Methoxy-, (8a,9R)-, Anhydrous
CAS* Number	[130-95-0]
Test Result According To	Deutsches Arzneibuch
Appearance	A white crystalline powder, has a very bitter taste.
Solubility	- Ethanol 96%, Chloroform : Freely soluble. - Water : Very slightly soluble.

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

QUININE BISULPHATE

As Leg Cramps Treatment.

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

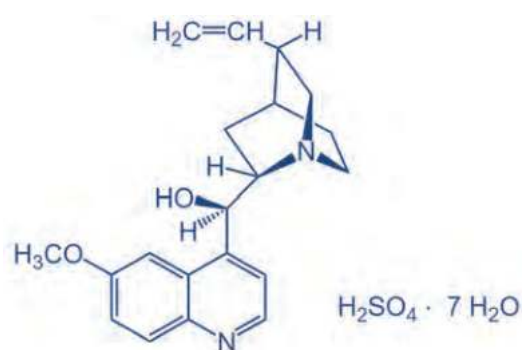
STANDARD PRODUCT SPECIFICATIONS

Product	Quinine Bisulphate
Formula	C ₂₀ H ₂₄ N ₂ O ₂ ·H ₂ SO ₄ ·7H ₂ O MW = 548.6
Synonym	(8S,9R)-6'-methoxycinchonan-9-ol hydrogen sulfate heptahydrate
CAS* Number	549-56-4
Test Result According To	BRITISH PHARMACOPOEIA 2022
Appearance	Colourless crystals or a white, crystalline powder, efflorescent in dry air.
Solubility	Freely soluble in water, sparingly soluble in ethanol 96%.

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

CHEMICAL DATA

Formula : C₂₀H₂₄N₂O₂·H₂SO₄·7H₂O



FUNCTION OF QUININE BISULPHATE

- Leg Cramp Treatment.

EFFECT OF QUININE BISULPHATE

- Quinine Bisulphate may help by decreasing the excitability of the motor end-plate and increasing the muscle refractory period.

STORAGE TEMPERATURE

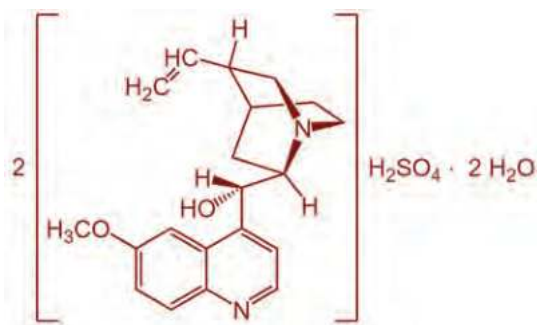
Storage Temp : 23°-27°C

QUINIDINE SULPHATE

Base medicine for Antiarrhythmic.
As per now is develop for pseudobulbar* cure.

CHEMICAL DATA

Formula : $(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 \cdot 2H_2O$



FUNCTION OF QUINIDINE SULPHATE

- Antiarrhythmic.
- Pseudobulbar cure.
- Therapy for the Slow Channel Congenital Myasthenic Syndrome.

EFFECT OF QUINIDINE SULPHATE

- Quinidine sulfate is an antiarrhythmic drug used to treat or prevent many types of irregular heartbeats (heart arrhythmias such as atrial fibrillation). Quinidine is currently approved for acute conversion of symptomatic AF and AFL. The preparation commonly used for oral administration is quinidine sulfate.
- Dextromethorphan is a sigma-1 receptor agonist and a noncompetitive N-methyl-d-aspartate (NMDA) receptor antagonist. By competitively inhibiting CYP2D6, Quinidine Sulphate increases plasma levels of dextromethorphan, thereby catalyzing a major biotransformation pathway for Dextromethorphan.
- Inhibits fibrillation, where there is no coordinated contraction of muscle fibres in the heart.

