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INSTRUMENTS

Solutions for the Dairy Industry

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INSTRUMENTS

- **Who, What, Where**
- **Lab/LIMS data automation**
- **Qualitative monitoring**
- **Standardizing instrument**

Mission Statement

Bentley Instruments is committed to **providing quality, state-of-the-art analytical instruments** for the dairy industry.

Bentley Instruments: Global Distribution





Founded in 1983



Present in 50+ Countries



**1500+ Machines Installed
Worldwide**

Bentley Combi Systems

Available in two models



Combi FTS



DairySpec Combi

Features of Bentley Combi

- Sample throughput 100 – 600 /hr
- FTIR, fully open system
- Critical system functions logged
- Programmable auto-standby / auto-ready
- Internet ready/remote access
- Same software across all platforms
- Customizable data output
- Solid state laser
- Sample and water-bath temp. monitored
- Sealed optical deck reduces desiccant maintenance (annual)



Applications

- **Traditional Components**

- Fat, Protein, Lactose, Solids (SNF, Total, Other), MUN, FPD

- **Traditional Fatty Acids**

- Saturated, Unsaturated, Mono & Polyunsaturated, Oleic (C18:1), Palmitic (C16:0) and Stearic(C18:0)

- **Other Applications**

- Citric Acid, Casein, pH, Omega 3, Omega 6, BHB, Acetone, Blood BHB, Lactoferrin

- **Under evaluation**

- **De Novo/Short Chain fatty Acids**

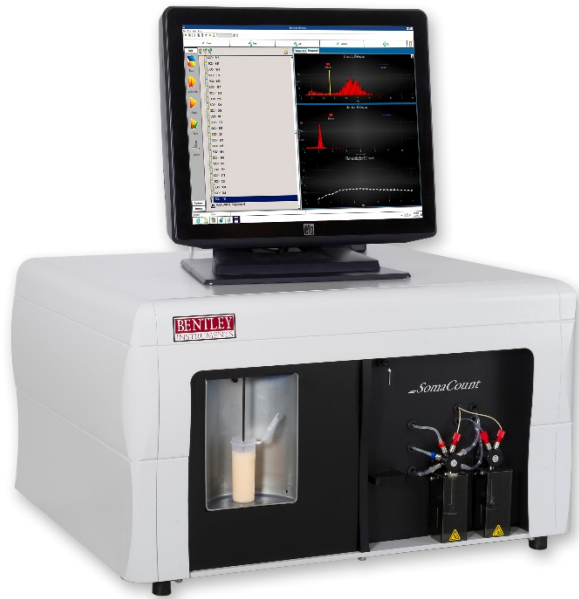
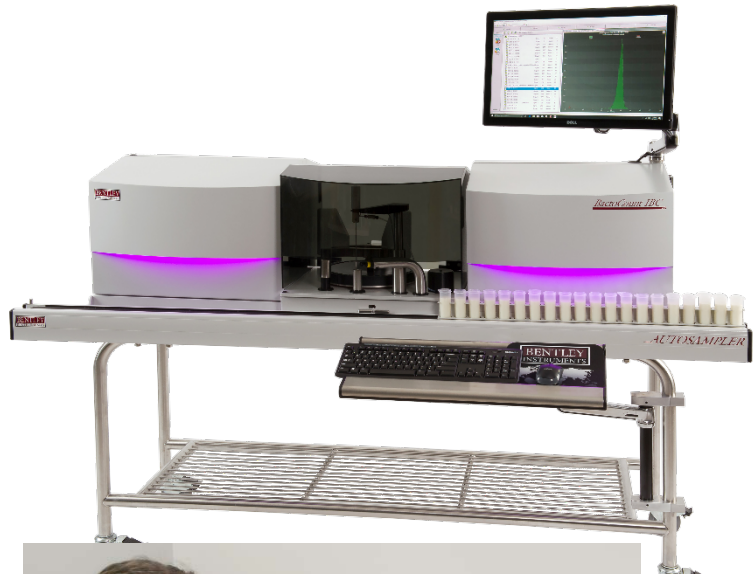
- C4:0, C6:0, C8:0, C10:0, C12:0, C14:0, C14:1

