（FOR RESEARCH USE ONLY. DO NOT USE IT IN CLINICAL DIAGNOSIS !）

**Catalog No：E-BC-K006-M**

**Specification：96T(40 samples)/500Assays(242 samples)**

**Measuring instrument：Microplate reader（535-540 nm）**

**Detection range：0.01-0.37 U/mL**

# **Elabscience®** α-Amylase And β-Amylase Activity Assay Kit

This manual must be read attentively and completely before using this product.

If you have any problem, please contact our Technical Service Center for help：

Toll-free: 1-888-852-8623

Tel: 1-832-243-6086

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Email: techsupport@elabscience.com

Website: www.elabscience.com

Please kindly provide us the lot number (on the outside of the box) of the kit for more efficient service.

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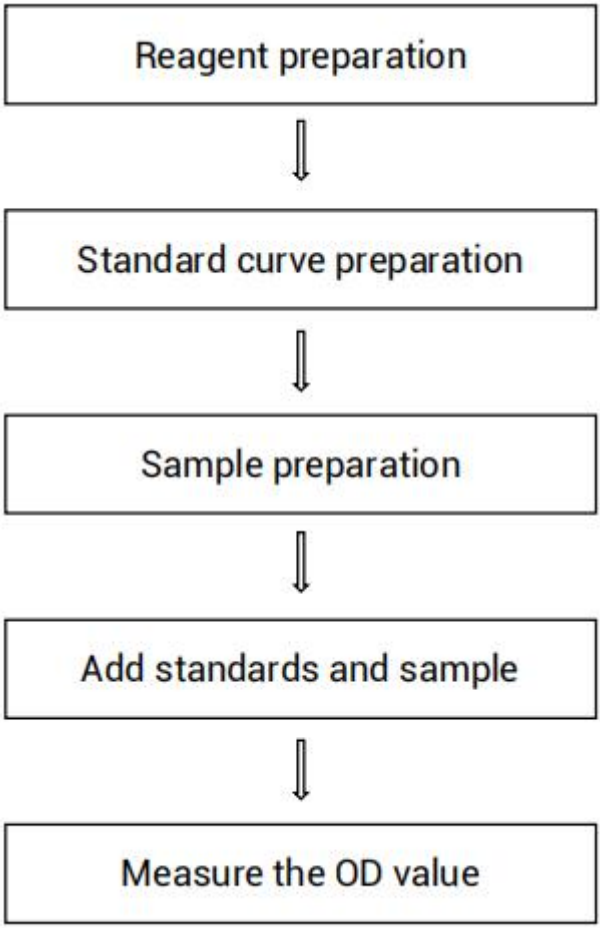
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**Assay summary**



## Intended use

This kit can measure amylase activity in serum, plasma, saliva, tissue samples.

## Detection principle

The reducing sugar reacts with 3,5-dinitrosalicylic acid under heating conditions to produce a brown-red substance. Amylase activity can be calculated by measuring the OD value at 540 nm.

## Kit components & storage

| Item | Component | Size 1(96 T) | Size 2 (500Assays) | Storage |
|---|---|---|---|---|
| Reagent 1 | Substrate | 10 mL × 1 vial | 50 mL × 1 vial | 2-8°C, 12 months |
| Reagent 2 | Chromogenic Agent | 20 mL × 1 vial | 50 mL × 2 vials | 2-8°C, 12 months, shading light |
| Reagent 3 | 10 mg/mL Standard | 1.5 mL × 1 vial | 7.5 mL × 1 vial | 2-8°C, 12 months |
| | Microplate | 96 wells | / | No requirement |
| | Plate Sealer | 2 pieces | | |
| | Sample Layout Sheet | 1 piece | | |

Note: The reagents must be stored strictly according to the preservation conditions in the above table. The reagents in different kits cannot be mixed with each other. For a small volume of reagents, please centrifuge before use, so as not to obtain sufficient amount of reagents.