STORAGE TEMPERATURE

Storage Temp : 23°-27°C

*Pseudobulbar Affect (PBA) is a disorder of emotional regulation, characterized by uncontrollable outbursts of laughing and/or crying that are disproportionate to the emotions being experienced.

**CAS is a registry of chemical identification numbers maintained by the American Chemical Society

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Quinidine Sulphate
Formula	$(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 \cdot 2H_2O$ MW = 783.0
Synonym	bis[(S)-[(2R,4S,5R)-5-ethenyl-1-azabicyclo[2.2.2]oct-2-yl](6-methoxyquinolin-4-yl)methanol] sulfate
CAS** Number	6591-63-5
Test Result According To	EUROPEAN PHARMACOPOEIA 11.0
Appearance	White or almost white, crystalline powder or silky, colourless needles.
Solubility	Slightly soluble in water, soluble in boiling water and in ethanol 96%, practically Insoluble in acetone.

QUINIDINE BASE

Base medicine for Anti Malaria and Antiarrhythmic.

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

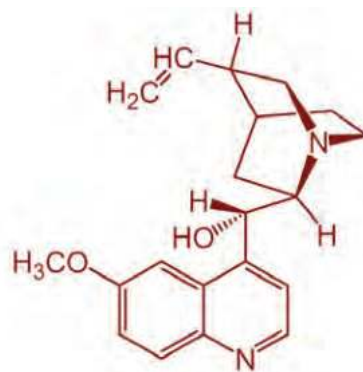
STANDARD PRODUCT SPECIFICATIONS

Product	Quinidine Base
Formula	C ₂₀ H ₂₄ N ₂ O ₂ MW = 324.42
Synonym	Cinchonan-9-ol, 6'-Methoxy-, (9S)
CAS* Number	56-54-2
Test Result According To	Schering
Appearance	White to brownish-white crystals.
Solubility	- In Methanol : Very soluble. - In Chloroform : Freely soluble - In Ether : Sparingly soluble - In Water : Very slightly soluble

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

CHEMICAL DATA

Formula : C₂₀H₂₄N₂O₂



FUNCTION OF QUINIDINE BASE

- Malaria medicine.
- Quinidine is used to regulate heart rate. In combination with dextromethorphan, quinidine helps increase the levels and duration of dextromethorphan in the blood.

EFFECT OF QUINIDINE BASE

- Effective anti malaria agent by targeting the erythrocytic stage of the *Plasmodium* species. The drug achieves this by accumulating within the parasite's food vacuole and forming a complex with heme, thereby inhibiting crystallization within the same compartment. Consequently, the inhibited heme polymerase activity leads to the accumulation of cytotoxic free heme. Moreover, quinidine exhibits anticholinergic activity as an additional pharmacological feature.
- Quinidine and quinidine-like drugs inhibit the entry of sodium ions, repolarization must proceed further before the influx of sodium can become great enough to allow the minimum rate of rise for a propagated action potential. The effects of quinidine and quinidine-like drugs, at least on the electrical activity of fibers of isolated tissue, are due to induced changes in membrane permeability, particularly depression of sodium flux into the cell.

STORAGE TEMPERATURE

Storage Temp : 23°-27°C

CINCHONINE

Commonly used as
Anticancer and Prevents Obesity.

CHEMICAL DATA

Formula : C₁₉H₂₂N₂O



FUNCTION OF CINCHONINE

- Anticancer.
- Cinchonine Prevents High-Fat-Diet-Induced Obesity.

EFFECT OF CINCHONINE

- Cinchonine inhibited cell growth and promoted apoptosis in human liver cancer cells. Cinchonine could induce apoptosis and reduce proliferation of cancer cells.
- Cinchonine effectively ameliorated hyperlipidemia and hyperglycemia induced by the HFD; cholesterol, LDL+VLDL cholesterol, HDL cholesterol, TG, and the plasma glucose levels were reduced in CID group compared to HFD group.

