Glutamate Assay Kit

Catalog Number KA1670

100 assays

Version: 02

Intended for research use only

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Introduction

Intended Use

Application

- ✓ Direct Assays: glutamate in serum, plasma, tissue extracts and food extract samples.
- ✓ Drug Discovery/Pharmacology: effects of drugs on glutamate levels

Features

- ✓ Sensitive and accurate. Detection limit of 50 μM, linearity up to 2.5 mM glutamate in 96-well plate assay.
- ✓ Convenient. The procedure involves adding a single working reagent, and reading the optical density at time zero and at 30 min at room temperature. No 37℃ heater is needed.
- ✓ High-throughput. Can be readily automated as a high-throughput 96-well plate assay for thousands of samples per day.

Background

Glutamate is an important chemical in general metabolism. It is also a crucial mammalian neurotransmitter that is believed to be involved in a number of neurological and psychiatric disorders such as lateral sclerosis, lathyrism, autism and Alzheimer's disease. Glutamate is also widely used as a flavor enhancer in the food industry.

Simple, direct and automation-ready procedures for measuring glutamate concentration are very desirable. Glutamate Assay Kit is based on glutamate dehydrogenase catalyzed oxidation of glutamate, in which the formed NADH reduces a formazan (MTT) Reagent. The intensity of the product color, measured at 565 nm, is proportionate to the glutamate concentration in the sample.

General Information

Materials Supplied

List of component

Component	Amount
Assay Buffer	10 mL
NAD Solution	1 mL
Enzyme Mix	120 ul
MTT Solution	1.5 mL
Standard	1 mL 100 mM Glutamate

Storage Instruction

Storage conditions. Store all reagents at -20℃. Shelf life: 6 months after receipt.

Materials Required but Not Supplied

- ✓ Pipeting (multi-channel) devices
- ✓ Clear-bottom 96-well plates (e.g. Corning Costar)
- ✓ Plate reader

Precautions for Use

- Precautions

Reagents are for research use only. Normal precautions for laboratory reagents should be exercised while using the reagents.

Assay Protocol

Assay Procedure

1. Calibration Curve

Prepare 600 µL 2.5 mM Glutamate Premix by mixing 15 µL 100 mM Standard and 585 µL distilled water. Dilute standard as follows. Transfer 20 µL standards into wells of a clear bottom 96-well plate.

No	Premix + H_2O	Vol (µL)	Galactose (µM)
1	100 µL + 0µL	100	2.5
2	80 µL + 20 µL	100	2.0
3	60 µL + 40 µL	100	1.5
4	40 µL + 60 µL	100	1.0
5	30 µL + 70 µL	100	0.75
6	20 µL + 80 µL	100	0.5
7	10 µL + 90 µL	100	0.25
8	0 µL +100 µL	100	0.0

Samples: add 20 µL sample per well in separate wells.

I*MPORTANT: Serum and tissue extract samples require a sample blank.*

2. Reagent Preparation. Spin the Enzyme Mix tube briefly before pipetting. For each well of reaction, prepare Working Reagent by mixing 60 µL Assay Buffer, 1 µL Enzyme Mix, 5 µL NAD and 14 µL MTT. Fresh reconstitution is recommended. Where a sample blank in required, prepare a Blank Working Reagent by mixing 60 µL Assay Buffer, 5 µL NAD and 14 µL MTT (i.e. No Enzyme Mix).
3. Reaction. Add 80 µL Working Reagent (or Blank Working Reagent where appropriate) per reaction well quickly. Tap plate to mix briefly and thoroughly.
4. Read optical density (OD_0) for time “zero” at 565 nm (520-600nm) and OD_{30} after a 30-min incubation at room temperature.

Data Analysis

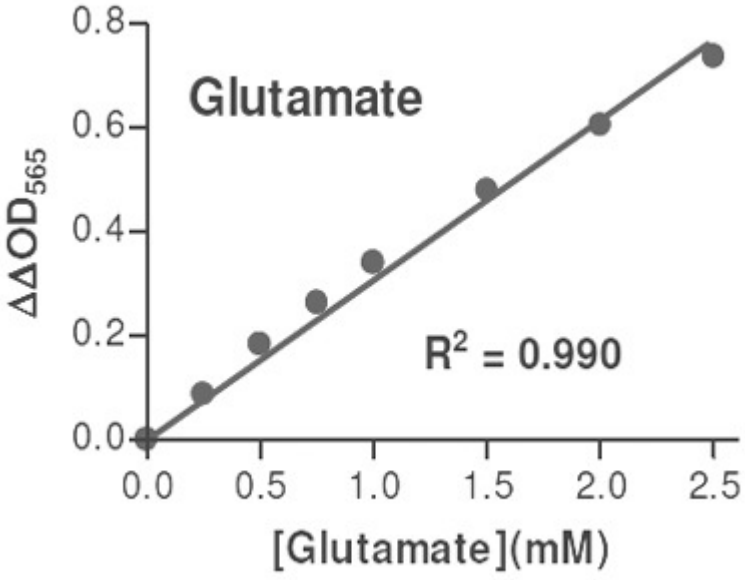
Calculation of Results

Subtract OD_0 from OD_{30} for the standard and sample wells. Next, subtract the ΔOD_{water} (Std 8) from each $\Delta OD_{standard}$ and ΔOD_{sample} to obtain the $\Delta\Delta$ODs. (Where a sample blank was required, subtract the ΔOD_{blank} from ΔOD_{sample} to obtain the $\Delta\Delta OD_{sample}$.) Plot the $\Delta\Delta OD_{standard}$'s and use this standard curve to convert the $\Delta\Delta OD_{sample}$ values to sample glutamate concentration.

$$[\text{Glutamate}] = \frac{\Delta\Delta OD_{SAMPLE}}{\text{Slope}} (\text{mM})$$

Note: If the sample ΔΔOD values are higher than the ΔΔOD value for the 2.5 mM glutamate standard, dilute sample in distilled water and repeat this assay. Multiply the results by the dilution factor.
Conversions: 1 mM glutamate = 14.5 mg/dL.

- ✓ This assay is based on an enzyme-catalyzed kinetic reaction. Addition of Working Reagent should be quick and mixing should be brief but thorough. Use of multi-channel pipettor is recommended.
- ✓ The following substances interfere and should be avoided in sample preparation: EDTA (>0.5 mM), ascorbic acid, SDS (>0.2%), sodium azide, NP-40 (>1%) and Tween-20 (>1%).



Standard Curve in 96-well plate assay

Resources

References

- ✓ Perez-de la Mora, M, et al (1989). A Glutamate Dehydrogenase-Based Method for the Assay of L-Glutamic Acid: Formation of Pyridine Nucleotide Fluorescent Derivitives. Anal. Biochem. 180: 248-252.
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