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Product Information

D-CYCLOSERINE

Product Numbers:

C 6880, Microbial Source

C 3909, Synthetic

C 7670, γ -Irradiated, Molecular Biology Reagent

Product Number C 6880 is a replacement for 85,857-9

Storage Temperature -20°C

CAS #: 68-41-7

Synonyms: D-4-amino-3-isoxazolidone, D-oxamycin, Seromycin, K300, NJ-21

Product Description

Appearance: White powder

Molecular Formula: $\text{C}_3\text{H}_6\text{N}_2\text{O}_2$

Molecular Weight: 102.1

$E^{1\%} = 402$ (226 nm)

$[\alpha]_{\text{D}}^{23} = +115^{\circ}$ (c=1.0%, water)¹

C 6880 and C 7670: prepared from a microbial source

C 3909: synthetically produced

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 $\mu\text{g}/\text{ml}$) 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 $\mu\text{g}/\text{ml}$)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 $\mu\text{g}/\text{ml}$. 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

Reagents

These products are supplied as powders. C 7670 is convenience packaged for use in molecular biology; it is pre-weighed in quantities to give typical working concentrations when the entire package is added to 1 L of agar preparations (for 50 plates of 20 ml per plate). Furthermore, C 7670 is γ -irradiated for sterility and septum-capped for ease in injecting sterile diluent. C 7670 is also USP tested for potency following γ -irradiation to assure full biological activity.

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

D-Cycloserine powder is stable for at least four years when stored unopened and desiccated at -20°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

References

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