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HUMAN HEALTH | ENVIRONMENTAL HEALTH

VOLUME 5 April 2009

Dear customers,

We are pleased to inform your that the FRESH is enabling us to reach out to you as many of you have responded to us ; which has encouraged us to make the Spring-Summer issue in the hard copy format and must have reached you. We keep you posted about the new developments in the technology and applications to suit cross section of the Industry. Since PerkinElmer is multiproduct company our focus is on the solutions to the customers under single roof.

In this issue of FRESH we have illustrated the solutions for the food, hydrocarbon industries, renewable energies and bio-pharmaceuticals. Please write to us with suggestions and comments.

Enjoy the reading.

WHAT'S Fresh inside...

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The quality control of Biofuels with a Simultaneous ICP-OES for Trace Metal Determination

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Global application Centre, Mumbai

Biodiesel is a renewable fuel which means, the feed stocks can be regenerated after use. Phosphorus if present in biodiesel, can damage the catalytic convertor system of vehicles. Ca, Mg, Na and K, all can cause injector clogging, piston and engine wear and also they will be responsible for engine deposits. So it becomes extremely important to analyze these metal ions in biodiesel samples.

ASTM and CEN are two regulatory agencies which have published specifications for biodiesel (ASTM D 6751 & EN 14214). EN 14538 is the official method exclusive for the analysis of phosphorus in biodiesel and EN 14107 is for the analysis of Ca, Mg, Na & K . In the present work what we have done is, we have combined these two EN methods in to a single method for the simultaneous analysis of these metal ions in biodiesel. We have used the PE optima 7300 DV ICP-OES equipped with S-10 auto sampler and special accessories, for high throughput analysis. The dual view nature of the instrument helps to ensure extended linear dynamic range. The instrument is equipped with user friendly winlab version 4 software for ICP and the segmented array CCD detector helps to achieve simultaneous analysis of all the metal ions in a single run.

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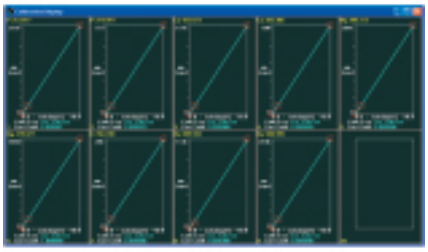
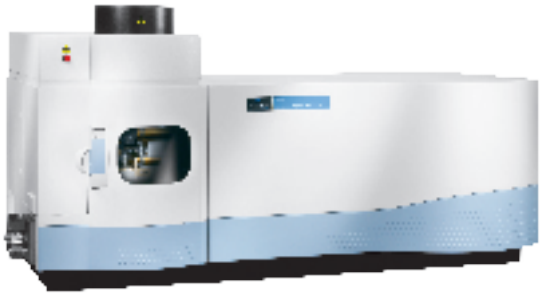
The detection limits shows that the developed method is highly sensitive with respect to biodiesel analysis (See table)



Calibration curves

Element	Wavelength (nm)	Instrument detection limits (mg/kg)	Biodiesel detection limits (mg/kg)
Phosphorus	213.620	0.04	0.4
Sodium	588.993	0.02	0.2
Potassium	766.485	0.08	0.8
Calcium	422.673	0.004	0.04
Magnesium	285.213	0.002	0.02

To conclude, a simultaneous, fast accurate method was developed for the analysis of trace metal impurities mentioned in ASTM and EN specifications. We have got excellent % RSD and the time required to complete one analysis of 5 metal ions with two different wavelengths and three replicates were 130 seconds. Out of this 130, 45 seconds were for wash in and wash out. We can reduce the analysis time further by using the flush option available with the winlab software. Additionally as both the wavelengths used gave identical results, one can go with the most sensitive line alone, which will further bring down the analysis time. In short the two different EN methods for the analysis of biodiesels with ICP-OES were combined in to a single method. The analysis was carried out at the limits specified in the ASTM D 6751 and EN 14214 to ensure quality control of biodiesel samples obtained from different feedstocks. With the help of winlab version 4 software a fully automated analysis was achieved.



