

Copper Assay Kit (Colorimetric)

LS-K212-250 (250 Tests) • Store at 4°C



Introduction

Copper is an essential trace element. Copper-containing enzymes play important roles in iron and catecholamine metabolism, free radical scavenging, and in the synthesis of hemoglobin, elastin and collagen. Copper is mainly present in caeruloplasmin in the liver. Low levels of copper have been associated with mental retardation, depigmentation, anaemia, hypotonia and scorbutic changes in bone. Levels of copper are key diagnostic indicator of diseases such as Wilson's disease, microcytic hypochromic anaemia and bone disease due to reduced collagen synthesis. Simple, direct and automation-ready procedures for measuring copper concentrations find wide applications in research, drug discovery and environmental monitoring. This copper assay kit is designed to measure copper with no or minimal sample treatment. The improved Method utilizes a chromogen that forms a colored complex specifically with copper ions. The intensity of the color, measured at 359nm, is directly proportional to copper concentration in the sample. The optimized formulation substantially reduces interference by substances in the raw samples.

Key Features

- Sensitive and accurate. Linear detection range 7 µg/dL (1.0 µM) to 300 µg/dL (47 µM) copper in 96-well plate assay.
- Simple and high-throughput. The simple procedure can be readily automated as a high-throughput assay in 96-well plates for thousands of samples per day.
- Improved reagent stability and versatility. The optimized formulation has greatly enhanced reagent and signal stability. Cuvette or 96-well plate assay.

Applications

- Direct Assays: biological, environmental, food and beverage samples.
- Drug Discovery/Pharmacology: effects of drugs on Cu metabolism.

Components

Component	K212-250
	250 Tests
Reagent A	10 mL
Reagent B	1.5 mL
Reagent C	40 mL
Copper Standard (1.5 mg/dL Cu ²⁺)	1 mL

Materials Not Supplied

Pipetting devices and accessories. For 96-well plate assays: clear flat-bottom 96-well plates and plate reader. For cuvette assays: spectrophotometer and cuvettes for measuring OD at 356-362nm.

Storage

The kit is shipped at room temperature. Store all reagents at 4 °C. Shelf life: 12 months after receipt.

FOR RESEARCH USE ONLY! Not for use in humans.

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Assay Procedure

Note: metal chelators (e.g. EDTA) interfere with this assay and should be avoided in sample preparation.

Procedure Using 96-Well Plate

1. Standards: transfer 100 μL dH_2O into one Eppendorf tube labeled "Blank". Into another tube labeled "Standard", mix 20 μL 1.5 mg/dL Standard and 80 μL dH_2O (final 300 $\mu\text{g}/\text{dL}$ Cu^{2+}).

Samples: transfer 100 μL samples into separate tubes.

Add 35 μL Reagent A (trichloroacetic acid) to each tube and mix by vortexing. If samples contain protein (e.g. serum/plasma), precipitates form. Centrifuge tubes for 2 min at 14,000 rpm and use clear supernatant for assay. For samples that do not contain protein, the mixture remains clear and centrifugation is not necessary.

Transfer 100 μL Blank, Standard and Sample into separate wells of a clear flat-bottom 96-well plate.

2. For each assay well, prepare Working Reagent by mixing 5 μL Reagent B and 150 μL Reagent C. Transfer 150 μL Working Reagent to each well and tap plate to mix thoroughly.
3. Incubate 5 min at room temperature and read optical density at 356-362nm (peak absorbance at 359nm).

Note: if sample OD values are higher than the OD value for the 300 $\mu\text{g}/\text{dL}$ Standard, dilute sample in dH_2O and repeat assay. Multiply the results by the dilution factor.

Procedure Using Cuvette

Prepare standards and samples as for 96-well assay procedure.

1. Transfer 400 μL Standards and Samples into separate cuvettes.
2. Add 600 μL Working Reagent. Mix by pipetting.
3. Incubate 5 min at room temperature and read optical density at 356-362nm (peak absorbance at 359nm).

Calculations

The copper concentration of Sample is calculated as

$$= \frac{\text{OD}_{\text{SAMPLE}} - \text{OD}_{\text{BLANK}}}{\text{OD}_{\text{STANDARD}} - \text{OD}_{\text{BLANK}}} \times 300 \text{ (}\mu\text{g/dL)}$$

$\text{OD}_{\text{SAMPLE}}$, OD_{BLANK} and $\text{OD}_{\text{STANDARD}}$ are optical density values of the Sample, Blank and the 300 $\mu\text{g}/\text{dL}$ Standard, respectively.

Conversions: 100 $\mu\text{g}/\text{dL}$ Cu equals 15.5 μM , 0.0001% or 1 ppm.

General Considerations

For scarce samples (e.g. mice serum or plasma), mix sample with dH_2O to a total of 100 μL , e.g. 50 μL serum + 50 μL dH_2O . Multiply the results by the dilution factor (2 fold).

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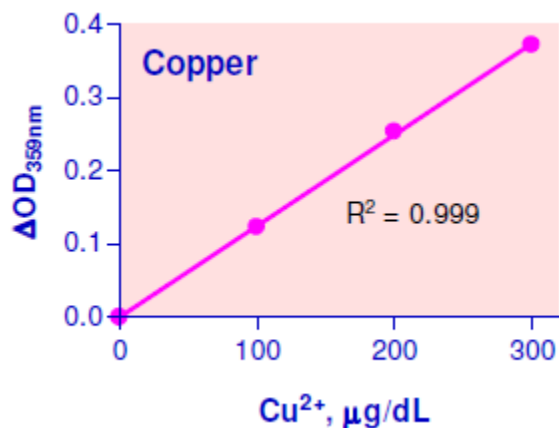
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Sample Data

Human serum, rat plasma, rat serum, and bovine serum were assayed in duplicate using the 96-well plate assay protocol. The copper concentrations were 97 ± 1 , 104 ± 1 , 101 ± 2 , 78 ± 1 $\mu\text{g/dL}$, respectively.



Standard Curve in 96-well plate assay

Version: V.08.09.2018

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