- **Preformed / Long Chain Fatty Acids**

- C18:1, C18:2

- **Mixed/Medium Chain Fatty Acids**

- C16:1





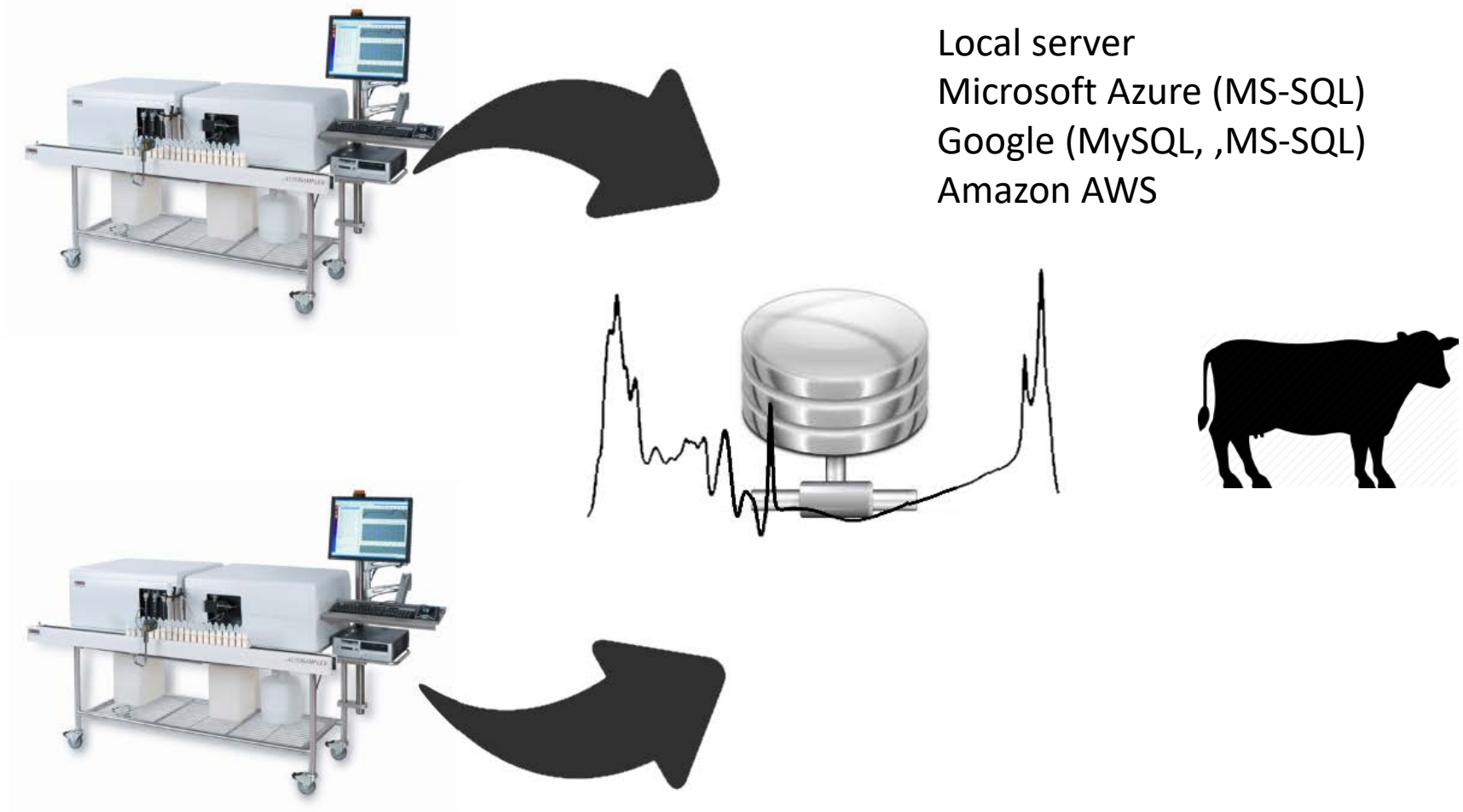
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Lab/LIMS data automation

Store data centrally, share globally

- LIMS



Share globally

- Share data between dispersed laboratories
- Centrally located quality control and reporting.
- Research access
- Customer real-time access to results.