STORAGE TEMPERATURE

Storage Temp : 23°–27°C

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Cinchonine
Formula	C ₁₉ H ₂₂ N ₂ O MW = 294.39
Synonym	(9S)-Cinchonan-9-ol
CAS** Number	118-10-5
Test Result According To	PT.Sinkona Indonesia Lestari Specification
Appearance	White crystals, crystalline or granular powder.
Solubility	- In Chloroform : Slightly soluble - In Alcohol : Sparingly soluble - In Water : Practically insoluble

**CAS is a registry of chemical identification numbers maintained by the American Chemical Society

CINCHONIDINE

Cinchonidine is an Insecticidal and Antifungal in Plants and also can reduce ototoxicity caused by Cisplatin.

OUR PRODUCT



MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Cinchonidine
Formula	C ₁₉ H ₂₂ N ₂ O MW = 294.39
Synonym	(8 α , 9R)-, CINCHONIDINE-9-ol
CAS* Number	CAS#485-71-1
Test Result According To	PT.Sinkona Indonesia Lestari Spesification
Appearance	White crystals, crystalline or granular powder.
Solubility	- In Chloroform : Soluble - In Alcohol : Soluble - In Water : Practically insoluble.

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

CHEMICAL DATA

Formula : C₁₉H₂₂N₂O



FUNCTION OF CINCHONIDINE

- Cinchonidine Derivative have certain Insecticidal Activity.
- Cinchonidine as an Antifungal in Plants.
- Cinchonidine can reduce ototoxicity caused by cisplatin.

EFFECT OF CINCHONIDINE

- The cinchonidine compound have insecticidal activity, and particularly aim at lepidoptera pest armyworms, so that the cinchonidine compound can be applied to control the lepidoptera pest.
- Cinchonidine had antifungal activity against 8 different types of fungi, there was no reduction in the antifungal activity of the simplified quinone and quinotoxine compounds (which tend to increase the antifungal activity).
- Cinchonidine inhibited cisplatin-triggered activation of apoptotic pathways and ROS overproduction.

STORAGE TEMPERATURE

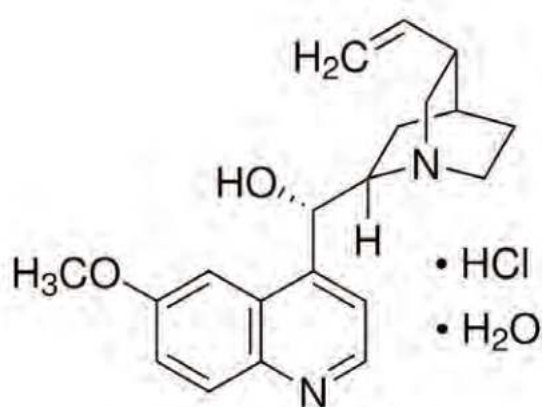
Storage Temp : 23°–27°C

QUINIDINE HYDROCHLORIDE

Is used as Class IA Antiarrhythmic.

CHEMICAL DATA

Formula : C₂₀H₂₄N₂O₂



OUR PRODUCT



FUNCTION OF QUINIDINE HYDROCHLORIDE

- Is Antiarrhythmic.

EFFECT OF QUINIDINE HYDROCHLORIDE

- Quinidine Hydrochloride decreased both cytoplasmic Ca²⁺ level ([Ca²⁺]_{cyt}) and muscle tension elevated by high-KCl in fura-2-loaded coronary preparations.
- Quinidine block Ca²⁺ uptake and their potencies to inhibit vascular contractions are very close to those of cardiac myocytes L-type Ca²⁺ channel currents, the blockade of transmembrane Ca²⁺ influx through L-type Ca²⁺ channel is likely to be involved in the mechanism for their vascular actions.

