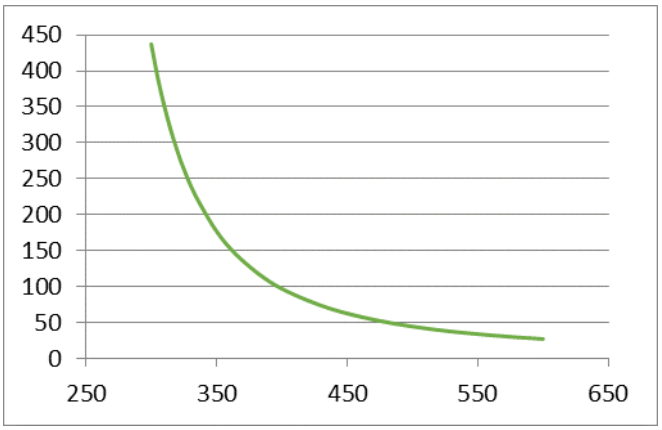
Rudolph Instruments Inc. dba
DigiPol Technologies

APPLICATION NOTE

Measuring Optical Rotation of Dextromethorphan Hydrobromide In accordance with USP 781 at 325nm

Dextromethorphan HBr is an effective and widely used cough suppressant. Its levo isomer, however, is a narcotic. Any contamination of the medication by the narcotic would have dangerous consequences and so its isomeric purity is extremely important. USP recommends that this purity be checked by measuring optical rotation, as it is the only convenient means.

USP further recommends that this be measured at 325 nm where optical rotation is almost ten times larger than at 589 nm where most other measurements are made, as shown in plot below. This is extremely important since the specified tolerance of 1% between the USP standard and sample cannot be accurately judged at longer wavelengths, these values are shown in the table.



Variation of Specific Rotation of Dextromethorphan HBr with wavelength, nm

The numbers in the table demonstrate the reason for choosing 325 nm: instrumental errors constitute a large fraction of the tolerance window at all longer wavelengths making the test practically useless.

The DigiPol Nova Polarimeter which can measure at 325nm and can use 200 mm cells comfortably handles this task with instrumental errors at just 5% of the window.

Other Polarimeters which can only handle 100 mm cells and do not have the 325 nm capability can barely meet the requirements.

Wavelength, nm	Specific Rotation	Optical rotation @1.8% USP conc. in a cell of		Max allowed diff between USP Std. & Sample @1% of measured value		DigiPol Nova Polarimeter accuracy
		100 mm	200 mm	100 mm	200 mm	
325	265°	4.77°	9.54°	0.0477°	0.095°	0.005°
334	225°	4.05°	8.10°	0.0405°	0.081°	-
365	145°	2.61°	5.22°	0.0261°	0.052°	0.005°
589	28°	0.504°	1.008°	0.0050°	0.010°	0.003°

325 nm is not an emission of the two commonly used spectral arc lamps, sodium and mercury but is well within the range of emission of the Miniature UV source used by the DigiPol Nova Polarimeter. This broad spectrum source has a much longer life than the spectral lamps used in other Polarimeters and is also much less expensive, offering multiple advantages. Highly stable and narrow band pass filters used in the DigiPol Nova Polarimeter further guarantee wavelength stability and reading reproducibility that is not easily possible to achieve by monochromators used in ORD instruments or other means.

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