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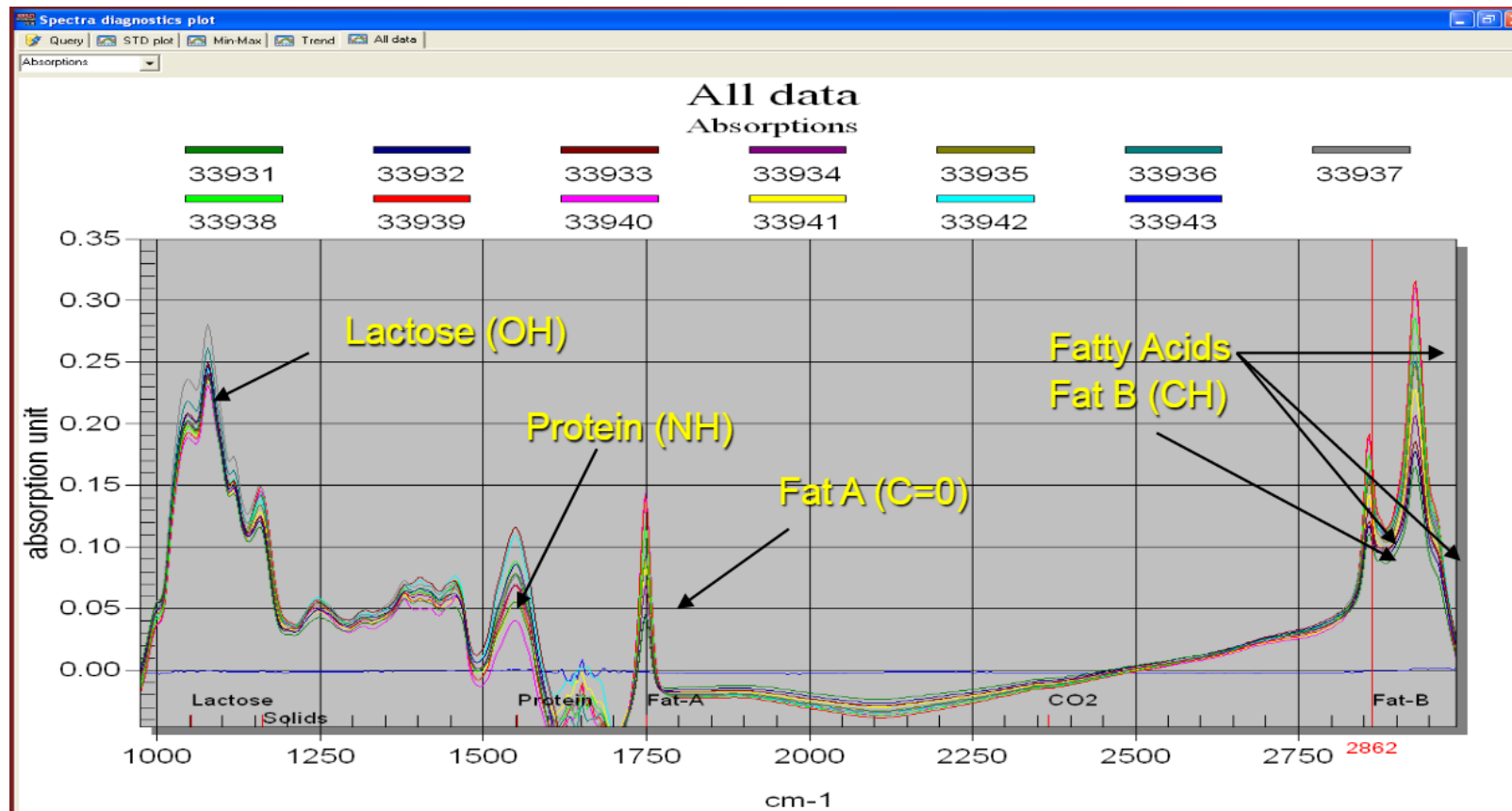
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Qualitative monitoring

Bentley FTIR

The qualitative approach to quality

Each sample has a unique fingerprint.



