

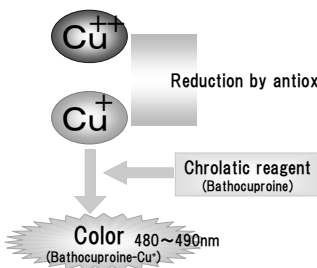


# PAO Test kit for Total Antioxidant Capacity

## Instruction manual

Oxidative stress plays an important role in various diseases and aging. The control of oxidative stress is expected to be useful to prevent diseases and aging. Oxidative stress is caused by the imbalance between reactive oxygen species (ROS) and antioxidant defense system. For accurate assessment of oxidative stress, measurement of ROS, oxidative damage and antioxidant activity may be essential. PAO can detect not only hydrophilic antioxidants such as Vitamin C, glutathione, but also can detect hydrophobic antioxidants such as Vitamin E. Applicable for assessment of total antioxidants of serum, foods and beverage samples.

### 1. Principles and components



Samples are mixed with  $Cu^{++}$  Solution.  $Cu^{++}$  are reduced by antioxidants to form  $Cu^+$ . Reduced  $Cu^+$  react with Chromatic Solution (Bathocuproine), and can be detected by absorbance at wavelength 480 to 490 nm. Antioxidant capacity can be calculated from the  $Cu^+$  formed.

① Standard (Uric acid powder)	1 vial (for 2mM)	Dissolve with distilled water.
② Sample diluent	60 mL x 1 bottle	Ready to use.
③ $Cu^{++}$ solution	5 mL x 1 bottle	Ready to use.
④ Stop solution	5 mL x 1 bottle	Ready to use.
⑤ Micro titer plate	1 plate	

### 2. Specifications

① Assay range:	21.9~4378 $\mu$ mol/L (Cupric ion reducing power)
② Storage:	Room temperature
③ Expiry date:	3 years (Indicated on the outer box)

### 3. Required but not provided

- ① A micro plate reader (measuring wavelength 490 nm)
- ② Pipettes and pipette chips
- ③ Plastic test tubes
- ④ Distilled water
- ⑤ NaOH, HCl solution and pH meter (Not required if standards are prepared with distilled water only)

### 4. Assay procedure

#### 1) Reconstitute of Standard (2mM Uric acid solution).

There are two ways for preparation. Please select one.  
Case 1: Add distilled water to ① Standard vial, and stand for 3 or 4 hours at room temperature. The volume of distilled water is indicated on the label of the vial.

Case 2: If you wish to prepare standard solution immediately, please pour 1mL of 10% (w/v) NaOH to ① Standard vial, and dissolve completely, followed by pH adjustment (pH7.4) by HCl solution. Add distilled water to make the total volume as indicated on the label.

2mM uric acid solution can be stored at below -70°C for 1 year.

#### 2) Preparation of standards.

Dilute 2mM uric acid solution with distilled water for 2, 4, 8, 16 and 32 times, result in 5 levels of diluted standards (1 mM, 0.5 mM, 0.25 mM, 0.125 mM and 0.063 mM respectively).

#### 3) Preparation of samples.

If you measure serum samples, fresh frozen samples are recommended. Because some antioxidants such as vitamin C, uric acid and coenzyme Q10 are unstable. For other samples such as beverages, see section 6) Assay examples, and dilute with distilled water.

#### 4) Assay procedure.

A) Please prepare plastic test tubes for 6 levels of standards and each sample. Pour 390  $\mu$  L of ② Sample Diluent, and add 10  $\mu$  L of standards or diluted samples.

B) Pour 200  $\mu$  L of mixture to ⑤ Micro titer plate. Use 200  $\mu$  L of ② Sample Diluent for blank well.

C) Read absorbance at 490 nm (as READ1).

D) Add 50  $\mu$  L of ③  $Cu^{++}$  solution to each well, mix gently, and incubate at room temperature for 3 minutes.

E) Add 50  $\mu$  L of ④ Stop solution, mix gently, and read absorbance at 490 nm (as READ2).

(Optional: reference wave length 620 or 660 nm)

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(Page 1/2)

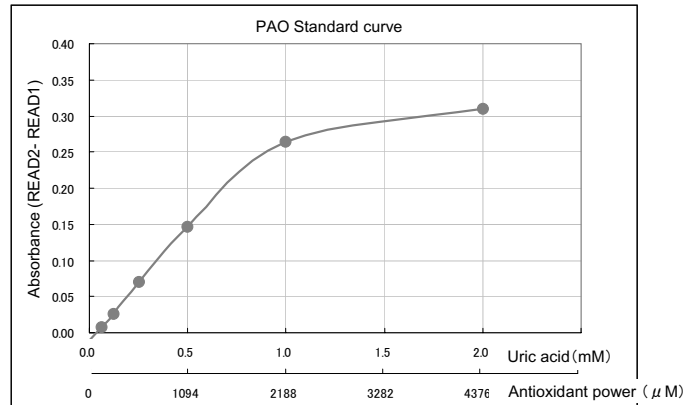


### 5) Determination of antioxidant power of samples.

Please draw standard curves by plotting the difference of absorbance readings ( $READ2 - READ1$ ) as vertical axis, and concentration of uric acid standards (mM) as horizontal axis. Calculate the corresponding uric acid concentration of samples. Multiply corresponding uric acid concentration (mM) of samples by 2189, to estimate antioxidant power ( $\mu\text{ mol/L}$ ).

**1mM of uric acid = 2189  $\mu\text{ mol/L}$  (copper reducing power)**

### 5. Typical standard curves



### 6. Assay examples

D.W. : distilled water.

Sample	Pre-dilution	Antioxidant power ( $\mu\text{ mol/L}$ )	
Human serum	Not required	1069 $\pm$ 145	Fresh frozen serum.
Human urine	Mix with 3 volumes of D.W.	5508	
Red wine	Mix with 7 volumes of D.W.	45479	
Japanese SAKE (rice wine)	Not required	18~211	
Black tea	Mix with 7 volumes of D.W.		
Coffee	Mix with 27 volumes of D.W.		
Green tea	Mix with 7 volumes of D.W.	8728~46687	Green tea products.

A more dilution is recommended if the antioxidant power is over 2000  $\mu\text{ mol/L}$  antioxidant power. For example, some green tea products which contain high concentration of catechin should be diluted by 40 times (mix 1 volume of sample and 39 volume of distilled water). Some samples which contain chelating agents such as EDTA can't be applied.

### 7. References

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For more information and technical support, please visit CosmoBio web site <http://www.cosmobio.co.jp/>

The "PAO assay kits" are inventions by Dr. Giuseppe Da Cruz, Italy (US PAT. #6613577 and IT PAT. #1309421).

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