STORAGE TEMPERATURE

Storage Temp : 23°-27°C

MARKET SEGMENT



Pharmaceutical

STANDARD PRODUCT SPECIFICATIONS

Product	Quinidine Hydrochloride
Formula	C ₂₀ H ₂₄ N ₂ O ₂ · HCl · H ₂ O MW = 378.89
Synonym	(9S)-6'-Methoxycinchonan-9-ol monohydrochloride
CAS* Number	CAS#485-71-1
Test Result According To	THE UNITED STATES PHARMACOPEIA 42
Appearance	White or almost white or colourless, fine, silky needles, often in clusters
Solubility	Chloroform-alcohol-insoluble substances ≤ 0.1 %

*CAS is a registry of chemical identification numbers maintained by the American Chemical Society

OUR PRODUCTS CERTIFICATIONS

Certificate of FSSC V6



Certificate of ISO 9001 - 2015



Certificate of ISO 14001 - 2015



Certificate of HALAL



Sertifikat MSK 3



Certificate of KOSHER



OUR PRODUCTS CERTIFICATIONS

CEP Quinine Hydrochloride



CPOB-Certificate of GMP (NADFC)



CEP Quinine Sulfate



PT SIL Complete Biennial Registration Renewal 2022-2024



Usecase :

QUININE SULPHATE IN PHARMACEUTICAL INDUSTRIES




Globally in 2022, there were 249 million estimated malaria cases in 85 malaria endemic countries and areas (including the territory of French Guiana), an increase of 5 million cases compared with 2021. Most of the increase in case numbers over the past 5 years occurred in countries in the WHO African Region.

Malaria occurs primarily in tropical and subtropical countries. The vast majority of malaria cases and deaths are found in the WHO African Region, with nearly all cases caused by the *plasmodium falciparum* parasite. This Parasite is also dominant in other malaria hotspots, including the WHO regions of South-East Asia, Eastern Mediterranean and Western Pacific. In the WHO Region of the Americas, the *Plasmodium vivax* parasite is predominant.

The treat of malaria is highest in Sub-Saharan Africa, and 4 countries in that region accounted for nearly half of all malaria deaths worldwide in 2022: Nigeria (31.1 %), the Democratic Republic of the Congo (11.6 %), Niger (5.6 %) and the United Republic of Tanzania (4.4 %).

Quinine treatment for severe malaria was established before the methods for modern clinical trials were developed. Several salts of quinine have been formulated for parenteral use, but the dihydrochloride is the most widely used. The peak concentrations after intramuscular quinine in severe malaria are similar to those after intravenous infusion.



Studies of pharmacokinetics show that a loading dose of quinine (20 mg salt/kg bw, twice the maintenance dose) provides therapeutic plasma concentrations within 4 h. The maintenance dose of quinine (10 mg salt/kg bw) is administered at 8-h intervals, starting 8 h after the first dose. If there is no improvement in the patient's condition within 48 h, the dose should be reduced by one third, i.e. to 10 mg salt/kg bw every 12 h.

Rapid intravenous administration of quinine is dangerous. Each dose of parenteral quinine must be administered as a slow, rate-controlled infusion (usually diluted in 5% dextrose and infused over 4 h). The infusion rate should not exceed 5 mg salt/kg bw per h..

Whereas many antimalarial drugs are prescribed in terms of base, for historical reasons quinine doses are usually recommended in terms of salt (usually sulphate for oral use and dihydrochloride for parenteral use). Recommendations for the doses of this and other antimalarial agents should state clearly whether the salt or the base is being referred to; doses with different salts must have the same base equivalents. Quinine must never be given by intravenous bolus injection, as lethal hypotension may result.



Quinine dihydrochloride should be given by rate-controlled infusion in saline or dextrose solution. If this is not possible, it should be given by intramuscular injection to the anterior thigh; quinine should not be injected into the buttock in order to avoid sciatic nerve injury. The first dose should be split, with 10 mg/kg bw into each thigh. Undiluted quinine dihydrochloride at a concentration of 300 mg/ mL is acidic (pH 2) and painful when given by intramuscular injection, so it is best to administer it either in a buffered formulation or diluted to a concentration of 60–100 mg/mL for intramuscular injection. Gluconate salts are less acidic and better tolerated than the dihydrochloride salt when given by the intramuscular and rectal routes.

