Optical rotation of Dextromethorphan Hydrobromide measured using 365 nm emission line of mercury lamp

Introduction

Optical rotation of Dextromethorphan Hydrobromide in accordance with the *U.S. Pharmacopeia*, is requested to be measured at 325 nm, however there is no emission line of 325 nm available in the polarimeter using Na lamp or Hg lamp as light source. Therefore, for the measurement of optical rotation of Dextromethorphan Hydrobromide, a polarimeter with halogen lamp as a light source and interference filter (325 nm) has been usually used, but as shown in Fig. 1, the optical rotatory dispersion (ORD) spectrum, there is a very steep slope in the short wavelength range near 325 nm, where even a very small error in the wavelength of interference filter may cause a very large error in the optical rotation measurement, which will makes the accurate measurements very difficult. On the other hand, if the measurement by using 365nm is allowed, since no wavelength error is expected, the measurement of optical rotation can be implemented with much higher accuracy. In this experiment, Dextromethorphan Hydrobromide was measured using polarimeter with Hg lamp (365 nm), polarimeter with Halogen lamp and interference filter (325 nm) and polarimeter with ORD attachment.

Keywords: Dextromethorphan Hydrobromide, Mercury lamp, Optical rotation, ORD spectrum

Results

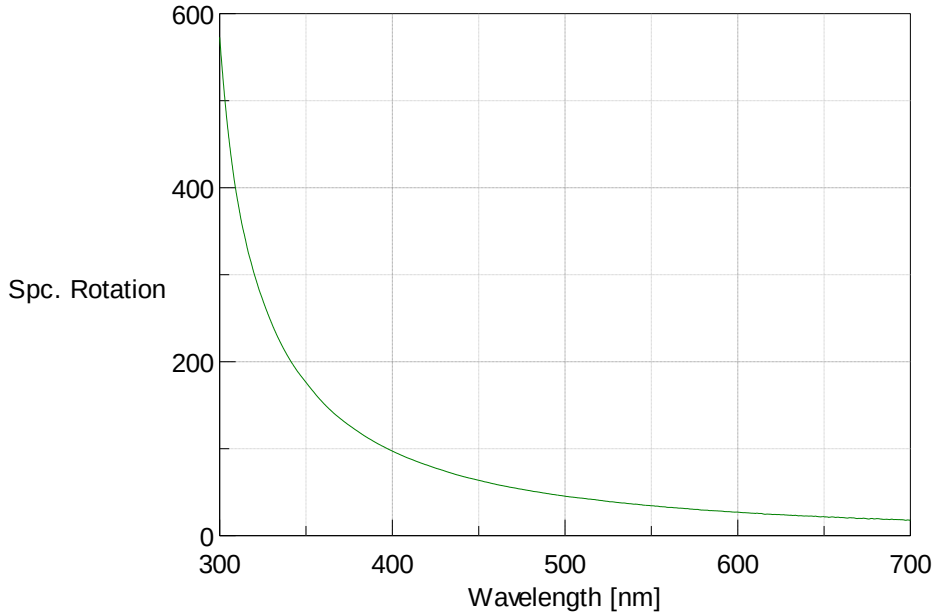

Fig. 1 ORD spectrum of Dextromethorphan Hydrobromide

<Polarimeter>

Optical rotation (365 nm, 20˚C): +2.5655º (by JASCO P-2000 with Hg lamp)
Specific rotation $[\alpha]_{365}^{20}$: +142.53
Optical rotation (325 nm, 20ºC): +4.7034º (by JASCO P-2000 with halogen lamp & interference filter)
Specific rotation $[\alpha]_{325}^{20}$: +261.30

<ORD attachment>

Optical rotation (365 nm, 20ºC): +2.5706º (by JASCO P-2000 with ORD attachment)
Specific rotation $[\alpha]_{365}^{20}$: +142.81
Optical rotation (325 nm, 20ºC): +4.8726º (by JASCO P-2000 with ORD attachment)
Specific rotation $[\alpha]_{325}^{20}$: +270.70

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