



Pyruvate Assay Kit

Catalog Number KA1674

100 assays

Version: 02

Intended for research use only

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Introduction

Intended Use

Application

- ✓ Direct Assays: pyruvate in biological samples.
- ✓ Drug Discovery/Pharmacology: effects of drugs on pyruvate metabolism.

Features

- ✓ Sensitive and accurate. Use as little as 10 μ L samples. Linear detection range in 96-well plate: 2 to 500 μ M (17 μ g/dL to 4.4 mg/dL) pyruvate for colorimetric assays and 0.2 to 50 μ M for fluorimetric assays.
- ✓ Simple and convenient. The procedure involves addition of a single working reagent and incubation for 30 min at room temperature, compatible for HTS assays.
- ✓ Improved reagent stability. The optimized formulation has greatly enhanced the reagent and signal stability.

Background

PYRUVATE is a key intermediate in cellular metabolic pathways. Pyruvate can be converted to carbohydrates via gluconeogenesis, to fatty acids or energy through acetyl-CoA, to the amino acid alanine and to ethanol. Abnormal levels of pyruvate have been linked to liver diseases and metabolic disorders. Simple, direct and automation ready procedures for measuring pyruvate concentrations find wide applications in research and drug discovery. Pyruvate Assay Kit uses a single Working Reagent that combines pyruvate oxidase and hydrogen peroxide determination in one step. The color intensity of the reaction product at 570nm or fluorescence intensity at $\lambda_{em}/\lambda_{ex}$ = 585/530nm is directly proportional to pyruvate concentration in the sample.

General Information

Materials Supplied

List of component

Component	Amount
Enzyme Mix	10 mL
Dye Reagent	120 µL
Standard	400 µL 25 mM Pyruvate

Storage Instruction

The kit is shipped on dry ice. Store all reagents at -20 °C. Shelf life of three months after receipt.

Materials Required but Not Supplied

- ✓ Pipeting devices
- ✓ Centrifuge tubes
- ✓ Clear flat bottom 96-well plates, black 96-well or 384-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

- Colorimetric method

Note: SH-group containing reagents (e.g. mercaptoethanol, DTT) may interfere with this assay and should be avoided in sample preparation.

1. Equilibrate all components to room temperature. Prepare a 500 μ M Standard Premix by mixing 10 μ L of the 25 mM Standard and 490 μ L H₂O. Dilute Standard in distilled water as follows.

No	Premix + H ₂ O	Vol (μ L)	Pyruvate (μ M)
1	100 μ L + 0 μ L	100	500
2	80 μ L + 20 μ L	100	400
3	60 μ L + 40 μ L	100	300
4	40 μ L + 60 μ L	100	200
5	30 μ L + 70 μ L	100	150
6	20 μ L + 80 μ L	100	100
7	10 μ L + 90 μ L	100	50
8	0 μ L + 100 μ L	100	0

Transfer 10 μ L standards and 10 μ L samples into separate wells of a clear flat bottom 96-well plate.

2. For each reaction well, mix 94 μ L Enzyme Mix and 1 μ L Dye Reagent in a clean tube. Transfer 90 μ L Working Reagent into each assay well. Tap plate to mix. Freeze unused reagents for future use.
3. Incubate 30 min at room temperature. Read optical density at 570nm (550-585nm).

Note: if the Sample OD is higher than the Standard OD at 500 μ M, dilute sample in water and repeat the assay. Multiply result by the dilution factor.

- Fluorimetric method

For fluorimetric assays, the linear detection range is 0.2 to 50 μ M pyruvate. Dilute the Standards prepared in Colorimetric Procedure 1:10 in H₂O.

1. Transfer 10 μ L standards and 10 μ L samples into separate wells of a black 96-well plate.
2. Add 90 μ L Working Reagent (see Colorimetric Procedure). Tap plate to mix.
3. Incubate 30 min at room temperature and read fluorescence at $\lambda_{\text{ex}} = 530\text{nm}$ and $\lambda_{\text{em}} = 585\text{nm}$.
4. If assays in 384-well plate are desired, use 5 μ L Standards and 45 μ L Working Reagent.

Data Analysis

Calculation of Results

- Colorimetric method

Subtract blank OD (water, #8) from the standard OD values and plot the OD against standard concentrations. Determine the slope using linear regression fitting. The pyruvate concentration of Sample is calculated as

$$[\text{Pyruvate}] = \frac{\text{OD}_{\text{SAMPLE}} - \text{OD}_{\text{H}_2\text{O}}}{\text{Slope}} (\mu\text{M})$$

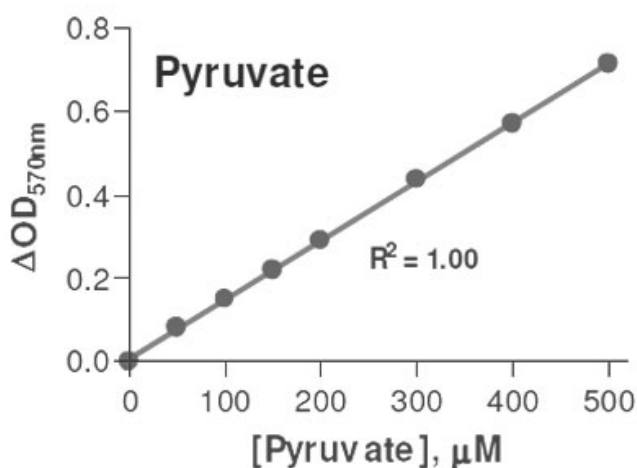
$\text{OD}_{\text{SAMPLE}}$ and $\text{OD}_{\text{H}_2\text{O}}$ are optical density values of the sample and water.

Conversions: 1mM pyruvate equals 8.7 mg/dL or 87 ppm.

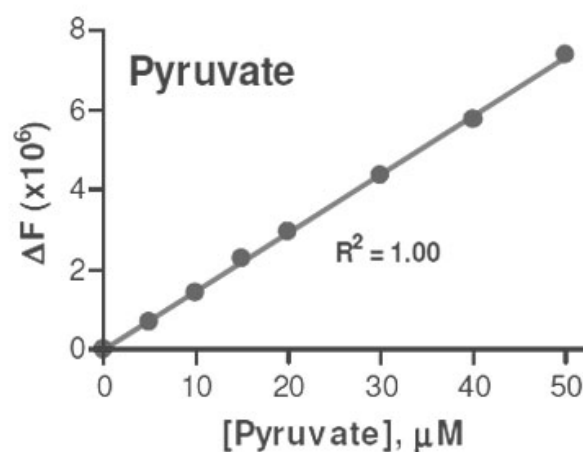
- Fluorimetric method

The pyruvate concentration of Sample is calculated as

$$[\text{Pyruvate}] = \frac{F_{\text{SAMPLE}} - F_{\text{H}_2\text{O}}}{\text{Slope}} (\mu\text{M})$$



96-well colorimetric assay



384-well fluorimetric assay

Resources

References

- ✓ Hansen JL, Freier EF. (1978). Direct assays of lactate, pyruvate, beta-hydroxybutyrate, and acetoacetate with a centrifugal analyzer. Clin Chem. 24(3):475-9.
- ✓ Sutherland DV, Barns AM, Ross CA. (1995). Trypanosoma evansi: measurement of pyruvate production as an indicator of the drug sensitivity of isolates in vitro. Trop Med Parasitol. 46(2):93-8.
- ✓ Chariot P. et al (1994). Optimal handling of blood samples for routine measurement of lactate and pyruvate. Arch Pathol Lab Med. 118(7):695-7.