Studies in Southeast Asia using quinine monotherapy for 7 days showed cure rates of 85–87% , which is similar to what was observed over 15 years earlier. Moreover, the addition of either tetracycline or clindamycin to quinine in the Thai study improved cure rates to 98% and 100% respectively and also delayed the appearance of *Plasmodium vivax* infection, suggesting additional activity against this species.

Usecase :

QUINIDINE SULPHATE X DEXTROMETHORPHAN AS PSEUDOBULBAR TREATMENT

Pseudobulbar affect (PBA), also known as emotional lability, labile affect, or emotional incontinence, refers to sudden outbursts of involuntary crying or laughing in patients with neurological disorders, even though there might not be any sad or humorous event to trigger those emotions.

The FDA approved Dextromethorphan Hydrobromide/Quinidine Sulphate capsules in a fixed-dose combination intended for oral use only. Each capsule contains the active ingredients of Dextromethorphan Hydrobromide (HBr) 20 mg and Quinidine Sulphate 10 mg orally once daily for 7 days..

Dextromethorphan is a sigma-1 receptor agonist and a noncompetitive N-methyl-d-aspartate (NMDA) receptor antagonist. By competitively inhibiting CYP2D6, Quinidine Sulphate increases plasma levels of dextromethorphan, thereby catalyzing a major biotransformation pathway for Dextromethorphan.



QUININE SULPHATE FOR NOCTURNAL LEG CRAMPS

Quinine Sulphate (quinine) was originally developed as an antimalarial but has been used in the United Kingdom for many years as a treatment for nocturnal leg cramps. Leg cramps are defined as sudden painful involuntary maximal contraction of a muscle or a group of muscles lasting up to 10 minutes in a person with no other neurological or muscle pathology. Cramps usually are confined to the calf muscle, but affect other muscles. Leg cramps can occur because of decreased blood flow to the legs during walking, forcing one to stop, which is called intermittent claudication.



The usual dose of quinine for leg cramps is one tablet at bedtime. The strength of the tablet will be either 200 mg or 300 mg. Quinine Sulphate in a dose of 200mg or 300mg taken before going to bed for up to 4 weeks was more effective than placebo in preventing cramps and also 300 mg at night for the Quinine Bisulphate.

In nocturnal leg cramps, Quinine Sulphate reduces the response of the motor end-plate to acetylcholine and tetanic stimulation, reducing its excitability. Quinine Sulphate is 95% metabolised in the liver and has a half-life of around 10 hours.

Regulatory Agency (MRHA) in the UK stated that Quinine Sulphate should not be used as a routine treatment for nocturnal leg cramps. Quinine Sulphate should only be considered when cramps cause regular disruption of sleep and when cramps are very painful or frequent.

Cinchonine has benefits as a hair growth stimulant by stimulating hair follicles and dermal papilla so that it enters the anagen phase more quickly by activating the Wnt/b-catenin pathway, increasing the production of VEGF (Vascular Endothelial Growth Factor), which is important in hair growth and regeneration. Quinine, Quinidine, Cinchonine, and Cinchonidine, that have the activity/potential to protect hair cells from hair loss (hair cell death).



Cinchona alkaloids require a delivery system that can facilitate and enhance their penetration into hair follicles and skin papillae. One of the delivery systems is Nanostructured Lipid Carriers (NLC). CN-NLC serum is effective as a hair growth stimulant in the treatment of Androgenetic Alopecia characterized by increased hair length, number, and size of hair follicles-dermal papillae. The hair length of the CN-NLC 1 and 2 serum test groups increased by 39.97% and 39.30%.