Optima 7300 DV ICP-OE

S10 Autosampler

Baffled cyclonic spray chamber and low flow gemcone nebulizer

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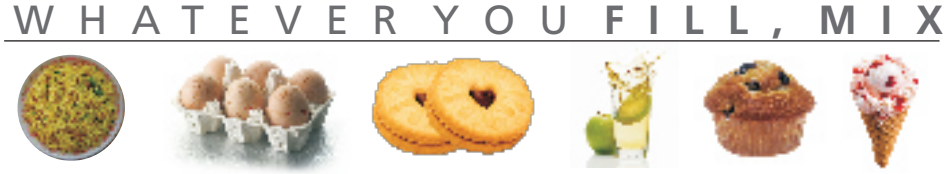

Spectrum100 N FTNIR Products for the Food and Beverage Quality Measurements

Perkin Elmer has applied it's leading edge development expertise to deliver new levels of NIR performance, flexibility and ease of use for a wide range of food and beverage quality measurements. From clear liquids to dark grains, at-instrument sampling to remote, form single particle measurements to slurries – we have a comprehensive range of sampling and software solutions to address your needs. We apply the simple guideline that any measurement system is only as good as it's weakest component – hence we base our systems around a common high specification spectrometer and software platform –Spectrum100N and Assure ID software

At the heart of the NIR measurement system is the Spectrum100N FT-NIR spectrometer, which delivers unsurpassed spectroscopic performance, combined with completely reliable operation. The unique, patented Dynascan™ interferometer design is field-proven with the highest levels of NIR wavelength accuracy and precision, ensure the most robust foundation for measurement solutions. This highly flexible interferometer design allows coupling with a range of optimized sampling options. A single system can accommodate multiple sampling options with sampling changeover in seconds – providing maximum return on investment and possible upgrade paths as measurement needs change.

Sampling solutions

Clear liquids –
A range of simple cells and cuvettes provide the simplest configuration for clear liquids – these are used with our Sample Shuttle option which allows for automatic compensation for atmosphere variation during measurement – ensuring the highest quality measurement from unskilled staff. The first choice for the most demanding quantitative measurements e.g. alcohol determination in drinks to better than 0.05% w/w.

A liquids autosampler system is available, with 50 and 100 sample cassette options providing greater productivity and consistency of measurement in busy QA laboratories, or for rapidly generating large sample-set calibrations.

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Remote sampling is available via an optically matched single fiber optic interface. Providing very high quality measurement over large distances as required. This can be coupled with optimized probes from a range of probe options to match the application.

Pastes and slurries-

Special consideration is required for these samples, particularly when the materials show high inhomogeneity. Our new NIRA with ICRA liquids sampling options provide a fast, convenient method of measuring pastes. Large sample areas (>1cm2) can be measured to provide representative sampling, and the sample holders are disposable for sampling convenience. This system has been successfully used in raw materials screening applications where the samples are very viscous and/or inhomogeneous.

Powders-

The Spectrum100N NIRA sampling system combines the high performance advantage of FT-NIR with the simplest 'no sample preparation' method of NIR. Samples are measured as-is, by placing directly onto a sapphire window, or can be measured in glass vials through the base of the vial. It is even possible to perform some analyses on samples inside polymer bags. This is the first choice for simple, rapid conformance checks of powders such as sucrose, and quantitative determinations such as fat in milk powder.

Remote solids measurements are possible using our fiber optic-coupled

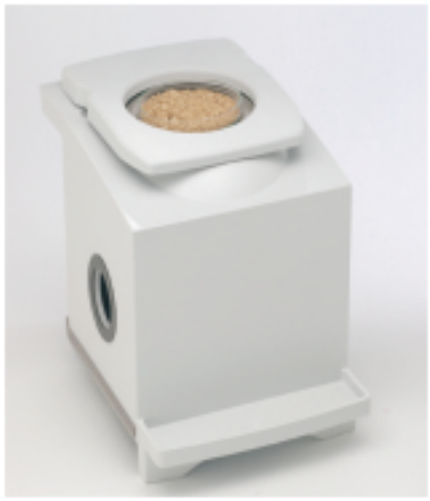
remote solids sampling system. This is particularly useful if materials are to be checked whilst inside large containers. This can be fitted simultaneously with on-board NIRA solids and liquids sampling options providing a highly versatile system. Sample changeover is accomplished immediately, with automatic sample accessory recognition and setting of instrument data collection parameters.