## Materials prepared by users

**Instruments:**

Test tubes, Vortex Mixer, Centrifuge, Water bath, Microplate reader (535-540 nm, optimum wavelength: 540 nm）

## Reagent preparation

① Equilibrate all the reagents to room temperature before use.

② If there is precipitation in substrate and chromogenic agent, Heat it at 70-80°C in water bath until dissolved. Cool down to 40°C with fresh water before use.

③ The preparation of standard curve：

Always prepare a fresh set of standards. Discard working standard dilutions after use.

Dilute 10 mg/mL standard solution with double distilled water to a serial concentration. The recommended dilution gradient is as follows: 0, 0.2, 0.4, 0.6, 0.8, 1.0, 1.2, 1.4 mg/mL. Reference is as follows:

| Item | ① | ② | ③ | ④ | ⑤ | ⑥ | ⑦ | ⑧ |
|---|---|---|---|---|---|---|---|---|
| **Concentration (mg/mL)** | **0** | **0.2** | **0.4** | **0.6** | **0.8** | **1.0** | **1.2** | **1.4** |
| **10 mg/mL standard (μL)** | 0 | 20 | 40 | 60 | 80 | 100 | 120 | 140 |
| **Double distilled water (μL)** | 1000 | 980 | 960 | 940 | 920 | 900 | 880 | 860 |

## Sample preparation

**① Sample preparation**

**Serum and plasma:** detect directly. If not detected on the same day, the serum or plasma can be stored at -80°C for a month.

**Saliva sample:** Use a sterile container to collect saliva samples. Remove particulates by centrifugation for 10 min at 3000×g. It is recommended to take fresh saliva sample.

**Tissue sample:**

① Weigh 0.1 g sample, add 0.9 mL of distilled water and homogenized with a homogenizer in ice water bath, then transfer to the EP tube, incubate at room temperature for 15 min and oscillate every 5 min.

② Centrifuge at 3000×g at room temperature for 10 min, take the supernatant and add double distilled water to the final volume of 10 mL, mix fully and it is the α-amylase solution.

**② Dilution of sample**

The recommended dilution factor for different samples is as follows (for reference only):

| Sample type | Dilution factor |
|---|---|
| Human plasma | 10-15 |
| Human serum | 10-15 |
| Human saliva | 15-25 |
| Mouse serum | 15-25 |
| Rat serum | 15-25 |
| 1% Corn grain tissue homogenate | 2-5 |

Note: The diluent is double distilled water. For the dilution of other sample types, please do pretest to confirm the dilution factor.

## The key points of the assay

① For measuring the OD value, if there is precipitation, centrifuge at 4000 g for 5 min at room temperature and take the supernatant for determination.

② When the absolute OD value is more than 0.800, it is recommended to dilute the sample appropriately.

## Operating steps

**1. The measurement of standard**

① Take 1.5 mL EP tube and number the tubes from A to H in duplication, add 75 μL of standard solution with different concentrations to the corresponding tubes.

② Add 75 μL of substrate to each tube.

③ Add 150 μL of chromogenic agent to each tube.

④ Mix fully and incubate at 95°C for 5 min. Cool the tubes with running water and take 250 μL of supernatant to the microplate. Measure the OD value of each well with microplate reader at 540 nm.

**2. The measurement of sample**

① Sample tube: add 75 μL of sample to the corresponding tubes.
Control tube: add 75 μL of sample to the corresponding tubes.

② Sample tube: add 75 μL of substrate to the corresponding tubes.
Control tube: add 75 μL of double distilled water to the tubes.

③ Incubate the sample tubes and control tubes at 40°C water bath for 5 min.

④ Add 150 μL of chromogenic agent to each tube.

⑤ Mix fully and incubate at 95°C for 5 min. Cool the tubes with running water and take 250 μL of supernatant to the microplate. Measure the OD value of each well with microplate reader at 540 nm.

## Calculation

**The standard curve**:

1. Average the duplicate reading for each standard.

2. Subtract the mean OD value of the blank (Standard # ①) from all standard readings. This is the absoluted OD value.

3. Plot the standard curve by using absoluted OD value of standard and correspondent concentration as y-axis and x-axis respectively. Create the standard curve (**y = ax + b**) with graph software (or EXCEL).

