Application Note 89: Analysis of the Effects of Glucose in Wine Samples using a Series 1000 Alcohol Analyser.

Introduction:

Given that wine is created through a sugar based fermentation process there is some question as to the effects of sugar when analysing for alcohol content in finished wines using near infrared analysers.

This study was undertaken to determine the effects of sugar on the alcohol calibration for finished wines on the Series 1000 Alcohol Analyser.

Procedure:

Two red and two white wines were doctored using powdered glucose to create 16 samples. The addition of glucose was at the concentration levels of 5, 10, 15 and 20 grams per litre. The samples were placed in a liquid sample cell and scanned over the wavelength range of 860nm to 1020nm at a pathlength of 30mm. A total of 5 scans were collected of each sample and the spectra was uploaded into NTAS (NIR Technology Australia Software) and analysed.

Results:

Figure 1, below, is the spectra of wine samples with added glucose.

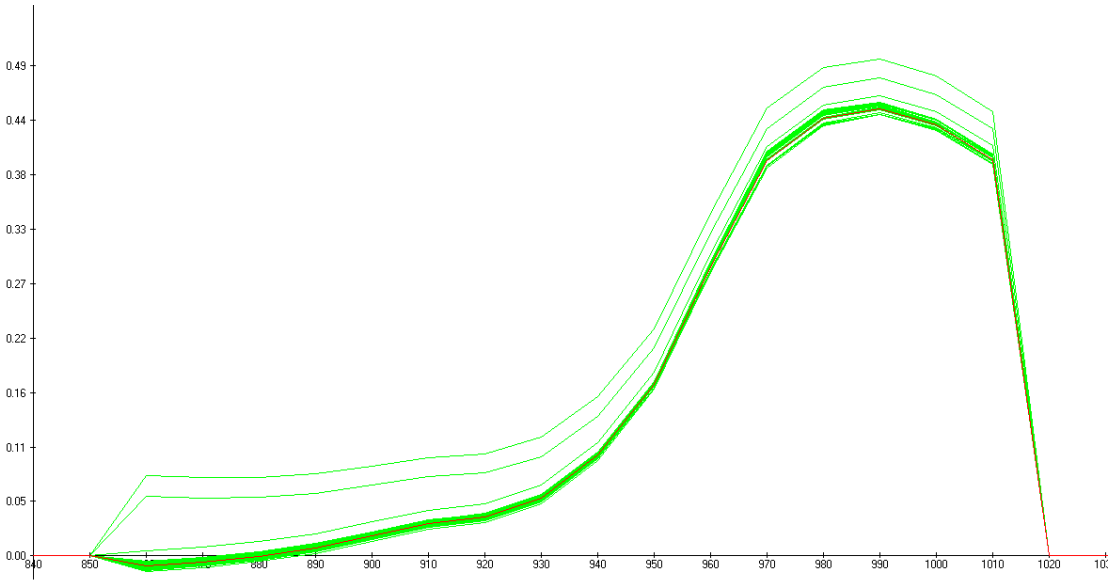

Figure 1: Plot of NIR Spectra for scanned wine samples with adjusted glucose levels.

The sugar-adjusted samples were predicted using the existing alcohol calibrations and the results are shown below in figure 2.

Sample ID	Glucose Added Grams per litre	Reference %Alcohol	NIR %Alcohol	Difference
10	0	13.2	13.2	0
	5	13.2	13.2	0
	10	13.2	13.2	0
	15	13.2	13.3	-0.1
	20	13.2	13.4	-0.2
11	0	14	13.9	0.1
	5	14	13.9	0.1
	10	14	13.9	0.1
	15	14	13.9	0.1
	20	14	14	0
17	0	13.4	13.4	0
	5	13.4	13.3	0.1
	10	13.4	13.5	-0.1
	15	13.4	13.5	-0.1
	20	13.4	13.5	-0.1
18	0	12.9	12.8	0.1
	5	12.9	12.8	0.1
	10	12.9	12.8	0.1
	15	12.9	12.8	0.1
	20	12.9	12.8	0.1
			Average	0.02
			Standard Deviation	0.10

Figure 2: Table of prediction and reference alcohol values for adjusted wine samples.

Figure 2 shows that the samples are being predicted with a Standard Deviation of differences of only 0.10% Alcohol.

The sugar-adjusted samples were then included into the initial calibration set and a new calibration was created. The sugar-adjusted samples were then run using this new calibration and no differences to the above table were recorded.

Conclusion:

From the above testing it can be concluded that the sugar content of the wine does not unduly affect the prediction results of the alcohol content in wine using the Series 1000 Alcohol Analyser. The calibration is significantly robust enough that the testing of sweet or dry wines using the same calibration can be conducted with confidence.

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