MP Biomedicals, LLC
29525 Fountain Parkway
Solon, Ohio 44139
Telephone: 440/337-1200
Toll Free: 800/854-0530
Fax: 440/337-1180
mailto: biotech@mpbio.com
web: http://www.mpbio.com

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 37ºC and pH 9.5
Optimum pH: 10 (Mn^{2+} 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:

Arginine + H_2O ----> Ornithine + Urea

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] Mn^{2+}, Ni^{2+} or Co^{2+}
Inhibitors:[12] Hg^{2+}, Ag^{2+}, Zn^{2+}
Stability: Susceptibility of arginase to proteolytic inactivation is enhanced by increasing activating concentration of Mn^{2+}.[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:

	Tube		
	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.

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

Origin: USA

References:

– Aminlari, M., "A novel colorimetric method for assaying arginase activity." *Clin. Biochem.*, **v. 25**, 431 (1992).
– Aminlari, M. and Vaseghi, T., "Arginase distribution in tissues of domestic animals." *Comp. Biochem. Physiol. B*, **v. 103**, 385 (1992).
– Bach, S. and Killup, J., "Purification and crystallization of arginase." *Biochim. Biophys. Acta*, **v. 29**, 273 (1958).
– Bond, J.S., "Effect of manganese and amino acids on proteolytic inactivation of beef liver arginase." *Biochim. Biophys. Acta*, **v. 327**, 157 (1973).
– Greenberg, D., "Arginase" in *The Enzymes, IV*, (Boyer, P., Lardy, H. and Myrback, K., eds), Academic Press, NY, p. 257 (1960).
– Harell, D. and Sokolovsky, M., "Beef-liver arginase isolation and molecular properties." *Eur. J. Biochem.*, **v. 25**, 102 (1972).
– Mora, J., Martuscelli, J. and Soberon, G., "The regulation of urea-biosynthesis enzymes in vertebrates." *Biochem. J.*, **v. 96**, 28 (1965).
– Roholt, O. and Greenberg, D., "Liver arginase. IV. Effect of pH on kinetics of manganese activated enzyme." *Arch. Biochem. Biophys.*, **v. 62**, 454 (1956).
– Turkoglu, S. and Ozer, I., "Possible involvement of manganese in the catalytic mechanism of bovine liver arginase." *Intl. J. Biochem.*, **v. 24**, 937 (1992).
– Turkoglu, S. and Ozer, I., "Resolution of multiple forms of bovine liver arginase by chromatofocusing." *Intl. J. Biochem.*, **v. 23**, 147 (1991).
– Yip, M.C.M. and Knox, W.E., "Function of arginase in lactating mammary gland." *Biochem. J.*, **v. 127**, 893 (1972).
– Supplier Information.