**The sample**:

**1. Serum (plasma) and other saliva sample:**

**Definition:** The production of 1 mg reducing sugar catalyzed by 1 mL of sample per minute that is defined as an enzyme activity unit.

$$(\alpha+\beta)\ \text{Amylase activity (U/mL)} = (\Delta A - b) \div a \times V_3 \div t \div V_2 \times f$$

**2. Tissue sample:**

**1) Calculate according to the protein concentration of the sample**

**Definition:** The production of 1 mg reducing sugar catalyzed by 1 mg of tissue protein per minute that is defined as an enzyme activity unit.

$$(\alpha+\beta)\ \text{Amylase activity (U/mgprot)} = (\Delta A - b) \div a \times V_3 \div t \div V_2 \times f \div C_{pr}$$

**2) Calculate according to the fresh weight of sample**

**Definition:** The production of 1 mg reducing sugar catalyzed by 1 g of tissue per minute that is defined as an enzyme activity unit.

$$(\alpha+\beta)\ \text{Amylase activity (U/g fresh weight)} = (\Delta A - b) \div a \times V_3 \div t \div w \times \frac{V_1}{V_2} \times f$$

**[Note]**

f: Dilution factor of sample before tested.

$\Delta A$: $OD_{Sample}$ - $OD_{Control}$.

$V_1$: The volume of prepared tissue sample in sample preparation step (10 mL).

$V_2$: The volume of sample added to the reaction (0.075 mL).

$V_3$: The volume of enzymatic reaction (the volume of sample + the volume of substrate = 0.15 mL).

t: The time of enzymatic reaction (5 min).

w: The weight of tissue sample (0.1 g).

$C_{pr}$: Concentration of protein in sample (mgprot/mL).

# Appendix I Performance Characteristics

**1. Parameter:**

**Intra-assay Precision**

Three human serum samples were assayed in replicates of 20 to determine precision within an assay. (CV = Coefficient of Variation)

| Parameters | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|
| **Mean (U/mL)** | 0.08 | 1.40 | 0.25 |
| **%CV** | 3.2 | 2.4 | 2.8 |

**Inter-assay Precision**

Three human serum samples were assayed 20 times in duplicate by three operators to determine precision between assays.

| Parameters | Sample 1 | Sample 2 | Sample 3 |
|---|---|---|---|
| **Mean (U/mL)** | 0.08 | 1.40 | 0.25 |
| **%CV** | 3.0 | 4.0 | 3.8 |

**Recovery**

Take three samples of high concentration, middle concentration and low concentration to test the samples of each concentration for 6 times parallelly to get the average recovery rate of 97%.

| | Standard 1 | Standard 2 | Standard 3 |
|---|---|---|---|
| **Expected Conc. (mg/mL)** | 0.3 | 0.7 | 1.1 |
| **Observed Conc. (mg/mL)** | 0.3 | 0.7 | 1.1 |
| **Recovery rate (%)** | 99 | 95 | 97 |

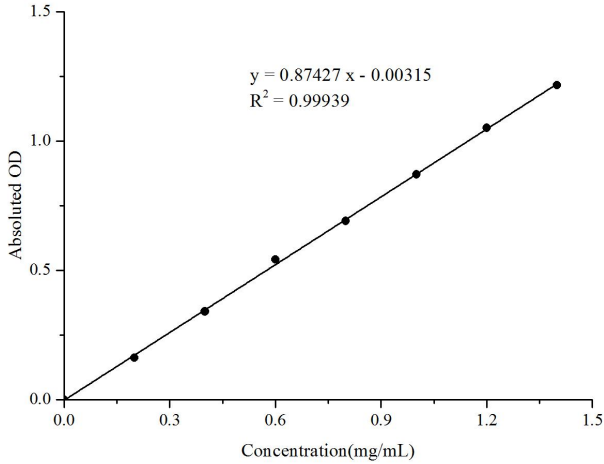
**Sensitivity**

The analytical sensitivity of the assay is 0.008 U/mL. This was determined by adding two standard deviations to the mean O.D. obtained when the zero standard was assayed 20 times, and calculating the corresponding concentration.