Bentley FTIR

The qualitative approach to quality

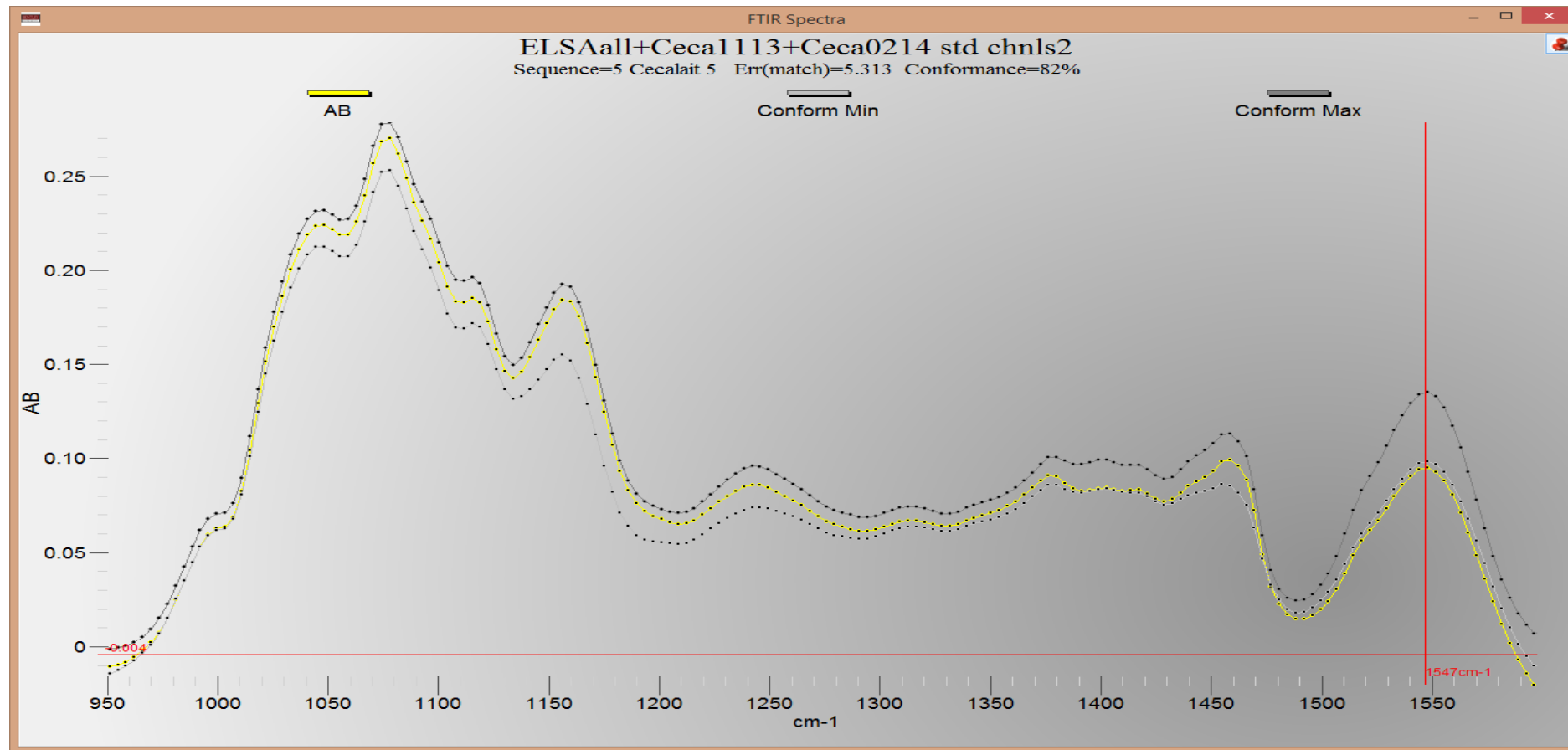
Qualitative analysis can be used to :

- Detect abnormal samples
- Detect adulterated samples
- Detect instrument abnormal behavior
- Inconsistent sample handling

Bentley FTIR

Trust your samples

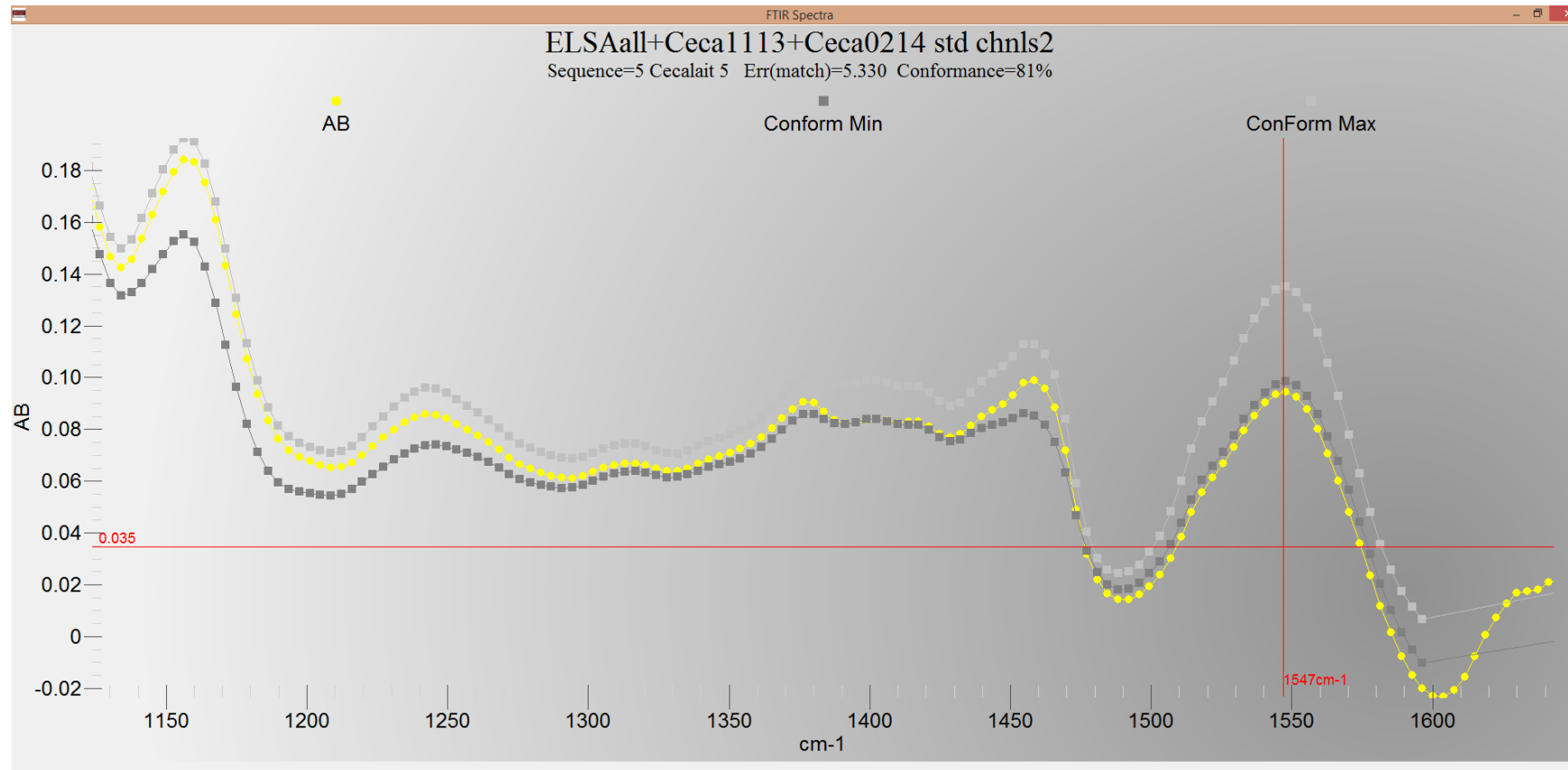
Comparing to trusted samples :



