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TECHNICAL INFORMATION

Catalog Number: 100277

Arginase

Molecular Weight: 115,000 - 120,000.⁶

CAS # : 9000-96-8

Synonyms: E.C. 3.5.3.1; L-arginine amidinase; L-arginine amidino-hydrolase

Physical Description: Brown powder

Source: *Beef liver*

Form: A salt free freeze-dried powder

Composition: The amino acid content has been reported by Greenberg.⁵ The enzyme does not split into subunits; it binds 4 atoms of Mn²⁺ which are essential to its activity as well as stability and has a hexose content of 3-5%.⁶

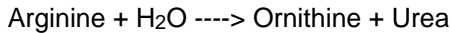
Unit Definition: That amount of enzyme causing the hydrolysis of one micromole of L-arginine per minute at 37°C and pH 9.5

Optimum pH: 10 (Mn²⁺ activated)⁵

Extinction Coefficient: E^{1%₂₇₈} = 9.6.⁶

Solubility: Dissolves readily at 1 mg/ml in 0.05 M manganese maleate pH 7.0 to give a clear pale brown solution, also soluble in distilled water or dilute buffer

Description: Arginase catalyzes the following reaction:



The enzyme participates in the Krebs-Henseleit urea cycle. It is most highly concentrated in mammalian liver. It is also present in the mammary glands.¹²

Specificity: Arginase activity requires the free guanidino group and the free carboxyl group of arginine.⁵

Activators:¹² Mn²⁺, Ni²⁺ or Co²⁺

Inhibitors:¹² Hg²⁺, Ag²⁺, Zn²⁺

Stability: Susceptibility of arginase to proteolytic inactivation is enhanced by increasing activating concentration of Mn²⁺.⁴ Cysteine, isoleucine, leucine, valine and alanine protect the enzyme against trypsin inactivation.¹²

Assay:^{1,12}

Method: Based upon the colorimetric determination of released urea nitrogen, using 2,3-butanedione reagent.

Reagents:

A. 0.05 M Maleic acid, pH 7.0 with 0.05 M manganous sulfate

B. 0.713 M L-arginine, pH 9.5

C. Reagent grade water, pH 9.5 (20 mg NaOH per liter).

D. 0.075%, 2,3-Butanedione in buffered arsenic-sulfuric acid

Enzyme:

Incubate a one mg/ml solution of the enzyme in maleic-manganous sulfate buffer (Reagent A) at 37°C for 4 hours. Following activation, dilute to 1-2 micrograms/ml in reagent grade water, pH 9.5 (Reagent C).

Procedure:

Pipette the following into screw capped tubes:

	Blank	#1	#2
Water, pH 9.5 (Reagent C)	0.3 ml	0.1 ml	0.2 ml
Diluted, activated enzyme	--	0.2 ml	0.1 ml

Incubate in 37°C water bath for 5 minutes to achieve temperature equilibration. At timed intervals start reaction by adding:
Arginine (Reagent B) 0.2 ml 0.2 ml 0.2 ml

Incubate for 30 minutes at 37°C. Stop reaction at timed intervals by adding:

B.U.N. Reagent (Reagent D)

4.0 ml

4.0 ml

4.0 ml

Cap tubes and develop color by boiling in water bath for 12 minutes. Chill tubes for 3 minutes in an ice bath. Read the color at 490 nm against blank.

Calculation:

Determine the micromoles of urea released from a standard urea curve in the range of 0.1-1.0 micromoles urea.

$$\text{Units/mg} = \frac{\text{micromoles urea released}}{30 \times \text{mg enzyme in reaction mixture}}$$

Origin: USA

References:

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- Supplier Information.