N-butyryl-L-Homoserine lactone-d₅

Item No. 10007899

Formal Name: N-[(3S)-tetrahydro-2-oxo-3-furanyl]butanamide-3,3,4,4,4-d₅
Synonym: C₄-HSL-d₅
MF: C₉H₅D₅NO₃
FW: 176.2
Chemical Purity: ≥98%
Deuterium Incorporation: ≥99% deuterated forms (d₁-d₅); ≤1% d₅
Stability: ≥1 year at -20°C
Supplied as: A solution in methyl acetate

Laboratory Procedures
N-butyryl-L-Homoserine lactone-d₅ (C₄-HSL-d₅) contains five deuterium atoms at the 3, 3’, 4, 4, and 4 positions. It is intended for use as an internal standard for the quantification of C₄-HSL by GC- or LC-mass spectrometry (MS). For long term storage, we suggest that C₄-HSL-d₅ be stored as supplied at -20°C.
C₄-HSL-d₅ is supplied as a crystalline solid. A stock solution may be made by dissolving the C₄-HSL-d₅ in an organic solvent purged with an inert gas. C₄-HSL-d₅ is soluble in organic solvents such as DMSO and dimethyl formamide. The solubility of C₄-HSL-d₅ in these solvents is approximately 30 mg/ml. While C₄-HSL-d₅ is also soluble in ethanol and other primary alcohols, their use is not recommended as they have been shown to open the lactone ring.
C₄-HSL-d₅ is used as an internal standard for the quantification of C₄-HSL by stable isotope dilution MS. The accuracy of the sample weight in this vial is between 5% over and 2% under the amount shown on the vial. If better precision is required, the deuterated standard should be quantitated against a more precisely weighed unlabeled standard by constructing a standard curve of peak intensity ratios (deuterated versus unlabeled).
Quorum sensing is a regulatory system used by bacteria for controlling gene expression in response to increasing cell density. A promising field of study involves controlling bacterial infections by quenching their quorum sensing systems. The expression of specific target genes, such as transcriptional regulators belonging to the LuxR family of proteins, is coordinated by synthesis of diffusible acylhomoserine lactone (AHL) molecules. C₄-HSL is a small diffusible signaling molecule involved in quorum sensing, controlling gene expression, and affecting cellular metabolism. The diverse applications of this molecule include regulation of virulence in general, infection prevention, and formation of biofilms.

References

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