

Determination of Benzoyl Peroxide in Foods

In Japan, the food additive benzoyl peroxide is permitted to be used as a processing agent only in flour, and its concentration is limited to 0.30g/kg or less in the "Specifications and Standards of Foods and Food Additives" published by the Japanese Ministry of Health, Labour and Welfare. In the Food Safety

Standards Notification No. 0513003 (May 13, 2004), the benzoyl peroxide analysis method was changed from gas chromatography to HPLC.

Here we introduce an example of benzoyl peroxide analysis based on the method specified in the Food Safety Standards Notification No. 0513003.

■ Analysis of Standard Solution

Fig.1 shows the structural formula of benzoyl peroxide. Fig.2 shows the result of analysis of a standard solution, and Table 1 shows the analytical conditions. The benzoyl peroxide standard sold in Japan is diluted with water (approx.25%) for stabilization. Therefore, before preparing a standard solution, it is necessary to

determine the accurate content of benzoyl peroxide by titration.

Table 1 Analytical Conditions

| | |
|--------------|-------------------------------------------|
| Column | : Shim-pack VP-ODS (250mmL. × 4.6mm I.D.) |
| Mobile Phase | : Water/Acetonitrile = 45/55(v/v) |
| Flow rate | : 1.0mL/min |
| Column Temp. | : 40°C |
| Detection | : UV 235nm |

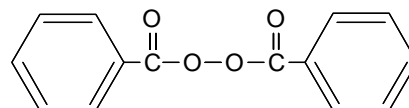


Fig.1 Structure of Benzoyl Peroxide

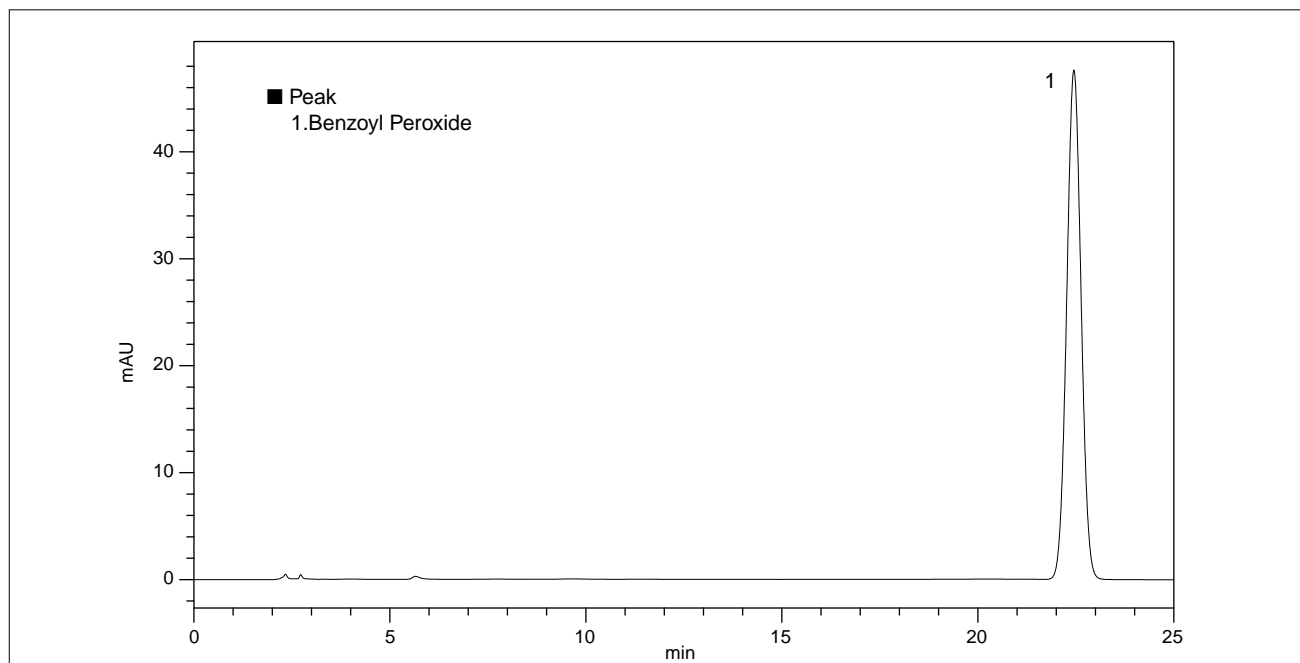


Fig.2 Chromatogram of Benzoyl Peroxide (10mg/L, 20μL inj.)

■ High-Sensitive Analysis

Fig.3 shows an example of high-sensitive analysis of a benzoyl peroxide standard (40 μ g/L). This concentration corresponds to 0.2mg/kg of benzoyl peroxide in flour. The repeatability of area value (n=6) was 2.8%(C.V.).

