Application Note 161. Comparison of Series 3000 Food Analyser for measuring Chemical Lean to a Microwave Oven Chemical Lean method.

NIR Technology Systems

Introduction:

Chemical Lean measurement using NIR has been shown in Application note 160, to be far more accurate and reproducible than the Microwave method commonly used by Australian meat processors.

Rivalea, Corowa, NSW, allowed Next instruments to demonstrate the Series 3000 Food Analyser that has recently been approved by AusMeat for measuring Chemical Lean. Samples of minced pork were analysed using the Series 3000 and then the samples were analysed using the Rivalea Microwave method.

This is a brief report presenting the comparison between the two CL methods.

Procedure:

6 packs of minced pork were provided by Rivalea, ie, 1 85CL and 5 95CL products.

90 grams of the minced pork was weighed and placed into the Series 3000 sample dish and 10 spectra were collected for each 90 gram sample. 5 x 90 gram portions of the 85Cl product were scanned in the Series 3000. Between 5 and 3 x 90 gram portions were taken from each of the 5 95CL product packs and scanned in the Series 3000.

After scanning in the Series 3000, the 90 grams were transferred into a plastic bag and marked according to the pack and sub sample. These samples were used be Rivalea to perform the Microwave CL measurements and a 50 gram sample was bagged for Soxhlet analysis at the Rivalea feed plant.

The spectra collected in the Series 3000 were used to calculate the Chemical Lean.

Results:

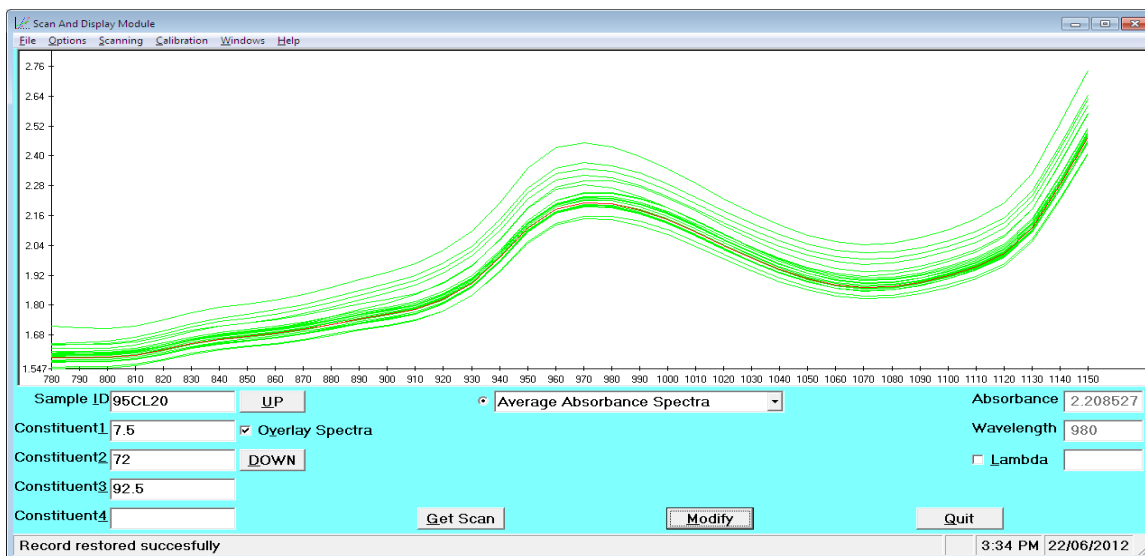Figure 1 shows the NIR spectra of the pork mince samples.

Table 1. presents the predicted Chemical Lean using the Series 3000 and the Rivalea Microwave method for Chemical Lean