**2. Standard curve:**

As the OD value of the standard curve may vary according to the conditions of the actual assay performance (e.g. operator, pipetting technique or temperature effects), so the standard curve and data are provided as below for reference only：

| Concentration (mg/mL) | 0 | 0.2 | 0.4 | 0.6 | 0.8 | 1.0 | 1.2 | 1.4 |
|---|---|---|---|---|---|---|---|---|
| OD value | 0.144 | 0.310 | 0.483 | 0.688 | 0.829 | 1.016 | 1.224 | 1.361 |
| | 0.144 | 0.301 | 0.486 | 0.684 | 0.840 | 1.013 | 1.164 | 1.356 |
| Average OD | 0.144 | 0.305 | 0.484 | 0.686 | 0.834 | 1.015 | 1.194 | 1.359 |
| Absoluted OD | 0.000 | 0.161 | 0.341 | 0.542 | 0.691 | 0.871 | 1.050 | 1.215 |



## Appendix Π Example Analysis

**Example analysis：**

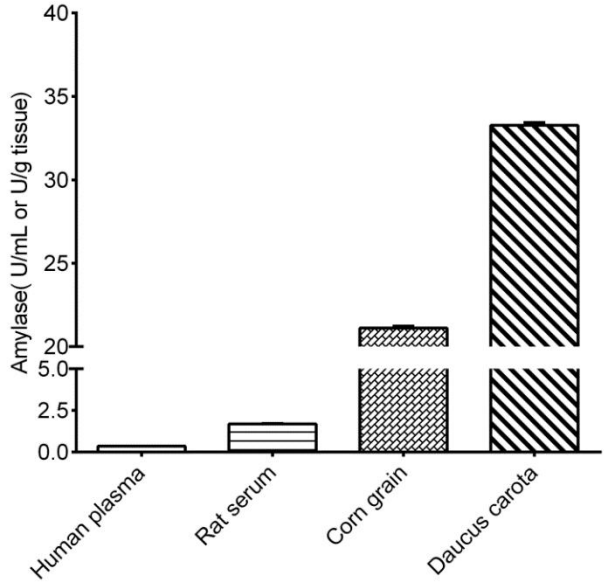
For rat serum, take 10 μL of rat serum, dilute with double distilled water for 25 times and carry the assay according to the operation steps. The results are as follows:

standard curve: y = 0.8729 x – 0.0112, the average OD value of the sample is 0.299, the average OD value of the control is 0.162, and the calculation result is:

$$(\alpha+\beta)\ \text{Amylase activity (U/mL)} = (0.299 - 0.162 + 0.0112) \div 0.8729 \times 0.15 \div 5 \div 0.075 \times 25$$

$$= 1.70\ \text{U/mL}$$

Detect human plasma (dilute for 5 times), rat serum (dilute for 25 times), 1% corn grain tissue homogenate (dilute for 5 times) and 1% daucus carota tissue homogenate (dilute for 5 times) according to the protocol, the result is as follows：



## Statement

1. This assay kit is for Research Use Only. We will not response for any arising problems or legal responsibilities causing by using the kit for clinical diagnosis or other purpose.
2. Please read the instructions carefully and adjust the instruments before the experiments. Please follow the instructions strictly during the experiments.
3. Protection methods must be taken by wearing lab coat and latex gloves.
4. If the concentration of substance is not within the detection range exactly, an extra dilution or concentration should be taken for the sample.
5. It is recommended to take a pre-test if your sample is not listed in the instruction book.
6. The experimental results are closely related to the situation of reagents, operations, environment and so on. Elabscience will guarantee the quality of the kits only, and NOT be responsible for the sample consumption caused by using the assay kits. It is better to calculate the possible usage of sample and reserve sufficient samples before use.