Bentley FTIR

Trust your samples

Comparing to trusted samples :





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Standardize your instrument

Spectra Standardization

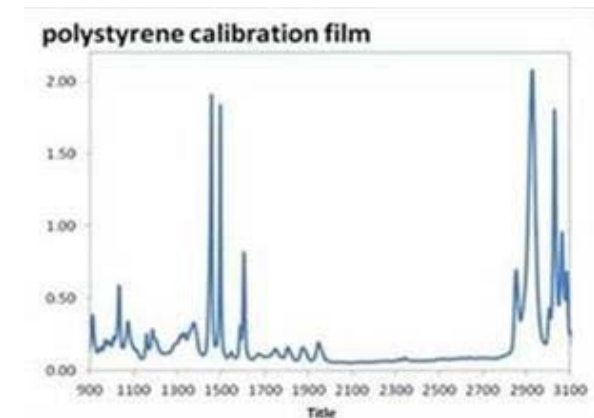
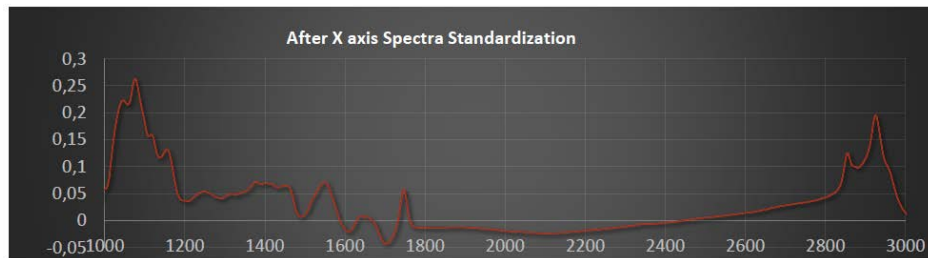
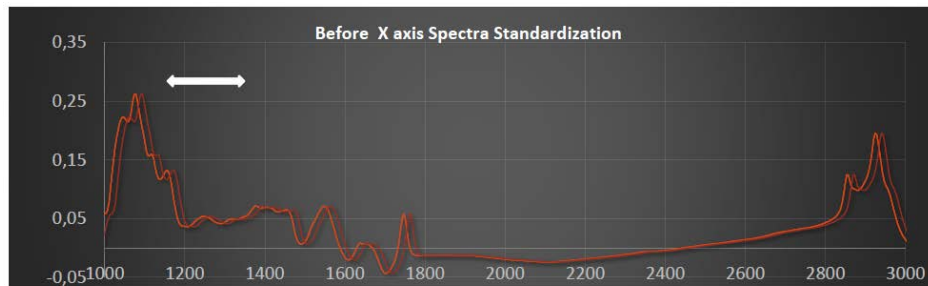
- Calibration stability (reduces need for slope/bias changes).
- Calibration transfer between instruments.
- Worldwide equivalence of spectra and analytical results.
- Reduce calibration development costs.
- Implementation of Qualitative Analysis.

