

## Measuring Samples with Large Optical Rotation

### < Key Points >

- The use of short-path-length cells allows measurements of samples with a large optical rotation.
- JASCO offers cells with path lengths of 10 mm, 20 mm, 50 mm and 100 mm.

### < Introduction >

Some types of pure liquid\* cannot be measured with a polarimeter and a normal 100-mm-path-length cell because their optical rotation exceeds 90 degrees. JASCO offers cells with short path lengths that enable measurements of samples with a large optical rotation. This application note describes optical rotation measurements for orange oil with a 50-mm-path-length cell.

\*Pure liquid: a liquid substance composed of only one type of molecule

### < Keywords >

Polarimeter, short path length, pure liquid, orange oil

### < Experimental >

- Sample  
Orange oil (research use)

- System

Instrument: P-4200 polarimeter (Fig. 1)

Cell: RQC-451 8.5-mm rectangular quartz cell (path length: 50 mm) (Fig. 2)

- Parameters

Light source: Na lamp

Wavelength: D line

D.I.T.: 5 sec

Repetition: 1 time



Fig. 1. P-4200 polarimeter



Fig. 2. Rectangular cell

### < Results and Discussion >

The measurement results are shown in Table 1. The blank measurement was performed using a dry empty cell.<sup>1)</sup> The use of a 50-mm-path-length cell allowed the optical rotation for orange oil to be measured without dilution, as the measured value remained within 90 degrees.

Table 1. Results

| Optical rotation / ° | Temperature / °C |
|----------------------|------------------|
| 49.107               | 20.4             |

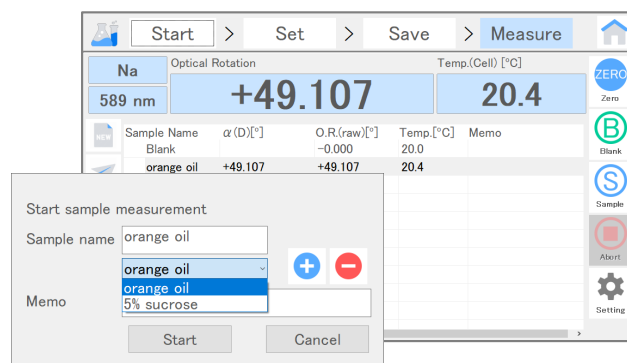


Fig. 3. Measurement screen

Top: The current optical rotation and temperature are displayed in the monitor. Bottom: Sample names can be added to the list for future measurement.

### < Conclusions >

Using a short-path-length cell, samples with a large optical rotation can be measured without dilution.

< References >

1. United States Pharmacopeial Convention: “USP-NF 2024 Issue 3”, (2024).
2. Ministry of Health, Labour and Welfare: June 7, 2021, MHLW Ministerial Notification No. 220, “The Japanese Pharmacopoeia 18th edition”, (2021).

Applicative Solution Lab Division  
A. Yamane

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