

Recovery Test for Sodium Dodecylbenzenesulfonate by TOC-Vws

The test method for organic carbon is listed in the General Tests and Assays section of the Japanese Pharmacopeia (JP). For this method, it is specified that the TOC analyzer must be capable of measuring a concentration below 0.05 mg/L, and that the instrument be able to achieve a recovery rate of at least 0.450 mg/L carbon in measurement of a sodium

dodecylbenzenesulfonate solution (0.806 mg/L). This Application News introduces an example of recovery testing for sodium dodecylbenzenesulfonate solution using the Shimadzu wet chemical oxidation model TOC-Vws, and an example of analysis of a sample with a TOC concentration below 0.05 mg/L.

■ Recovery Test for a Sodium Dodecylbenzenesulfonate Solution

The Japanese Pharmacopeia (JP) specifies that when measuring organic carbon content in a sodium dodecylbenzenesulfonate solution (0.806 mg/L), the instrument used must be capable of detecting carbon at a level of at least 0.450 mg/L.

Because sodium dodecylbenzenesulfonate solution (0.806 mg/L) corresponds to a carbon concentration of 0.500 mg/L, this means that the instrument must be capable of a 90 % detection rate (recovery) when measuring sodium dodecylbenzenesulfonate solution with a carbon concentration of 0.500 mg/L.

Thus, we prepared a sodium dodecylbenzenesulfonate solution with a carbon concentration of 0.500 mg/L by dissolving commercial reagent-grade sodium dodecylbenzenesulfonate in distilled water, and then conducted TOC measurement (TC-IC measurement). We calibrated the instrument by generating calibration curves using 0 and 1 mgC/ (1 mg/L carbon concentration) standard solutions for both the TC and IC measurements. To eliminate the influence of carbon in the distilled water used for preparing the standard solutions for generating both calibration curves, we performed correction using the calibration curve Shift to Origin function. (Fig.1)

Measurement of the 0.500 mg/L carbon concentration sodium dodecylbenzenesulfonate solution yielded a result of 0.494 mg/L, a recovery rate of 98.8 %, easily satisfying the instrument specifications stipulated in the organic carbon test method of the Japanese Pharmacopeia (JP) (Fig.2 and Table 1).

<Measurement Conditions>

Instrument : Shimadzu Wet Chemical Oxidation
Total Organic Carbon Analyzer TOC-Vws

Measurement : TOC (TOC by TC-IC)
item

Calibration : TC ; 0 to 1 mgC/L using aqueous
curves potassium biphthalate solution
IC ; 0 to 1 mgC/L using aqueous sodium
carbonate / sodium bicarbonate

Sample : Commercial sodium dodecylbenzenesulfonate
reagent was dissolved in distilled water to
prepare a 0.806 mg/L solution
(0.500 mg/L carbon concentration).

