Rudolph Instruments Inc. dba
DigiPol Technologies

APPLICATION NOTE

The Advantages of UV Measurements with the DigiPol Nova M6U Series of Automatic Polarimeters

Most published optical rotation values are found at 589 nm, the sodium 'D' line and it is the wavelength at which 95% of pharmaceutical QC measurements are done. Even in research, 589 nm measurements are indispensable since comparison with published values is always needed. DigiPol has 589 nm available in all the configurations.

Routine USP/ BP testing is done @589 nm sodium 'D' line but some materials need to be tested at other wavelengths even in the UV (e. g., Timolol Malleate @405 nm and Dextromethorphan HBr @325 nm, etc.) as exemplified in the list below. So it is necessary to review the test specifications to determine the need for wavelengths other than 589 nm.

Substance	λ	Specific Rotation (USP)	
	nm	Max	Min
Dextromethorphan Hydrobromide	325	Within ±1% of USP Std., 250 nominal	
Physostigmine	365	-236°	-246°
Vidarabine (Sterile)	365	-56°	-65°
Metaraminol Bitartrate	405	-31.5°	-33.5°
Methyldopate Hydrochloride	405	-13.5°	-14.9°
Timolol Maleate	405	-11.7°	-12.5°
Iopamidol	436	-4.6°	-5.2°
Metryosine	546	185°	195°

For materials which are transparent in the visible region, the optical rotation values increase as the wavelength is shortened due to Optical Rotary Dispersion. For this reason, **Ultra violet measurements** are very important in chemical research.

Researchers often have to make measurements on very dilute samples due to material unavailability; the **increased rotation values in UV make a measurement possible with greater accuracy** than in the visible. The same goes for materials with low specific rotation values. **The larger values in the UV also bring out the effect of substitutions more clearly than in visible measurements**. The shorter the wavelength, the better it is, and **DigiPol Nova M6U** with **325 nm** coverage reaches **farther in to the UV than most.**

The increased absorption in the UV region may require use of a shorter path length cell leading to smaller rotation values it is therefore advantageous **to choose a wavelength where a balance between increased accuracy and the reduced path length** is possible. A capability to make the measurements at **several wavelengths and the ability to switch wavelengths conveniently** is a definite advantage in working with new materials about which not too much is known. **The DigiPol Nova M6U with automatic control and coverage of up eight wavelengths is ideal for this situation.**

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