

TAS | Total Antioxidant Status

Summary and Explanation

Reactive oxygen species (ROS) is produced in metabolic and physiological processes, and harmful oxidative reactions may occur in organisms that remove them via enzymatic and nonenzymatic antioxidative mechanisms. Under certain conditions, the increase in oxidants and decrease in antioxidants cannot be prevented, and the oxidative or in over 100 disorders, develops .

Antioxidant molecules prevent or inhibit these harmful reactions² . Serum (or plasma) concentrations of different antioxidants can be measured in laboratories separately, but the measurements are time-consuming, labor-intensive, costly, and require complicated techniques. Because the measurement of different antioxidant molecules separately is not practical and their antioxidant effects are additive, the total antioxidant capacity of a sample is measured, and this is called total antioxidant capacity (TAC)³ , total antioxidant activity (TAA)⁴ , total antioxidant power (TAOP)⁵ , total antioxidant status (TAS)⁶ , total antioxidant response⁷ , or other synonyms

Principle of Assay

Antioxidants in the sample reduce dark blue-green colored ABTS radical to colorless reduced ABTS form. The change of absorbance at 660 nm is related with total antioxidant level of the sample. The assay is calibrated with a stable antioxidant standard solution which is traditionally named as Trolox Equivalent that is a vitamin E analog .

Reagent Composition

| Content | Concentration |
|------------|-----------------------|
| Reagent 1 | Buffer Solution |
| | Acetate Buffer |
| | 0.4 mol/L pH5.8 |
| Reagent 2 | Prochromogen Solution |
| | ABTS |
| | 30 mmol/L |
| Standard | Trolox |
| | 1 mmol / L |
| QC Level 1 | Trolox |
| | 0.5 mmol / L |
| QC Level 2 | Trolox |
| | 2.0 mmol / L |

Storage/Stability

The kit is shipped on wet ice and storage at 2–8 °C is recommended. Stable up to expiry date when stored capped and at 2–8 °C even after start using.

Normal Range

Human Serum: 1.20 – 1.50 mmol/L (1200 – 1500 umol/L)

Each laboratory is recommended to establish their own reference values.

Performance Characteristics

Precision

Inter-assay coefficient of variation 2.8%

Intra-assay coefficient of variation 3.3%

Assay Range

Samples containing 0.1 – 3.5 mmol Trolox Equiv. /L can be assayed without further dilution or concentration.

Interferences

EDTA interfere with the results.

Sample

Blood serum, plasma, semen plasma, saliva, urine, cell lysates, tissue homogenates, beverages, fruit juices and oils (oils require different reagent 1) can be used as sample.

Serum samples are stable up to 1 week stored at 4°C, 6 months at -20°C and 1 year at -80°C.

Safety Precautions and Warnings

1. For in vitro diagnostic use only.
2. Do not pipette by mouth.
3. Exercise the normal precautions required for handling laboratory reagents.
4. Wear disposable gloves while handling the kit reagents and wash hands thoroughly afterwards.
5. Do not use reagents beyond the expiry date.
6. The reagents must be used only for the purpose intended by suitably qualified laboratory personnel, under appropriate laboratory conditions.
7. Dispose cleaning liquid and also such used washing cloth or tissue paper with care, as they may also contain infectious agents.
8. Health and safety data sheets are available on request.

Procedure

| | |
|--|--------|
| Wavelength | 660nm |
| Pipette into cuvette as below order | |
| Sample OR Standard OR H ₂ O | 18 µl |
| Reagent 1 | 300 µl |
| Mix well | |
| Read absorbance (A1) after 30 seconds | |
| Reagent 2 | 45 µl |
| Mix well | |
| Read absorbance (A2) after 5 minutes at 37°C | |
| OR | |
| Read absorbance (A2) after 10 minutes at RT | |

Calculation

$A2 - A1 = \Delta\text{Abs of standard or sample or H}_2\text{O}$

$$\text{Results} = \frac{[\Delta\text{Abs H}_2\text{O} - \Delta\text{Abs Sample}]}{[\Delta\text{Abs H}_2\text{O} - \Delta\text{Abs Standard}]}$$

References

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