Product Information

Leupeptin

Hemisulfate salt, synthetic, ≥ 85% (HPLC)

L8511

Product Description

CAS Number: 103476-89-7

Synonyms: Acetyl-Leu-Leu-Arg-al, *N*-Acetyl-L-leucyl-L-leucyl-L-argininal hemisulfate salt

Molecular Weight: 475.6 (anhydrous)

Molecular Formula: $C_{20}H_{38}N_6O_4 \bullet ½\ H_2SO_4$

Leupeptin is a reversible competitive inhibitor of cysteine proteases and serine proteases.[1] Leupeptin acts by covalent binding to, respectively:[2]

- Catalytic cysteines of cysteine proteases
- Catalytic series of serine proteases

Leupeptin was first isolated from microbial sources as a mixture of two very similar forms:[3]

- Acetyl-Leu-Leu-Arg-al
- Propionyl-Leu-Leu-Arg-al

While the propionyl leupeptin is active as an inhibitor, the acetyl form is more commonly used.

Leupeptin has been reported to inhibit calpain,[4] cathepsin B,[5] cathepsins H and L,[6] and trypsin.[7] A typical working concentration range is 10-100 µM. The activity of leupeptins and related analogs has been studied.[9] Table 1 lists inhibitory activities of leupeptin against various enzymes.[10]

HPLC analysis of leupeptin gives multiple peaks because of the formation of tautomeric isomers in solution.[11] The primary mechanism of inactivation of leupeptin is via racemization of the L-arginal moiety, as leupeptin with a D-arginal group is totally inactive.[10] If the aldehyde is oxidized but retains its L-configuration, the resulting carboxylate compound does have some inhibitory activity.[12]

Leupeptin hemisulfate was the first commercially available leupeptin salt form. This product is a chemically synthetic form of leupeptin hemisulfate. Several dissertations[13-16] have cited use of product L8511 in their protocols.

Table 1. Concentrations for 50% inhibition (IC_{50}, reported as µg/mL leupeptin)[10]

Enzyme	Substrate	IC_{50} (µg/mL)
Aspergillopepsin II (Proctase A)	Casein	> 250
Aspergillopepsin I (Proctase B)	Casein	> 250
Cathepsin A	Carbobenzoxy-L·glutamyl-L·tyrosine (Cb-Glut-Tyr)	1680
Cathepsin B	*N*α-benzoyl-L-arginine amide HCl	0.44
Cathepsin D	Hemoglobin	109
α-Chymotrypsin	Casein	> 500
β-, γ-, and δ-Chymotrypsin	Casein	> 500
Kallikrein	BAEE (*N*α-benzoyl-L-arginine ethyl ester HCI)	75
Papain	Casein	0.5
Pepsin	Casein	> 500
	Hemoglobin	> 500
Plasmin	Fibrinogen	8
Thrombin	*N*α-(*p*-toluene-sulfonyl)-L-arginine methyl ester HCl	10000
Thrombokinase	Plasma	15
Trypsin	Casein	2

Precautions and Disclaimer

For R&D use only. Not for drug, household, or other uses. Please consult the Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability

Store the lyophilized product at –20 °C.

Solubility

This product is tested for solubility in water at 50 mg/mL.

A 10 mM aqueous solution of leupeptin has been reported to be stable for a week at 4 °C, and for a month at –20 °C.[8] At working concentrations (10-100 µM), a solution is stable for only a few hours.[8] The stock solution should be stored on ice for intermittent use over several hours.

Usage

Because of its aldehyde group, leupeptin may act as a reducing agent, and thus may interfere in protein determination assays, such as the Lowry assay and, to a lesser extent, the Bradford assay.

References

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