

This note describes a determination method of hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>) using HPLC-ECD (high-performance liquid chromatography-electrochemical detection) system.

H<sub>2</sub>O<sub>2</sub> is used for various purpose, such as disinfectant, oxidizing agent, and rinse solution. Determination of H<sub>2</sub>O<sub>2</sub> is required also for evaluation of fuel cells. Simple determination method for H<sub>2</sub>O<sub>2</sub> was often performed by titration or voltammetry. However, the detection of

these methods lack selectivity.

ECD, which is similar to voltammetry in principle, detects electric current generated by applied oxidation or reduction potential. However, the detection by ECD is performed after the HPLC separation, which provides excellent selectivity.

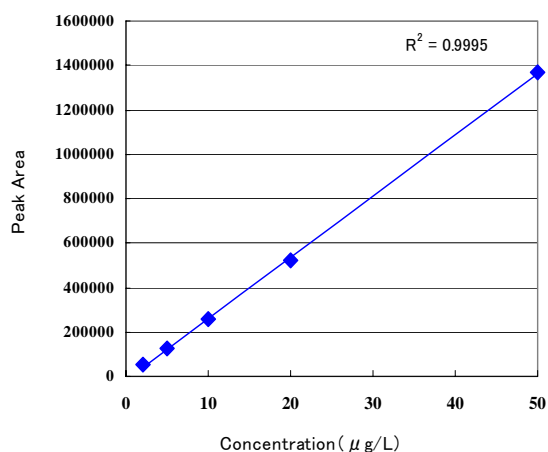
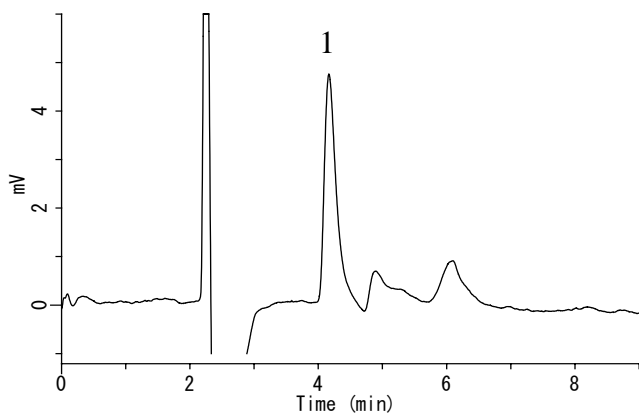
The method described in this note enables sensitive detection and accurate quantification of H<sub>2</sub>O<sub>2</sub>.

(K.Suzuki)

### A chromatogram obtained from standard solution

1. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>)

10 μg/L



The calibration curve of H<sub>2</sub>O<sub>2</sub>

#### HPLC conditions

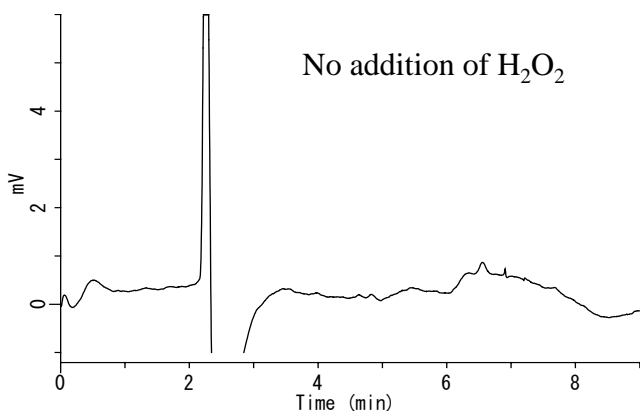
**Column** : Inertsil CX (5 μm, 250 × 4.6 mm I.D.)  
**Flow rate** : 0.8 mL/min  
**Detection** : ECD  
**Injection volume** : 100 μL

Contact us if more detailed conditions are necessary.

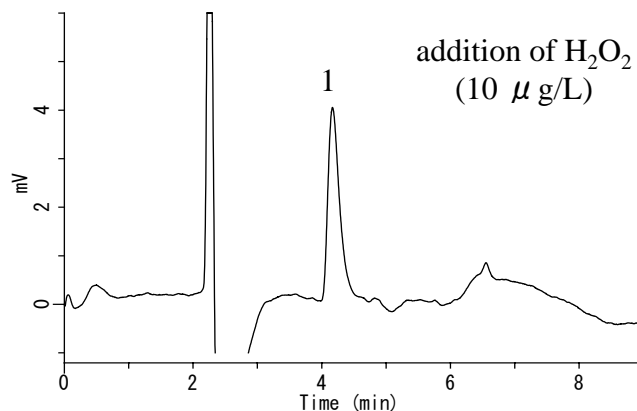
### Determination of H<sub>2</sub>O<sub>2</sub> in tap water

1. Hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>)

No addition of H<sub>2</sub>O<sub>2</sub>



addition of H<sub>2</sub>O<sub>2</sub>  
(10 μg/L)



## Cautions for the calibration

Accurate concentration of commercially available H<sub>2</sub>O<sub>2</sub> solution is not mentioned. The following is a titration method for determination of the H<sub>2</sub>O<sub>2</sub> concentration.

- ① Determination of the standard solution of potassium permanganate
  - Prepare standard solution of sodium oxalate
  - Add diluted sulfuric acid to the solution
  - Heat to about 80°C
  - Titrate with the standard solution of potassium permanganate
- ② Determination of H<sub>2</sub>O<sub>2</sub> solution to be examined
  - Dilute the H<sub>2</sub>O<sub>2</sub> solution
  - Add diluted sulfuric acid to the solution
  - Titrate with the potassium permanganate solution already calibrated

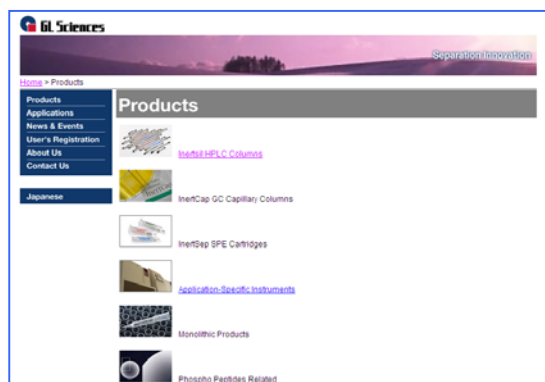
Based on the results of ① and ②, the accurate concentration of the H<sub>2</sub>O<sub>2</sub> solution for laboratory use can be obtained.

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