The use of hair tonic, especially those containing quinine, can help accelerate hair growth after experiencing hair loss.

Usecase :

CINCHONINE IN CHEMICAL INDUSTRIES



QUINIDINE IN ANIMAL HEALTH INDUSTRIES

Class I agents comprise the group of agents generally known as membrane-stabilizing drugs, such as quinidine, procainamide, and lidocaine. These agents work by selectively blocking a proportion of the fast sodium channels in cardiomyocytes, leading to depression of phase 0 of the action potential and subsequent reductions in conduction velocity.

Quinidine is related to the antimalarial drug quinine. In addition to its membrane-stabilizing properties inherent to class I agents, it also has indirect, antivagal (atropine-like) effects in the atria. The drug has efficacy against supraventricular and ventricular arrhythmias. Quinidine's main indication in veterinary medicine is to treat atrial fibrillation.

The sulfate preparation of quinidine is absorbed rapidly after administration PO.



In horses and cattle, quinidine sulphate is the drug of choice to convert atrial fibrillation to normal sinus rhythm. Digoxin can be added to the therapeutic regimen in horses and cattle with atrial fibrillation if conversion has not occurred in 24–48 hours. Concurrent administration of digoxin and quinidine will increase plasma digoxin concentration, and concentrations of digoxin should be monitored beginning the second day of combined treatment.

Dosages of Quinidine Sulphate are as follows:

- In dogs, 5–10 mg/kg, IV, every 6 hours, or 6–20 mg/kg, PO, every 6–8 hours.
- In horses, 22 mg/kg, PO, every 2 hours.

Dosages of Quinidine Gluconate are as follows:

- In dogs are 6–20 mg/kg, IM, every 6 hours, or 6–20 mg/kg, PO, every 6–8 hours.
- In horses, 1–1.5 mg/kg, IV, every 5–10 minutes.





Atrial Fibrillation in Horses: With Quinidine

Quinidine is a class I antiarrhythmic effective for treating atrial fibrillation by its vagolytic action and by increasing the fibrillation threshold of the atrial myocardium, concealed conduction through the atrioventricular (AV) node, and effective refractory period of the atrial myocardium. This α -adrenergic antagonist can significantly decrease vascular tone and mean arterial pressures.

Doses :

Quinidine gluconate has been used as a slow IV push at a dose of 6.2 mg/kg or as an IV bolus at a dose of 0.5 to 1.5 mg/kg administered every 10 to 15 minutes.



Quinidine sulphate is generally regarded as the most effective treatment for converting horses to sinus rhythm. Lower plasma peak concentrations and longer duration of effect may be factors in this observation.

Oral and IV forms of quinidine exhibit half-lives of approximately 6.5 hours and tissue and plasma equilibrium approximately 30 minutes after administration.

If blood levels of quinidine can be monitored and controlled, quinidine can be administered every 2 hours for 3 days. If plasma quinidine levels cannot be measured, treatment intervals should be decreased to every 6 hours (after using the 2-hour-interval protocol for the first 24 hours) to minimize the likelihood of quinidine toxicity.

Usecase :

QUININE HYDROCHLORIDE IN BEVERAGE INDUSTRIES



Quinine Hydrochloride in Beverage Industries

Quinine is most commonly used in tonic water, where its bitter taste provides a distinctive flavor to the drink. Due to its bitterness, quinine has been added as a flavoring agent.

TONIC WATER → **MIXING IN COCKTAILS**

The use of quinine as a flavoring in carbonated beverages is now regulated by the Food and Drug Administration (FDA) to a maximum of 83 ppm (mg/L). Most tonic waters on the market contain approximately 25 - 60 ppm (mg/L) of quinine.

Regulation of Quinine Used in Tonic Water in Indonesia

“ Quinine should not exceed 40 mg/kg* ”

*Regulation of Quinine Used in Tonic Water in Indonesia

Thank You

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