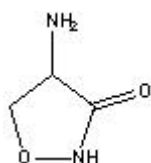


TECHNICAL INFORMATION

Catalog Number: 100535, 194788

D-Cycloserine

Structure:



Molecular Formula: C₃H₆N₂O₂

Molecular Weight: 102.1

CAS #: 68-41-7

Synonym: R (+)-4-amino-3-isoxazolidinone: D-4-amino-3-isoxazolidinone

Physical Description: White to off white powder

Solubility: Soluble in water (up to 100 mg/ml - clear, colorless to faint yellow solution), 96% ethanol (1 in 50 parts ethanol); slightly soluble in methanol or propylene glycol; practically insoluble in chloroform and ether. It is recommended to prepare solutions fresh for each use (neutral and acidic solutions are very unstable); however, aqueous solutions buffered to pH 10 with sodium carbonate may be stored for up to one week if stored at 2-8°C.

Mode of Resistance: D-Ala transport interference.

Inhibition: Studies in vitro show no suppression of growth in cultures made in media containing D-alanine which appears to block the antibacterial action of D-cycloserine.⁵

Description: A structural analog of D-Alanine. A partial agonist at the glycine modulatory site of NMDA receptors^{11,16,19}; enhances learning and memory in several models of cognitive deficit^{4,10,11,12,14,15,16,18}; anticonvulsant (at high doses).^{2,20} Antibiotic against gram-negative bacteria that acts by inhibiting the synthesis of the cell wall (D-Ala peptide bond formation).¹³

D-Cycloserine has antibiotic activity in vitro against growth phase gram-negative bacteria including *Escherichia coli* (working concentration of approximately 200 ug/ml)¹³, strains of *Staphylococcus aureus*, *Nocardia* species and *Chlamydia*,⁵ and some mycobacteria including *Mycobacterium tuberculosis*. The minimum inhibitory concentrations (MIC) in vitro for *M. tuberculosis* range from 5-20 ug/ml.

Typical Concentration for Use: 100-200 ug/ml. Prepare just before use using 0.1 M sodium phosphate buffer, pH 8.0.

Availability:

Catalog Number	Description	Size
100535	D-Cycloserine	10 mg 25 mg 100 mg 250 mg
194788	D-Cycloserine, gamma-irradiated	200 mg

References:

- Merck Index, **12th Ed**, No 2820.
- Chessell, I.P., et al., *Brain Res.*, **v. 565**, 345 (1991).
- El-Obeid, H.A. and Al-Badr, A.A., "Analytical Profile of D-Cycloserine" in *Analytical Profiles of Drug Substances*, v. 18, Academic Press; New York, p. 567 (1989).
- Flood, J.F., et al., *Eur. J. Pharmacol.*, **v. 221**, 249 (1992).
- *Goodman and Gilman's The Pharmacological Basis of Therapeutics*, 9th Ed., Hardman, J.G., et al. (eds.), p. 1164, McGraw-Hill, New York, NY (1995).
- Jain, M.K., *Handbook of Enzyme Inhibitors*, John Wiley & Sons; New York, p. 112 (1982).
- Jones, L.R., *Anal. Chem.*, **v. 28**, 39 (1956).
- Kuehl, F.A., Jr., et al., *J. Am. Chem. Soc.*, **v. 77**, 2344 (1955).
- Musson, D.G., et al., *J. Chromatog.*, **v. 414**, 121 (1987).
- Nakazato, E., et al., "Cholinergic and glutamatergic activation reverses working memory failure by hippocampal histamine H1 receptor blockade in rats." *Life Sci.*, **v. 67**, 1139-1147 (2000).
- Ohno, M. and Watanabe, S., *Eur. J. Pharmacol.*, **v. 318**, 267 (1996).
- Pussinen, R. and Sirvio, J., "Effects of D-cycloserine, a positive modulator of N-methyl-D-aspartate receptors, and ST 587, a putative alpha-1 adrenergic agonist, individually and in combination, on the non-delayed and delayed foraging behaviour of rats assessed in the radial arm maze." *J. Psychopharmacol.*, **v. 13**, 171 (1999).
- Raleigh, E.A., et al., "Selected Topics from Classical Bacterial Genetics" in *Short Protocols in Molecular Biology*, 4th Ed., Ausubel, F.M., et al. (eds.), Unit 1.4, p. 1-9 (John Wiley & Sons, Inc. New York (1999).
- Schneider, J.S., et al., "Effects of the partial glycine agonist D-cycloserine on cognitive functioning in chronic low dose MPTP-treated monkeys." *Brain Res.*, **v. 860**, 190-194 (2000).
- Schuster, G.M. and Schmidt, W.J., *Eur. J. Pharmacol.*, **v. 224**, 97 (1992).
- Sirvio, J., et al., *Neurosci. Lett.*, **v. 146**, 215 (1992).
- Stammer, C.H., et al., *J. Am. Chem. Soc.*, **v. 77**, 2346 (1955).
- Temple, M.D. and Hamm, R.J., *Brain Res.*, **v. 741**, 246 (1996).
- Watson, et al., "D-Cycloserine acts as a partial agonist at the glycine modulatory site of the NMDA receptor expressed in *Xenopus oocytes*." *Brain Res.*, **v. 510**, 158-160 (1990).
- Wlaz, P., et al., "Influence of D-cycloserine on the anticonvulsant activity of phenytoin and carbamazepine against electroconvulsions in mice." *Epilepsia*, **v. 37**, 610-617 (1996).