

## Introduction:

The practice of adding ethanol to petrol prior to sale is becoming a more commonplace occurrence every day. In some countries this practice is heavily controlled, in others it may even be illegal. The NIT-38 Alcohol Analyser is being used to measure the alcohol level of many different solutions. Therefore it was decided to determine the ability of the NIT-38 Alcohol Analyser to predict the ethanol level in petrol.

The sample preparation for use with the NIT-38 Alcohol Analyser required 50mls of Petrol to be placed in a liquid sampling cell with a fixed pathlength of 20mm. This method proved to be the best and most consistent means of sampling.

This study was undertaken to demonstrate the feasibility of measuring ethanol levels in petrol. The NIT-38 Alcohol Analyser was used for the purpose of this study.

## Procedure:

30 samples of petrol contain varying amounts of ethanol were prepared by placing 50mls into a liquid sampling cell with a fixed pathlength of 20mm. The samples were then scanned over the wavelength range of 720nm to 1100nm collecting 10 scans per sample. The samples were then redone and the scanning process repeated. The spectra were uploaded into NTAS (NIR Technology Australia Software) and Partial Least Squares Regression (PLS) was used to develop a calibration for Fat and Moisture.

## Results:

Figure 1, below, shows the NIT spectra, over the wavelength range of 720nm to 1100nm, for the 30 samples of Petrol.

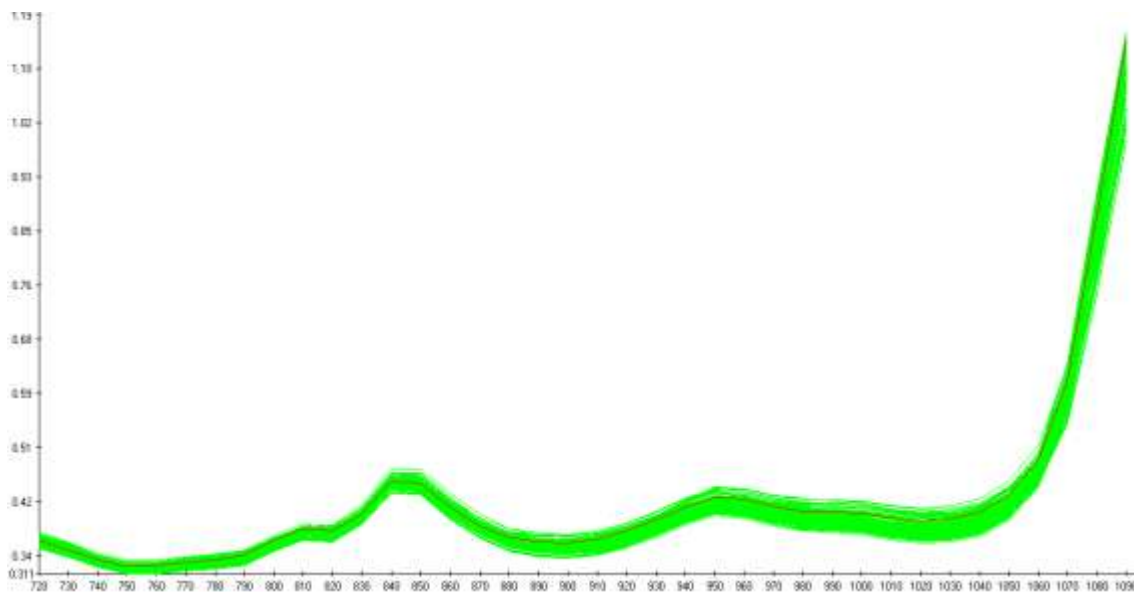


Figure 1: Plot of NIR Spectra for ethanol levels in petrol.

Figure 2 shows the calibration statistics for the NIR ethanol value versus the reference ethanol value. The Standard Error of Calibration is 0.13% with a correlation ( $R^2$ ) of 0.99.

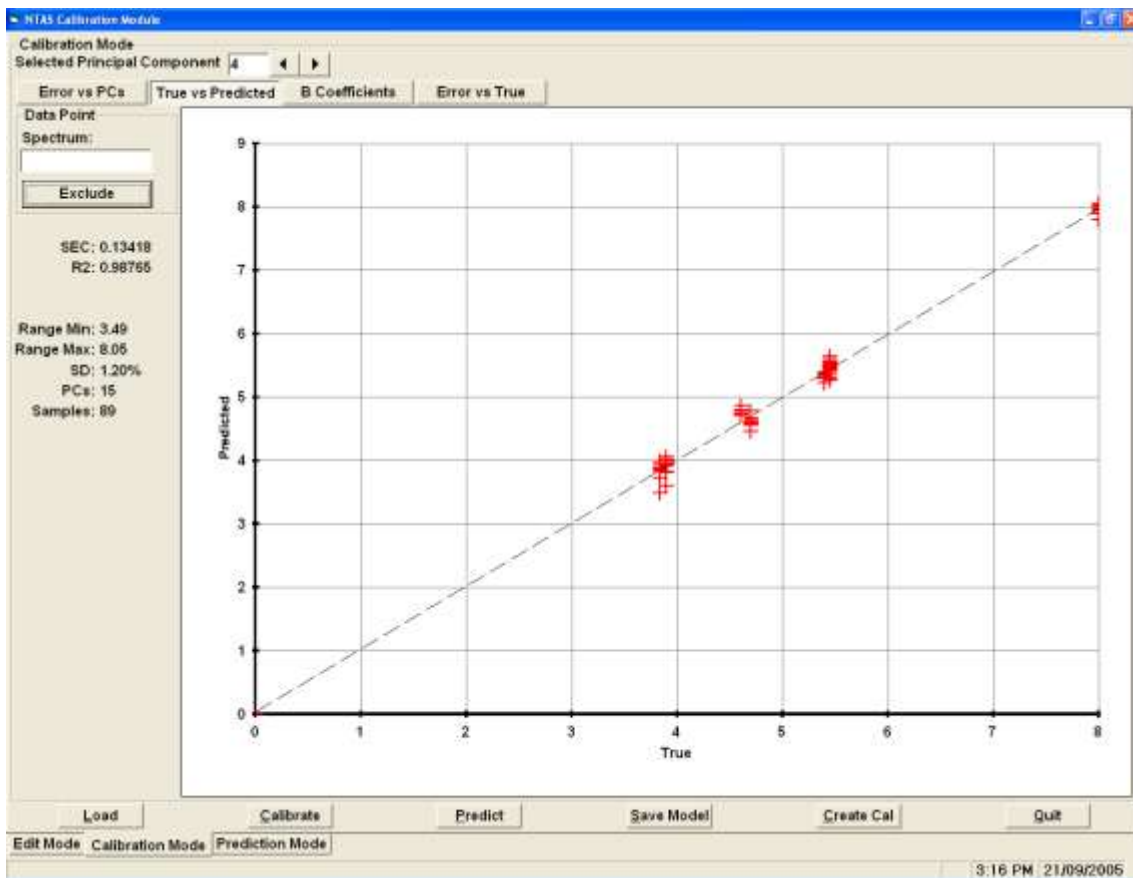


Figure 2: Plot NIR Predicted ethanol value vs. Reference ethanol value.

## Conclusion:

It can be seen in figure 2 that the NIT-38 Alcohol Analyser can be calibrated to measure the ethanol content with in petrol with a high level of accuracy. Due to the inherent accuracy of the laboratory reference methods for this application the calibration itself can be directed to a high level of confidence. The calibration shows excellent linearity and good predictability.