What – 2 major causes

- Wave axis changes caused by changing spectrometer conditions especially laser wavelength shifts.
- Path length of the sample interrogation area, changes caused by normal use of system. Shift in the absorbance axis.

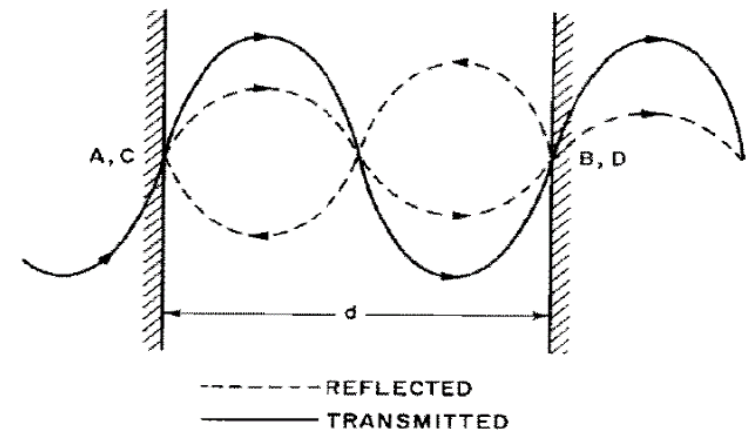
Wave-axis shift: Normal wear

- Interferometer laser frequency can change over time leading to wave-axis shift.
 - Calibrated during Initial instrument setup and during service visits if necessary. Using an internationally recognized NIST polystyrene film
 - Process can be automated to improve quality in operation.



