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Product Information

D-Cycloserine

Catalog Numbers:
C6880, C3909, C7670

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: $C_3H_6N_2O_2$
Molecular Weight: 102.09
$E^{1\%}$ = 402 (226 nm)
$[\alpha]_D^{23}$ = +115° (c=1.0%, water)[1]

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 100-200 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 urine[17] and a colorimetric method for determination of cycloserine in biological fluids[18] 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.

C7670 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 2-8 °C. In addition, aqueous solutions of D-cycloserine have been stored in aliquots at –20 °C and thawed just prior to use.[12]

Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

References

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