ALPHA DIAGNOSTIC INTERNATIONAL

Product Specification Sheet

Cat# URE-03 Urease (1400 Nessler U/mg material) **Size**: 100 KU

General Information

Urease (EC 3.5.1.5) is an enzyme that catalyzes the hydrolysis of urea into carbon dioxide and ammonia. The reaction occurs as follows:

$(NH2)2CO + H2O \rightarrow CO2 + 2NH3$

Urease is found in bacteria, yeast and several higher plants.

Molecular weight: 480 kDa or 545 kDa for Jack Bean Urease (calculated mass from the amino acid sequence).
Optimum pH: 7.4
Optimum Temperature: 60 degrees Celsius
Enzymatic specificity: urea and hydroxyurea
Inhibitors: heavy metals (Pb- & Pb2+)

The multi-subunit enzyme usually has a 3:3 (alpha:beta) stoichiometry with a 2-fold symmetric structure (note that the image above gives the structure of the asymmetric unit, one third of the true biological assembly). An exceptional urease is found in Helicobacter pylori, which combines four of the regular six subunit enzymes in an overall tetrahedral assembly of 24 subunits (α12β12). This supra-molecular assembly is thought to confer additional stability for the enzyme in this organism, which functions to produce ammonia in order to neutralise gastric acid. The presence of urease is used in the diagnosis of Helicobacter species.

Many gastrointestinal or urinary tract pathogens produce urease, enabling the detection of urease to be used as a diagnostic to detect presence of pathogens.

Urease-positive pathogens include:

Helicobacter pylori
Enteric bacteria including Proteus, Klebsiella and possibly Serratia
Ureaplasma urealyticum, a relative of the mycoplasma
Cryptococcus, an opportunistic fungus
Proteus mirabilis, Nocardia

Urease conductometric biosensors for detection of heavy metal ions consisting of interdigitated gold electrodes and enzyme membranes formed on their sensitive parts have been used for a quantitative estimation of general water pollution with heavy-metal ions. The measurements of the urease residual activity have been carried out in Tris-HNO_3 buffer after preincubation in model metal-salt solution. The detection limits, depending on preincubation time and dynamic ranges, have been determined in model solutions of heavy-metal ions. The sequence of metals ions relative to their toxicity toward urease is: $Hg^{2+} > Cu^{2+} > Cd^{2+} > Co^{2+} > Pb^{2+} > Sr^{2+} >$. The conditions for practical applications of the biosensors have been investigated and critically evaluated for optimization. Urease reactivation by EDTA after inhibition by heavy-metal ions has been demonstrated

Source and Storage:

Urease is isolated from Jack bean. It is supplied as freeze dried powder. It dissolves readily at 5 mg/ml in 0.05M Tris buffer, 1 mM EDTA pH 8.0 to provide a clear solution.

Store powder at -20oC or below under dry conditions. Allow the product to reach room temp before opening the vial and dissolve in appropriate buffers for usage. Before returning to storage, re-dessicate under vaccumn over silica gel for a minimum of 4 hours to provide best conditions for long term preservation of enzyme activity.

Unit Definition

Amount of enzyme causing hydrolysis of 1 umol of ureas per min at 25oC and pH 8.0.

Activity

>1400 nessler U/mg protein (lot sp. activity given on the vial)

Alpha Diagnostic Intl Inc., 6203 Woodlake Center Dr, San Antonio, TX 78244, USA; **Email**: service@4adi.com
☎ (800) 786-5777; (210) 561-9515; Fax: (210) 561-9544; Web **Site**: www.4adi.com