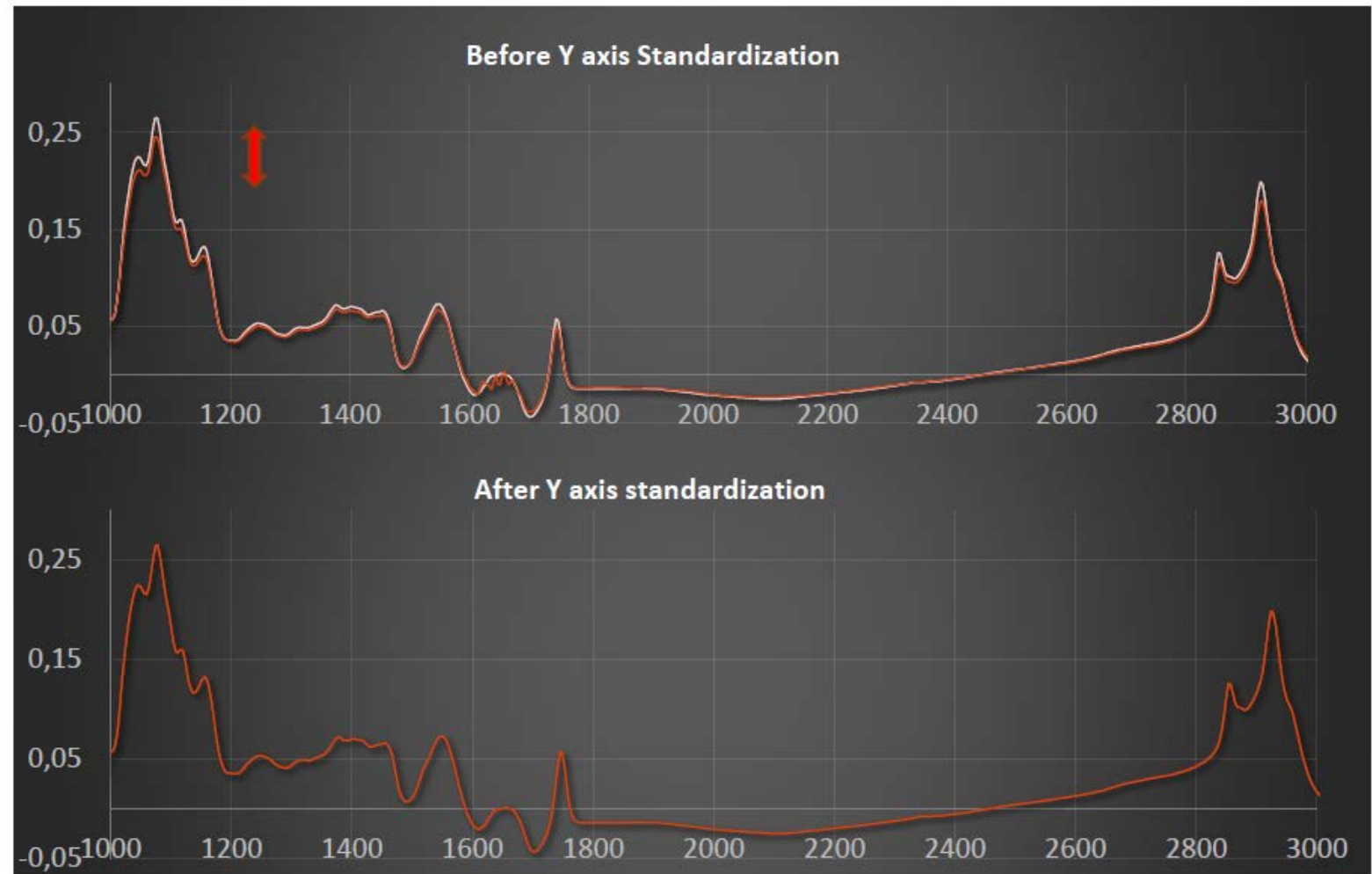
Absorbance-Axis: Normal wear

- Cell path length can change over time leading to spectrum Y-axis shift.
 - Cell path length is standardized using a fringe technique in which the standardization coefficient is calculated and applied to the stored value to compensate for any deviations in the cell path length.



Absorbance-Axis: Normal wear

- No liquid consumables. – works on air.
- Easy and quick – 10 minutes.

