Data Comparison between SoloVPE® Software V3.1 and ViPER® ANLYTX Software

Technical Note

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Abstract

The SoloVPE® System is a variable pathlength UV-Vis spectrophotometer. It utilizes the Slope Spectroscopy® method, which allows for a wide range of concentrations to be measured without dilution or baseline correction. There are two software platforms that can be used to collect data: the SoloVPE Software V3.1 and PATsmart™ ViPER® ANLYTX Software.

The SoloVPE software is the instrument's legacy software. It operates within the Cary WinUV Software Suite environment. Alternatively, ViPER ANLYTX is the newest VPT software platform. It operates within its own environment, allowing for control of the interface. Overall, both software platforms provide similar functionalities in regards to how the SoloVPE instrument analyzes data.

The purpose of this experiment is to determine whether the two software platforms provide comparable data. The SoloVPE System was used to measure CHEM013, ConfiRM, and bovine serum albumin (BSA) on both the SoloVPE software and the ViPER software. The study provides sufficient evidence that both software platforms yield comparable results.

Materials & Methods

The following materials were used to perform the study:

- SoloVPE instrument [Part No. SYS-VPE-SOLO5]
- Cary 60 UV-Vis spectrophotometer [Part No. IN-CARY 60]
- Fibrette® Optical Component [Part No. OF0009-1-P50]
- Plastic vessel—small [Part No. OC0009-1-P50]
- Sample vessel holder—small [Part No. HM0178]
- CHEM013 certified reference material [Lot No. 24004936]
- ConfiRM® High slope reference material [Lot No. NSI230816101]
- Protein Standard (bovine serum albumin (BSA)—purchased from Sigma Aldrich) [Product No. P5369]

The standards were all measured using the same method on the SoloVPE software (version 3.1.338.0) and the ViPER software (version 1.2.136.0), using the same SoloVPE System. First, the transmission was recorded on both software platforms to ensure the system was operating within specification. The Coupler Check, which measures the raw transmission from the Cary 60 spectrophotometer to the SoloVPE device, was performed first. Afterwards, the Quick Check, which measures the relative transmission through the Fibrette Optical Component, was performed.

All standards were used from their original bottles with no dilution or further sample preparation. Using their own pipette, 100 µL of each sample was used for measurement and samples were inverted 10 times to ensure homogeneity. The standards were measured in triplicate using the Repeat function. This function allows the user to collect multiple readings without changing the Fibrette Optical Component or aliquot. After a triplicate reading was performed on one software platform, another triplicate reading was performed on the other software platform using the same aliquot with a new Fibrette.

The CHEM013 standard was measured first. It is a slope-based standard composed of a dye, water, and methanol. The standard has 5 certified wavelengths, but only 260 nm, 310 nm, and 412 nm were used in this study. The ConfiRM High slope reference material was measured next. Similar to CHEM013, it

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is a slope-based standard, but it is composed of caffeine and water.

The sample was measured at 272 nm. Bovine serum albumin (BSA) was measured last. It has an extinction coefficient of 0.667 ml/(mg*cm), and the sample was measured at 280 nm. The wavelength, expected slope or concentration, and tolerance for each standard are shown in Table 1.

Each measurement yielded a slope or concentration and an R2 value, which represents the linearity of the absorbance vs. pathlength data within a single slope measurement. Average results and relative standard deviation (RSD) were calculated from each set of triplicate measurements. To verify that both software platforms yielded accurate results, the average result was compared against the expected result using the equation:

$$\%Error = \frac{|Average - Expected|}{Expected} \times 100\%$$

The focus of this study is the relative difference between the results from the V3.1 software and the ViPER software. This difference was calculated using the equation:

$$\%Difference = \frac{|V3.1 - ViPER|}{\left(\frac{V3.1 + ViPER}{2}\right)} \times 100\%$$

