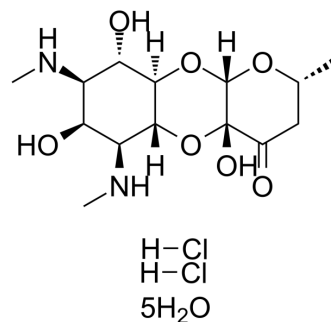


Spectinomycin dihydrochloride pentahydrate

Cat. No.:	HY-B1828A
CAS No.:	22189-32-8
Molecular Formula:	C ₁₄ H ₃₆ Cl ₂ N ₂ O ₁₂
Molecular Weight:	495.35
Target:	Bacterial; Antibiotic
Pathway:	Anti-infection
Storage:	4°C, sealed storage, away from moisture * In solvent : -80°C, 6 months; -20°C, 1 month (sealed storage, away from moisture)



SOLVENT & SOLUBILITY

In Vitro

H₂O : 62.5 mg/mL (126.17 mM; Need ultrasonic)

Concentration	Solvent	Mass	1 mg	5 mg	10 mg
			1 mg	5 mg	10 mg
Preparing Stock Solutions	1 mM		2.0188 mL	10.0939 mL	20.1877 mL
	5 mM		0.4038 mL	2.0188 mL	4.0375 mL
	10 mM		0.2019 mL	1.0094 mL	2.0188 mL

Please refer to the solubility information to select the appropriate solvent.

BIOLOGICAL ACTIVITY

Description

Spectinomycin dihydrochloride pentahydrate is a broad-spectrum antibiotic and inhibits the growth of a variety of gram-positive and gram-negative organisms. Spectinomycin dihydrochloride pentahydrate acts by selectively targeting to the bacterial ribosome and interrupting protein synthesis. Spectinomycin dihydrochloride pentahydrate is also a noncompetitive inhibitor of td intron RNA with an K_i value of 7.2 mM^{[1]-[5]}.

IC₅₀ & Target

bacterial ribosomal subunit^[5]

In Vitro

Spectinomycin dihydrochloride pentahydrate selectively inhibits protein synthesis in cells and in extracts of *Escherichia coli*: Spectinomycin dihydrochloride pentahydrate (50 µg/mL) inhibits *Escherichia coli* growth rapidly and reversibly, and suppresses amino acid incorporation immediately^[1].

Spectinomycin dihydrochloride pentahydrate (1 µg/mL or 3 µM) inhibits polypeptide synthesis directed either by endogenous messenger RNA or by MS-2 bacteriophage RNA, with maximum inhibition of 70-80% in extracts of *Escherichia coli*^[1].

Spectinomycin dihydrochloride pentahydrate blocks the translocation of peptidyl-tRNAs from A-site to P-site by inhibiting the binding of elongation factor G to the ribosome^[2].

Spectinomycin dihydrochloride pentahydrate interacts specifically with the residues G1064 and O1192 in 16S rRNA and potentially makes it inactive^[2].

Spectinomycin dihydrochloride pentahydrate exhibits splicing inhibition and dependent on pH changes and Mg^{2+} concentration, indicating electrostatic interactions with the intron RNA^[3].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Spectinomycin dihydrochloride pentahydrate (20 mg/kg; i.m.; 20-100 mg/kg; 9 d) shows the safety in healthy chicks^[4]. Spectinomycin dihydrochloride pentahydrate (10 mg/kg; i.v.; single dose) has the major elimination pathway by renal excretion, approximately 55% is excreted into the urine in unchanged form^[5].

Pharmacokinetics of Spectinomycin dihydrochloride pentahydrate in Rat^[5]

Parameter	C_0 (μ g/mL)	$AUC_{0-\infty}$ (μ g•h/mL)	V_d (L/kg)	CL (L/h/kg)	MRT (h)	$T_{1/2\alpha}$ (h)	$T_{1/2\beta}$ (h)	$T_{1/2\gamma}$ (h)	f_e	CL _{renal} (L/h/kg)	E _{ratio}
Non atrioventricular analysis	44.3	16.8	0.756	0.602	0.757	/	/	/	0.553	0.359	1.00
Three-compartment model	37.8	15.7	0.747	0.649	1.11	/	0.237	0.754	19.5	/	/

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Arbor Acres plus broiler chicks (15-day-old) ^[4]
Dosage:	20 mg/kg, 60 mg/kg, 100 mg/kg
Administration:	Intramuscular injection (chest muscles); 9 days
Result:	Showed biosecurity of 20 mg/kg by complete blood count, biochemical parameters, histopathological, clinical signs, body weight gain, and feed conversion ratio (FCR). Resulted minor toxicity of 60 mg/kg.

CUSTOMER VALIDATION

- BMC Vet Res. 2022 Jul 12;18(1):270.
- Patent. US20200368199A1.

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REFERENCES

- [1]. Khan EA, et al. Safety evaluation study of lincomycin and spectinomycin hydrochloride intramuscular injection in chickens. Toxicol Rep. 2022 Jan 29;9:204-209.
- [2]. Davies J, et al. Inhibition of protein synthesis by spectinomycin. Science. 1965 Sep 3;149(3688):1096-8.
- [3]. Brink MF, et al. Spectinomycin interacts specifically with the residues G1064 and C1192 in 16S rRNA, thereby potentially freezing this molecule into an inactive conformation. Nucleic Acids Res. 1994 Feb 11;22(3):325-31.
- [4]. Park IK, et al. Spectinomycin inhibits the self-splicing of the group 1 intron RNA. Biochem Biophys Res Commun. 2000 Mar 16;269(2):574-9.

Caution: Product has not been fully validated for medical applications. For research use only.

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