

## Product Information

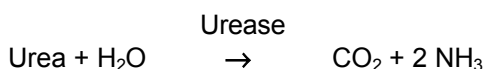
### Urease, Type C-3 from *Canavalia ensiformis* (Jack Bean)

Catalog Number **U0251**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

E.C. 3.5.1.5  
CAS RN 9002-13-5  
Synonym: Jack Bean Urease

#### Product Description

Urease is involved in purine metabolism and the urea cycle. It catalyzes the hydrolysis of urea to produce ammonia and carbon dioxide:



Hydroxyurea is also a substrate of the enzyme.<sup>1</sup>

Jack bean urease was the first enzyme to be crystallized and the first enzyme found to contain nickel. It is a multi-subunit enzyme, consisting of 91 kDa subunits in three protein forms. The major protein form has a molecular mass range of 440–480 kDa and two lesser forms have molecular mass ranges of 230–260 kDa and 660–740 kDa.<sup>2,3</sup>

Isoelectric point:<sup>4</sup> 5.0-5.2

Optimal pH:<sup>2</sup> 7.4

Optimal temperature:  $60\text{ }^{\circ}\text{C}$   
Urease begins to denature at temperatures above  $45\text{ }^{\circ}\text{C}$  for 60 minutes.

$K_M$ :<sup>2</sup> 1.3 mM (in Tris HCl)

Inhibitors:

2-mercaptoethanol<sup>5</sup>

acetohydroxamate<sup>6</sup>

EDTA<sup>7</sup>

phosphoramidate<sup>5</sup>

fluoride ion<sup>5</sup>

1,4-benzoquinone

2,5-dimethyl-1,4-benzoquinone<sup>8</sup>

This product is purified by crystallization and is supplied as a powder.

Specific activity:  $\geq 600,000$  units/g solid

Unit definition: one unit will liberate  $1.0\text{ }\mu\text{mole}$  of  $\text{NH}_3$  from urea per minute at pH 7.0 at  $25\text{ }^{\circ}\text{C}$ . One unit is equivalent to 1.0 I.U. or 0.054 Sumner unit (1.0 mg ammonia nitrogen released in 5 minutes at pH 7.0 at  $20\text{ }^{\circ}\text{C}$ )

Sigma's titrimetric assay uses a 1.10 ml reaction mix. The final concentrations are 684 mM sodium phosphate, 455 mM urea, 0.05% (w/v) bovine serum albumin and 25–50 units of urease.

A FTIR method used to monitor either the disappearance of substrate or the appearance of product has been published.<sup>9</sup>

#### 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.

#### Preparation Instructions

The enzyme is soluble in 0.2 M sodium phosphate buffer, pH 7.0, (1 mg/ml) yielding a colorless to light yellow solution with a haze. The following buffers have been shown not to inhibit urease activity: MES, HEPES, and CHES.<sup>2</sup>

#### Storage/Stability

The recommended storage temperature is  $-20\text{ }^{\circ}\text{C}$ .

## References

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4. Sumner, J.B., and Hand, D.B., The isoelectric point of crystalline urease. J. Am. Chem. Soc., **51**, 1255-60 (1929).
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7. Dixon, N.E. *et al.*, Jack bean urease (EC 3.5.1.5). II. The relationship between nickel, enzymatic activity, and the "abnormal" ultraviolet spectrum. The nickel content of jack beans. Can. J. Biochem., **58**, 474-480 (1980).
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9. Karmali, K. *et al.*, The use of Fourier transform infrared spectroscopy to assay for urease from *Pseudomonas aeruginosa* and *Canavalia ensiformis*. Anal. Biochem., **331**, 115-21 (2004).

GY,KAD,RGB,JWM,MAM 03/14-1