

## Product Information

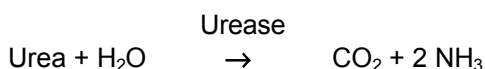
### Urease, Type III from *Canavalia ensiformis* (Jack Bean)

Catalog Number **U1500**  
Storage Temperature 2–8 °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 °C  
Urease begins to denature at temperatures above 45 °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>

The product is supplied as a lyophilized powder.

Specific activity: 15,000–50,000 units/g solid

Unit definition: one unit will liberate 1.0 μmole of NH<sub>3</sub> from urea per minute at pH 7.0 at 25 °C.

Notes: 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 °C)

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

Other components:

“Free” ammonia ≤0.05 μg/unit

Total reducing substances (as glucose) ≤1.5 μg/unit

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, (10 mg/ml) yielding a solution with a possible 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 2–8 °C.

## References

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2. Cesareo, S.D., and Langton, S.R., Kinetic properties of *Helicobacter pylori* urease compared with jack bean urease. FEMS Microbiol. Lett., **78**, 15-21 (1992).
3. Krajewska, B., and Ciurli, S., Jack Bean (*Canavalia ensiformis*) urease. Probing acid-base groups of the active site by pH variation. Plant Physiol. Biochem., **43**, 651-58 (2005).
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5. Dixon, N.E. *et al.*, Jack Bean urease (EC 3.5.1.5). III. The involvement of active-site nickel ion in inhibition by beta-mercaptoethanol, phosphoramidate, and fluoride. Can. J. Biochem., **58**, 481-488 (1980).
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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).
8. Zaborska, W. *et al.*, Inhibition of jack bean urease by 1,4-benzoquinone and 2,5-dimethyl-1,4-benzoquinone. Evaluation of the inhibition mechanism. J. Enzyme Inhib. Med. Chem., **17**, 247-53 (2002).
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GY,KAD,RGB,JWM,MAM 03/14-1