EnzyChrom™ Glutamate Assay Kit (EGLT-100)

Quantitative Colorimetric Determination of Glutamate at 565 nm

DESCRIPTION

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. BioAssay Systems' EnzyChrom™ 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.

KEY 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°C heater is needed.

High-throughput. Can be readily automated as a high-throughput 96-well plate assay for thousands of samples per day.

APPLICATIONS

Direct Assays: glutamate in serum, plasma, tissue extracts and food extract samples.

Drug Discovery/Pharmacology: effects of drugs on glutamate levels.

KIT CONTENTS (100 TESTS IN 96-WELL PLATES)

Assay Buffer:	10 mL	**Enzyme A:**	120 µL
NAD Solution:	1 mL	**Enzyme B:**	120 µL
MTT Solution:	1.5 mL	**Standard:**	1 mL 100 mM Glutamate

Storage conditions. The kit is shipped on ice. Store all reagents at -20°C. Shelf life: 6 months after receipt.

Precautions: reagents are for research use only. Normal precautions for laboratory reagents should be exercised while using the reagents. Please refer to Material Safety Data Sheet for detailed information..

PROCEDURES

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)	Glutamate (mM)
1	100 µL + 0 µL	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

Samples: add 20 µL sample per well in separate wells. *IMPORTANT*: Serum and tissue extract samples require a sample blank.

2. *Reagent Preparation*. Spin the Enzyme tubes briefly before pipetting. For each well of reaction, prepare Working Reagent by mixing 60 µL Assay Buffer, 1 µL Enzyme A, 1 µL Enzyme B, 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, 1 µL Enzyme B, 5 µL NAD and 14 µL MTT* **(i.e. No Enzyme A).** This assay is based on a kinetic reaction. To ensure identical incubation time, addition of Working Reagent to samples should be quick and mixing should be brief but thorough. Use of a multi-channel pipettor is recommended. Assays can be executed at room temperature or 30°C.

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 (520-600 nm) and OD_{30} after a 30-min incubation at room temperature.

5. *Calculation*. 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 $\Delta\Delta$OD values are higher than the $\Delta\Delta$OD 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 = 14.6 mg/dL.

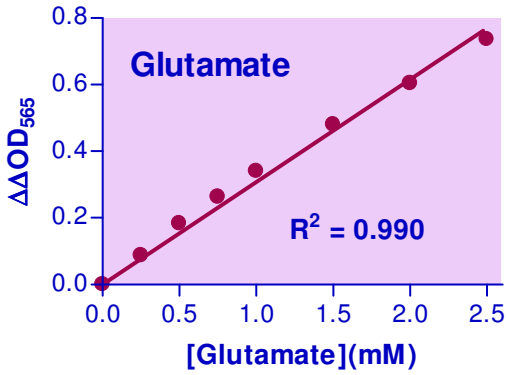
MATERIALS REQUIRED, BUT NOT PROVIDED

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

GENERAL CONSIDERATIONS

1. 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.

2. 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

PUBLICATIONS

1. Wray, R et al (2020). Novel MscL agonists that allow multiple antibiotics cytoplasmic access activate the channel through a common binding site. PLOS ONE, 15(1), e0228153.

2. Potter, AD et al. (2020). Host nutrient milieu drives an essential role for aspartate biosynthesis during invasive Staphylococcus aureus infection. Proceedings of the National Academy of Sciences, 117(22): 12394-12401.

3. Wray, R et al (2016). Dihydrostreptomycin directly binds to, modulates, and passes through the MscL channel pore. PLoS biology 14.6: e1002473.