Table 1. UV-Vis Reference Standard Information

Sample	Wavelength (nm)	Expected Slope (Abs/mm)	Expected Concentration (mg/mL)	Tolerance
CHEM013	260	0.5028	-	5%
	310	1.2801	-	
	412	0.8382	-	
ConfiRM High	272	22.868	-	4.5%
BSA	280	-	200	2.5%

Results

Both software platforms obtained measurements with high accuracy, linearity, and repeatability. Results using CHEM013, ConfiRM, and BSA are shown in Tables 2 through 4. The % Error and % Difference calculated for the V3.1 software and ViPER software are shown in Table 5. The R^2 value was consistently greater than 0.999 and the RSD was consistently less than 0.50%, indicating that this data is reliable and repeatable. The % Error was well within the tolerance of each reference standard. The largest % Difference for any sample was 1.01%, while three out of the five cases had a difference of less than 0.50%, demonstrating great comparability between the two software platforms.

Table 2. CHEM013 Results using V3.1 and ViPER

Wavelength (nm)	V3.1				ViPER			
	Slope (Abs/mm)	R^2 Value	Average Slope (Abs/mm)	RSD	Slope (Abs/mm)	R^2 Value	Average Slope (Abs/mm)	RSD
260	0.50860	0.99998	0.5081	0.16%	0.50573	0.99996	0.5044	0.25%
	0.50857	0.99996			0.50468	0.99998		
	0.50721	0.99997			0.50272	0.99997		
310	1.28604	1	1.2851	0.08%	1.27995	1	1.2795	0.03%
	1.28519	1			1.27969	1		
	1.28399	1			1.27897	1		
412	0.83559	0.99999	0.8351	0.05%	0.83812	0.99999	0.8358	0.21%
	0.83471	1			0.83525	1		
	0.83507	0.99999			0.83388	1		

Table 3. ConfiRM High Results using V3.1 and ViPER

Wavelength (nm)	V3.1				ViPER			
	Slope (Abs/mm)	R^2 Value	Average Slope (Abs/mm)	RSD	Slope (Abs/mm)	R^2 Value	Average Slope (Abs/mm)	RSD
272	22.73033	0.99998	22.664	0.27%	22.72127	0.99996	22.638	0.32%
	22.61315	0.999974			22.64707	0.99994		
	22.64743	0.999975			22.54448	0.99995		

Table 4. BSA Results using V3.1 and ViPER

Wavelength (nm)	V3.1				ViPER			
	Conc. (mg/mL)	R^2 Value	Average Conc. (mg/mL)	RSD	Conc. (mg/mL)	R^2 Value	Average Conc. (mg/mL)	RSD
280	196.25310	0.999816	196	0.13%	197.97365	0.99985	198	0.11%
	196.00070	0.999871			197.71981	0.99985		
	195.73207	0.999905			198.24118	0.99989		

Table 5. Summary of Results and Relative Difference using V3.1 and ViPER

Sample	Wavelength (nm)	V3.1 Result	V3.1 %Error	ViPER Result	ViPER %Error	%Difference
CHEM013	260	0.5081 Abs/mm	1.06%	0.5044 Abs/mm	0.31%	**0.74%**
	310	1.2851 Abs/mm	0.39%	1.2795 Abs/mm	0.04%	**0.43%**
	412	0.8351 Abs/mm	0.37%	0.8358 Abs/mm	0.29%	**0.08%**
ConfiRM High	272	22.664 Abs/mm	0.89%	22.638 Abs/mm	1.01%	**0.11%**
BSA	280	196 mg/mL	2.00%	198 mg/mL	1.01%	**1.01%**

Conclusion

The study demonstrated that both SoloVPE Software Version 3.1 and ViPER ANLYTX yield accurate and comparable results. The instrument performance tests and UV-Vis standard measurements showed no significant difference between the software platforms. The samples chosen in this study covered various levels of absorbance and several different wavelengths, supporting the equivalence of the two software platforms across the full range of intended use.

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