SOD | Superoxide Dismutase

Intended Use

Used to quantitatively detect the activity of superoxide dismutase in human serum and plasma samples. It is mainly used clinically to assist in the evaluation of the body's antioxidant capacity.

Principle of Assay

Under the catalysis of superoxide dismutase in the specimen, superoxide anion free radicals undergo dismutation reaction to generate hydrogen peroxide and oxygen. Under alkaline conditions, pyrogallol will produce a self-oxidation color reaction, and the color intensity is proportional to the activity of superoxide dismutase. By measuring the color change, the activity of superoxide dismutase in the specimen can be calculated.

Main Components

It is a liquid dual reagent, the main components include reagent 1: PBS buffer 100 mmol/L; reagent 2: pyrogallol 20 mmol/L;

Calibrator (optional): superoxide dismutase, PBS buffer; quality control (optional): superoxide dismutase, PBS buffer.

Note: The calibrator is traceable to the superoxide dismutase calibrator of Beijing Jiuqiang Biotechnology Co., Ltd.; the content concentration of the quality control product varies slightly from batch to batch.

Storage and Period of Validity

This product has a shelf life of 12 months when stored sealed at 2 ℃~8 ℃ and away from light. After the reagent is opened, it can be stored in the instrument at 2–8 ℃ or in a refrigerator at 2–8 ℃, and the shelf life is 1 month. After the calibrator and quality control product are opened and reconstituted, they can be stored at 2–8 ℃, and the shelf life is 1 month.

It is recommended that users verify the product according to laboratory conditions when using it on different instruments.

Sample Processing

1. Serum or plasma samples can be used.

2. Blood should be collected on an empty stomach. Do not do strenuous exercise before blood collection. Dry tubes, EDTA-K2, and lithium heparin anticoagulant tubes can be used for blood collection and stoppering for testing.

3. Avoid using hemolyzed or chylomicronized samples.

4. Samples can be stored at room temperature (10–30 ℃) for 8 hours, 2–8 ℃ for 7 days, and -20±5 ℃ for 30 days.

5. Samples must be restored to room temperature (10–30 ℃) before testing. Frozen samples must be completely thawed,

rewarmed, and mixed before use. Samples can only be frozen and thawed once and cannot be frozen and thawed repeatedly.

Reference Interval

By measuring superoxide dismutase in 184 serum samples of healthy people aged 2–72 years and 184 plasma samples of healthy people aged 2–65 years, the normal range is:

Serum, plasma: 110–215 U/mL.

It is recommended that each laboratory establish its own normal range based on the geographical location, patients, diet or environmental factors of the corresponding population.

Explanations for Testing Results

Professionals are responsible for reviewing and analyzing the test results. Due to the influence of age, diet, and region, test results are usually considered normal within the reference range. If they are outside the range, they should be re-measured for confirmation. If the test results are inconsistent with or even contrary to the clinical situation, the reasons should be analyzed and found.

Testing Method

1. Reagent preparation: Liquid double reagent, no preparation required, directly use on the machine.

2. Determination conditions and steps

Determination method: Endpoint method. Reaction temperature: 37 °C. Main/sub wavelength: 405 nm / 540 nm. Reaction direction: Positive reaction.

Additions	Blank Tube (B)	Calibrator (S)/Sample (T)
Distilled water (μl)	10	/
Calibrator/Sample (μl)	/	10
R1 (μl)	150	150
Mix well, incubate at 37 °C for 5 minutes, read absorbance A1.		
R2 (μl)	50	50
Mix well, incubate at 37 ℃ for 5 minutes, read absorbance A2, calculate △A=(A2-A1).		

3. Calibration: The calibration type is linear (linear), and it is recommended to use the calibrator that comes with the reagent.

4. Situations where calibration is required: It is recommended to calibrate once every two weeks; when the following situations occur (such as: when the batch number of the reagent used changes, the instrument is repaired, maintained, or key components are replaced), recalibration should be performed.

5. Quality control: It is recommended to use at least one level of quality control product for internal quality control every day.

6. Result calculation: SOD (U/mL) = sample (△A/min) / calibrator (△A/min) × SOD calibrator concentration.

Product Performance Indicators

1. Reagent appearance: All components of the kit should be complete and intact without liquid leakage; liquid reagents should be clear and transparent, without flocs, visible particles and precipitation; packaging labels should be clear, accurate and firm.

2. Accuracy: The recovery rate should be within the range of [85%–115%].

3. Sensitivity: When measuring a sample with superoxide dismutase activity of 150 U/mL, its absorbance change value (△A) should be ≥ 0.0100.

4. Reagent blank absorbance: When tested at a temperature of 37 °C and a wavelength of 405 nm, the reagent blank absorbance should be ≤ 0.5000 (colorimetric cup light path 1.0 cm).

5. Linear range: a) Linear range (15–250.0) U/mL, correlation coefficient r should be ≥ 0.9900; b) Absolute deviation in the range of (15–100) U/mL should not exceed 15 U/mL; Linear deviation in the range of (above 100–250) U/mL should be ≤ 15%.

6. Precision: Repeatability: CV% should be ≤ 5%; Batch difference: Relative deviation (R) should be ≤ 10%.

The Limitation of Testing Method

1. The test results of this product are only used for auxiliary diagnosis of clinical indications.

2. It is used to measure samples within the linear range. If the sample exceeds the linear range, it is diluted with physiological saline and then measured. The result is reported by multiplying the dilution factor. The maximum dilution factor is 2 times.

3. The influence of bilirubin ≤ 342 μmol/L, triglyceride ≤ 5.6 mmol/L, hemoglobin ≤ 2.0 g/L, and vitamin C ≤ 0.3 g/L in the sample on the measurement result is within ±15%.

Attentions

1. Before selecting the appropriate instrument, the product should be fully verified for performance.

2. To avoid contamination, wear gloves when using it and avoid contact with the skin and inner membrane. If contact is accidental, rinse with plenty of running water. If it accidentally contacts the eyes or is swallowed, seek medical help immediately.

3. This kit is only for in vitro diagnosis. It is strictly forbidden to take it orally and cannot be sucked by mouth.

4. Personal safety protection must be done during operation to prevent direct contact between samples, reagents, and calibrators and the human body.

5. After the test, reactants, samples, and disposable equipment that contact samples should be treated as medical waste.

6. Do not mix the remaining reagents from the bottle with the newly opened reagents to prevent contamination of the newly opened reagents.

7. It is recommended to measure the reagent blank every day, and calibration must be performed when the reagent batch is changed.

Reference Literature

1. Shang Hong, Wang Yusan, Shen Ziyu. National Clinical Laboratory Operation Procedures. 4th edition. People's Medical Publishing House. 2015.

2. Yuan Qinsheng, Superoxide dismutase and clinical practice, New Drugs and Clinical Practice, 1986;5:169.

3. Minoru Nakano. Assay for superoxide based on chemiluminescence of luciferin analog. Methods in Enzymology, 1990;186:227.

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