Sample ID	Series 3000 CL	Microwave CL	Series 300 Range	Microwave Range
Pack1 85-1	87.8	90		
Pack1 85-2	87.9	87.5		
Pack1 85-3	87.4	89.4		
Pack1 85-4	87.0	86.2		
Pack1 85-5	88.0	87.5	1	3.8
Pack1 95-1	91.6	88.7		
Pack1 95-2	91.4	92.5		
Pack1 95-3	91.1	95.1		
Pack1 95-4	91.9	91.3		
Pack1 95-5	91.5	97.6	0.8	5.1
Pack2 95-1	91.9	92.5		
Pack2 95-2	91.8	91.3		
Pack2 95-3	91.8	93.8		
Pack2 95-4	91.8	91.3	0.1	2.5
Pack3 95-1	91.7	90		
Pack3 95-2	91.2	92.5		
Pack3 95-3	90.7	93.8		
Pack3 95-4	91.0	93.8	1	3.8
Pack4 95-1	91.5	91.3		
Pack4 95-2	91.4	92.5		
Pack4 95-3	91.5	91.3	0.1	1.2
Pack5 95-1	91.9	95.1		
Pack5 95-2	91.4	93.8		
Pack5 95-3	91.4	92.5	0.5	2.6
	Stdev		0.4	1.4

Figure 2. present a plot of the data from Table 1.

Comparison of CL Methods
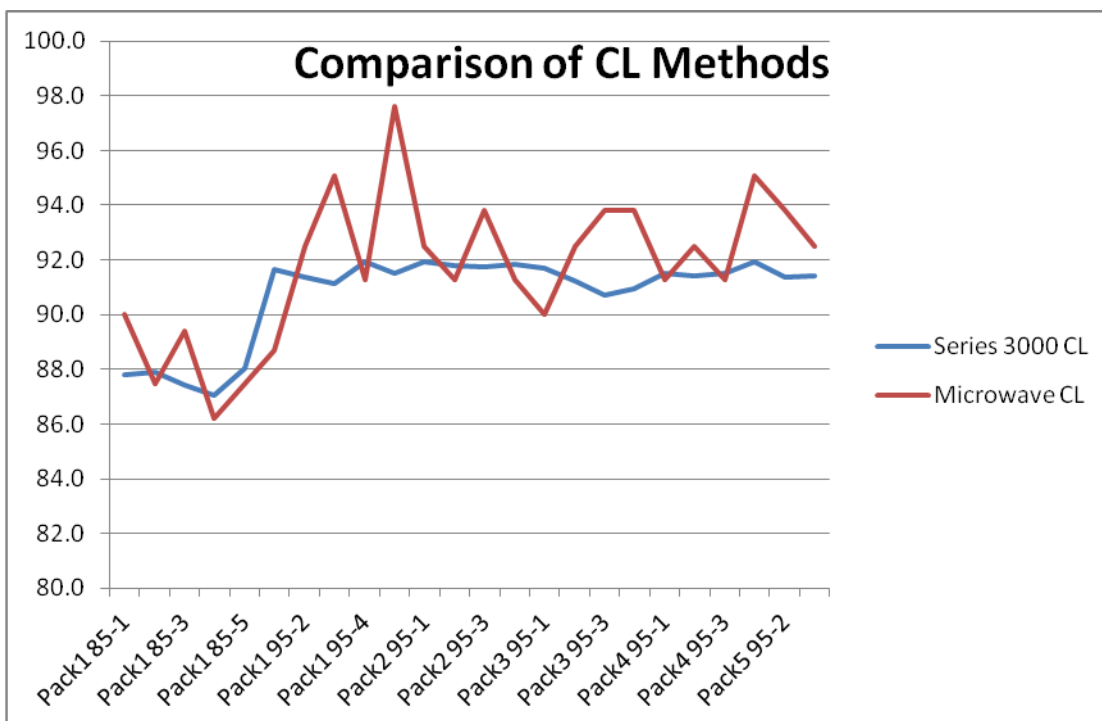
Discussion:

It should be pointed out that between 3 and 5 samples of minced pork were analysed for CL from each pack of meat. It is considered that even though no two portions of minced meat are exactly the same, the differences should be small.

Figure 2. shows clearly that the Microwave method presently used by Rivalea has a high degree of variability for samples taken from the one pack of minced pork. The Series 3000 CL method is shown to be far more consistent within a pack of minced pork and between packs.

Table 1. also shows the Standard Deviations of the differences for the two methods, ie,

Series 3000   SD   =   0.4

Microwave   SD   =   1.4

The benefit of the Series 3000 Food Analyser for measuring Chemical lean in minced pork are speed of analysis and repeatability. Also the Series 3000 can calculate Fat, Protein, Moisture and Chemical Lean in the one analysis in less than 60 seconds.