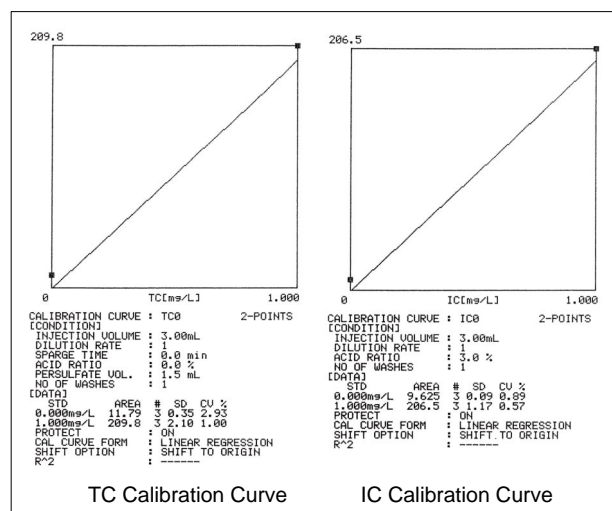


Fig.1 Calibration Curves

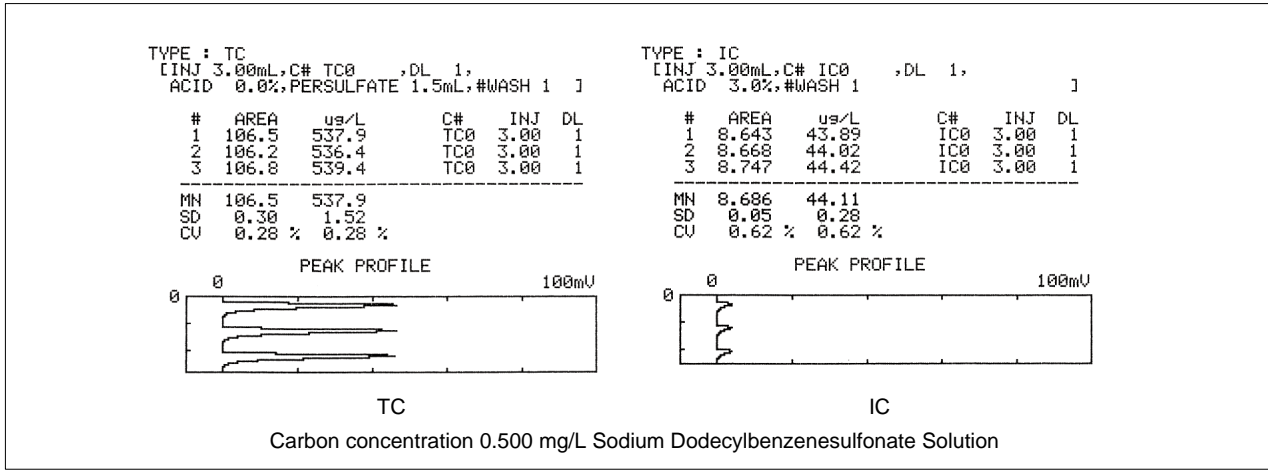


Fig.2 Measurement Data of a Sodium Dodecylbenzenesulfonate Solution

Table 1 Measurement Data of a Sodium Dodecylbenzenesulfonate Solution

Sample Name	TC Value [mgC/L]	IC Value [mgC/L]	TOC (TC-IC) Value [mgC/L]	Recovery [%]
Carbon concentration 0.500 mg/L sodium dodecylbenzenesulfonate solution	0.538	0.044	0.494	98.8

■ TOC Measurement below 0.05 mg/L

The Japanese Pharmacopeia (JP) specifies that the instrument used for measurement must be capable of measuring organic carbon concentration at a level below 0.05 mg/L.

Thus, we prepared a solution with a TOC concentration below 0.05 mg/L by adding potassium biphthalate aqueous solution to distilled water, and then conducted measurement using the Shimadzu Wet Chemical Oxidation Total Organic Carbon Analyzer TOC-Vws. The measurement results are shown in Fig.3. The sample, with a concentration of approx. 0.04 mg/L, was measured with excellent

accuracy at a CV% value within 1%, clearly demonstrating that the TOC-Vws is capable of satisfying the specification of TOC measurement below 0.05 mg/L stipulated by the Japanese Pharmacopeia organic carbon test method.

<Measurement Conditions>

Instrument : Shimadzu Wet Chemical Oxidation Total Organic Carbon Analyzer TOC-Vws

Measurement : Acidify and sparge method of TOC item

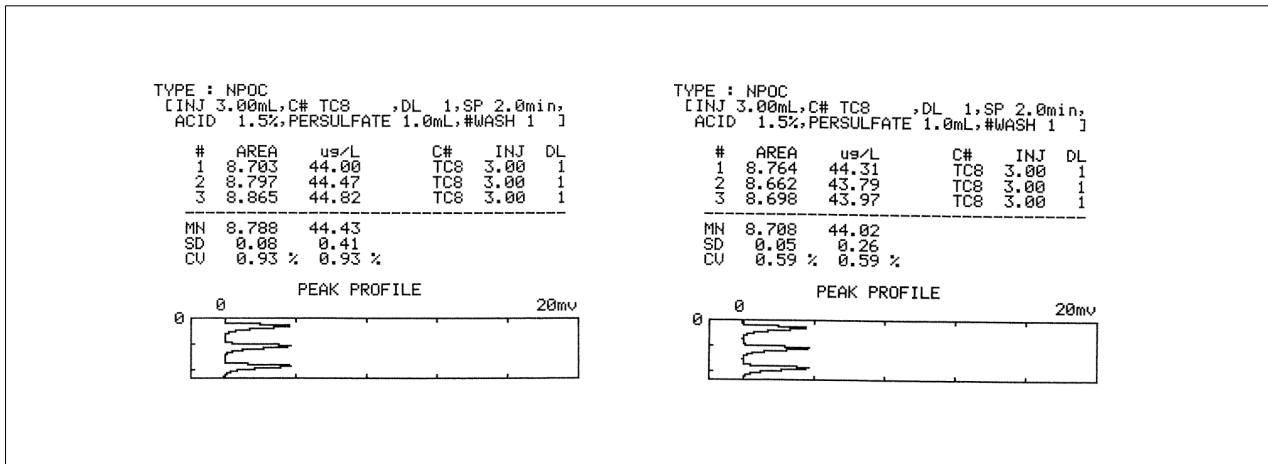


Fig.3 Results of TOC Measurement below 0.05 mg/L

NOTES:

*This Application News has been produced and edited using information that was available when the data was acquired for each article. This Application News is subject to revision without prior notice.