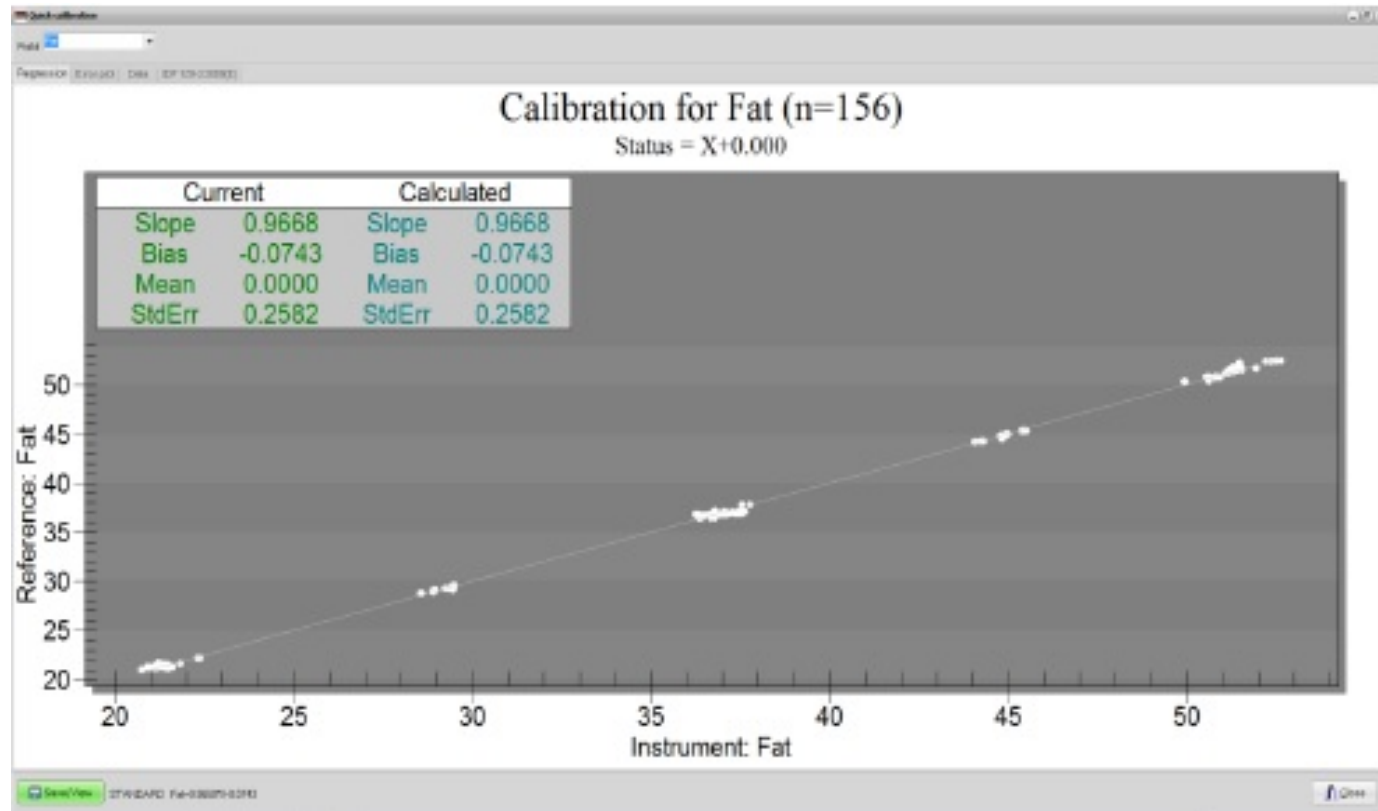


Absorbance-Axis: Normal wear

- In a fielded instrument the cell standardization method employed by Bentley is significantly more accurate than required for the method use.
- Example: cell thickness using the cell fringe method can typically be as determined with a 99% confidence interval of less than 0.05%.
- On a typical 4.00 milk sample, the error on correction performed is less than ± 0.002 . Which is greatly superior to any other method currently deployed.

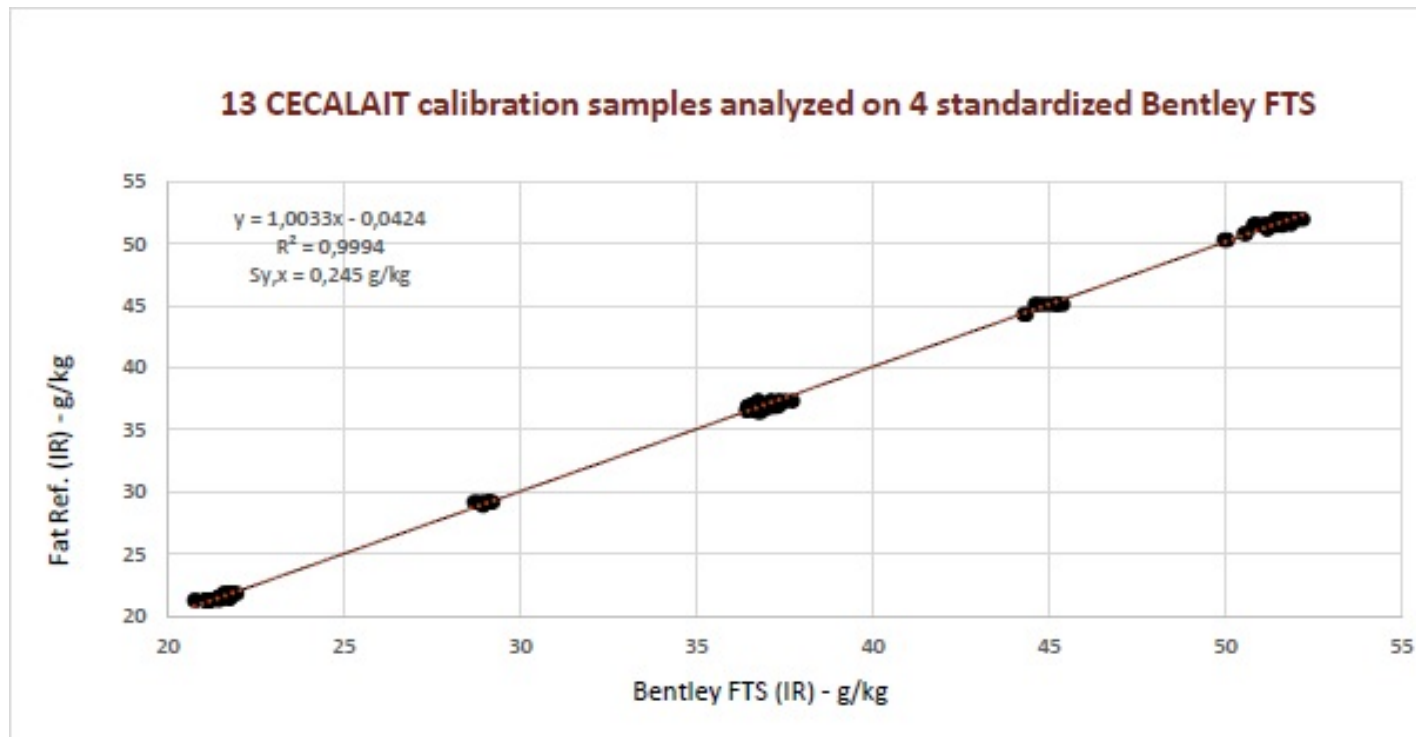
Absorbance-Axis: Normal wear

12 months – no adjustment to calibration coefficients.



Absorbance-Axis: Normal wear

Samples on 4 standardized systems using reference samples



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Thank you

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