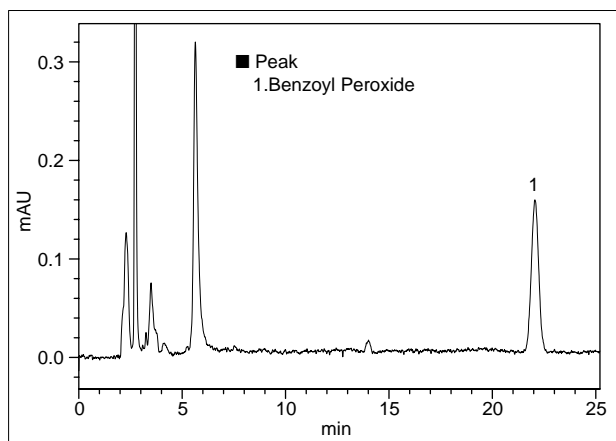


Fig.3 Chromatogram of Benzoyl Peroxide at High Sensitivity (40 μ g/L, 20 μ L inj.)

■ Linearity

The Food Safety Standards Notification No. 0513003 stipulates that the concentrations of the benzoyl peroxide standard solutions for the calibration curve should be in the range 0.5 to 25mg/L. Fig.4 shows the calibration curve in this range. Good linearity was obtained.

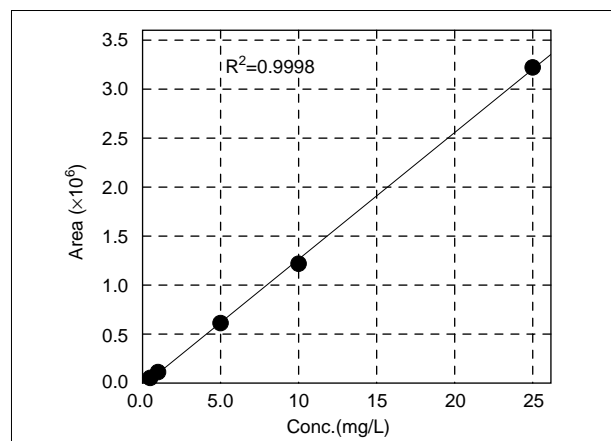


Fig.4 Linearity (20 μ L inj.)

■ Analysis of Flour

Fig.5 shows the sample preparation procedure for analyzing benzoyl peroxide in flour. Fig.6 shows the chromatograms obtained by analyzing a sample of flour produced in Japan (after preparation), and a sample spiked with 1.0mg/L benzoyl peroxide (equivalent to 5.0mg/kg in flour).

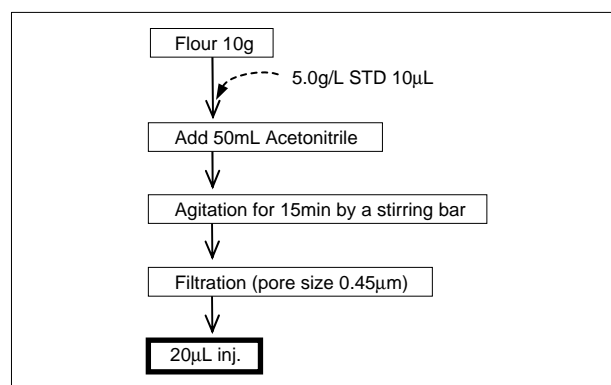


Fig.5 Sample Preparation

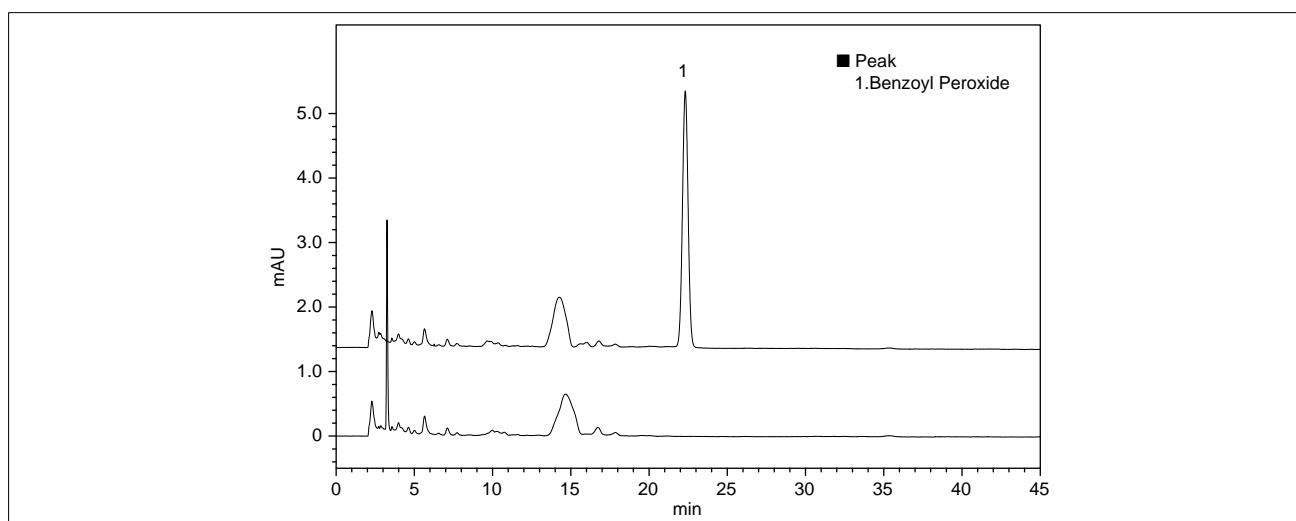


Fig.6 Chromatogram of Flour sample - Upper: Spiked with 1.0mg/L Benzoyl Peroxide, Lower: Not spiked (20 μ L inj. each)



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