UREA / BUN TEST KIT

UV Kinetic Method (Enzymatic GLDH Coupled System)

Product Code: 12052	**Reaction Type:** UV Kinetic (Decreasing Absorbance)
Pack Size: Dynamic System Matrix Pack	**Matrix Target:** Human Serum & Plasma
Storage Temp: 2–8°C (Do Not Freeze)	**Wavelength:** 340 nm Photometric Target Path

INTENDED USE & CLINICAL SIGNIFICANCE

Intended Use: This liquid diagnostic reagent system is configured for the direct quantitative in vitro enzymatic UV kinetic determination of Urea / Blood Urea Nitrogen (BUN) concentrations in human serum or plasma specimens using automated or semi-automated biochemistry platforms.

Clinical Significance: Urea is the primary structural nitrogenous waste product derived from protein catabolism, synthesized in hepatic parenchymal pathways via the urea cycle. Elevated blood urea levels (uremia / azotemia) are crucial diagnostic indicators for high-protein dietary intake, acute or chronic renal filtration disease, congestive heart failure, severe dehydration, or post-renal urinary tract obstructions. Conversely, low levels are less common but indicate progressive liver necrosis, advanced malnutrition, or physiological fluid shifts typical of normal pregnancy tracks.

METHOD PRINCIPLE

This procedure adapts a coupled enzymatic method. Urea is first hydrolyzed by urease to yield ammonium ions and carbon dioxide. Glutamate Dehydrogenase (GLDH) subsequently catalyzes the reductive amination of α-oxoglutarate using the liberated ammonia and NADH, oxidizing the coenzyme to NAD^+:

$$Urea + H_2O + 2\,H^+ \rightarrow 2\,NH_4^+ + CO_2$$

$$Ammonia + 2\,\alpha\text{-}oxoglutarate + 2\,NADH \rightarrow 2\,L\text{-}Glutamate + 2\,NAD^+ + 2\,H_2O$$

Two molecules of NADH are systematically oxidized for each molecule of urea hydrolyzed. The rate of decrease in optical absorbance at 340 nm, caused by the continuous disappearance of NADH, is directly proportional to the absolute concentration of BUN/Urea in the sample.

STEP 1: REAGENT CONFIGURATION & PIPETTING BASELINE

Working Reagent Preparation: Reconstitute and mix reagents according to the specific volume configurations indicated on the vial labeling. Bring the working reagent volume to room temperature (RT) before performing the pipetting steps.

Reagent / Component Line	Standard (S) Track	Patient Test (T) Track
Prepared GLDH / Urease Working Reagent	1000 µl	1000 µl
Urea Standard (Concentration stamped on vial)	10 µl	—
Patient Specimen (Non-hemolysed Serum / Plasma)	—	10 µl

Operational Directive: Mix completely and start a stopwatch immediately. Record the initial absorbance reading exactly 30 seconds post-addition (A_1) against a water or air blank at 340 nm. Record the secondary absorbance reading exactly 60 seconds later (A_2). Calculate the kinetic rate drop ($\Delta A = A_1 - A_2$).

STEP 2: CALCULATIONS & DATA TRACKING

$$\text{Urea / BUN Concentration} = [\Delta A \text{ of Test} / \Delta A \text{ of Standard}] \times \text{Standard Concentration}$$

TECHNICAL PARAMETERS & DIAGNOSTIC SUPPORT LIMITS

Universal Safeguards	Professional in vitro diagnostic use. Handle components following universal biosafety precautions. To preserve chemical stability, use fresh, completely separate micro-pipette tips for dispensing reagents, standards, and patient specimens. Cross-contamination degrades analytical performance profiles.
Linearity & High Range	Samples exceeding the upper linearity threshold must be diluted and re-assayed. Multiply the resolved outcome parameter by the appropriate dilution factor.
Expected Orientation Range	Each individual laboratory must establish its own specific standard reference range based on local inter-laboratory equipment calibration settings.

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