

30020 D-Cycloserine (D-4-amino-3-isoxazolidone, D-oxamycin, Seromycin, K300, NJ-21)

CAS number: 68-41-7

Product Description:

prepared from microbial source

Appearance: White powder

Molecular Formula: $C_3H_6N_2O_2$

Molecular Weight: 102.1 g/mol

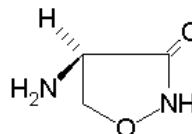
Mp: ~ 150 °C (dec.)

$E_{226\text{ nm}}$: 402 (1% in water)

$[\alpha]_D^{23}$: +115° (c = 1.0%, water)¹

$[\alpha]_D^{20}$: +114 ± 3° (c = 2% in water)¹⁹

$[\alpha]_{546}^{20}$: +138 ± 3° (c = 2% in water)¹⁹



D-Cycloserine, a structural analog of D-alanine, is a broad spectrum antibiotic produced by certain strains of *Streptomyces orchidaceus* or *S. garphalus*.¹⁻⁵

D-cycloserine (at 100 to 200 µg/ml) inhibits the synthesis of bacterial cell walls (involving peptidoglycan synthesis) by preventing formation of D-alanine from L-alanine and hence the formation of peptide bonds involving D-alanine.⁴ D-cycloserine has antibiotic activity *in vitro* against growth phase Gram-negative bacteria including *Escherichia coli* (working concentration of approx. 200 µg/ml)⁴, strains of *Staphylococcus aureus*, *Nocardia* species and *Chlamydia*,³ and some mycobacteria including *Mycobacterium tuberculosis*. The minimum inhibitory concentrations (MIC) *in vitro* for *M. tuberculosis* range from 5-20 µg/ml. 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.³

D-cycloserine is an excitatory amino acid and partial agonist at the glycine binding site of the N-methyl-D-aspartate (NMDA) receptor.⁶⁻⁸ At low doses it is a cognitive enhancer that improves learning and memory in several experimental models of disease and cognitive deficit.^{6,7,9-14} At high doses, D-cycloserine is an anti-convulsant.^{15,16} Intermediate doses potentiate the anti-convulsant action of phenytoin but block its long-term memory impairment.¹⁶ The HPLC determination of D-cycloserine in plasma and urine¹⁷ and a colorimetric method for determination of cycloserine in biological fluids¹⁸ have been reported. UV, IR, NMR and mass spectra and pharmacokinetics of D-cycloserine have been reported.²

Applications:

This product is used for preparing diverse selective media for molecular biology and microbiology²¹.

Cycloserine is a broad-spectrum antibiotic used to treat tuberculosis. It is used rarely for treating noninfectious diseases.²²

Preparation Instructions:

D-cycloserine is soluble in deionized water up to 100 mg/ml. A solution of 50 mg/ml cycloserine in water is clear and colorless or very faintly yellow. D-cycloserine is also soluble at 1 in 50 parts of 96% ethanol, but practically insoluble in chloroform and ether. It is also slightly soluble in methanol or propylene glycol. Stock solutions (e.g. 10 mg/ml) of D-cycloserine may also be prepared immediately before use in 0.1 M sodium phosphate buffer, pH 8.0.

Storage/Stability:

Storage Temperature of the powder is -18 °C

It is generally recommended to prepare solutions immediately before use because neutral or acidic solutions are unstable.⁴ However, aqueous solutions buffered to pH 10 with sodium carbonate may be stored for up to one week if stored at 2 °C to 8 °C. In addition, aqueous solutions of D-cycloserine have been stored in aliquots at -20 °C and thawed just prior to use.¹²

Precautions:

For Laboratory Use Only. Not for drug, household or other uses.

References:

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