Granular powders and pellets-

A 10cm rotating sample holder is available for the NIRA sampling system to ensure that a large and representative area of the sample is measured during the scan. Animal feeds, soybeans and doughs are typically analyzed using this system.

Even Single grains and particles-

The new Spectrum100N is the another industry first for Perkin Elmer. Inhomogeneous powders, foreign matter and packaging can now be examined microscopically AND with the added no-sample preparation benefits of NIR! For example, single particles of meat meal contamination have been detected and identified in ground animal feeds. The system can



measure both reflectance and transmission spectra of single particles, and perform fully automated spatial mapping to investigate spatial distributions of components in solids mixtures.

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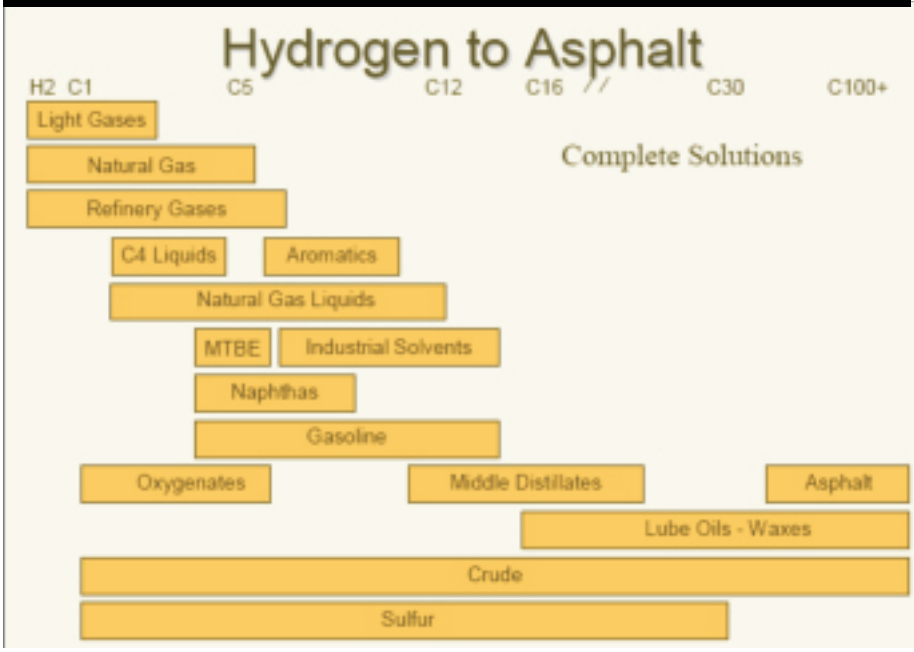
Petrochemical Analyzers & Systems from PerkinElmer



From Hydrogen to Asphalt

Today, the analytical challenges of monitoring and controlling the industries' processes and products are as complex as the chemical processes themselves. Analytical methodologies play a critical role in ensuring that manufacturing conditions are monitored and that product quality is maintained. PerkinElmer analytical solutions are designed to compliment these methods.

The term "Hydrogen to Asphalt" categorically represents the breath and depth of raw materials and products derived from crude oil. Each category has a set of analytical requirements that range from single component and / or multi-component analyses, plus the determination of metals and carbon content.

PerkinElmer's highly automated, ready-to-run analyzer and system solutions are on the leading edge of GC separations technology.

Natural Gas/LNG Analyzers

Over 30 Models of Natural Gas / LNG Analyzers are available addressing gas and / or liquid samples, as well as analyzing, optionally, hydrogen, helium, and heavier hydrocarbons through C10. Standard equipment and features include filters, backpressure regulation, sample loop purging and sample vaporization. These Analyzers can be obtained with automated, on line, single or multi-stream sampling capabilities.

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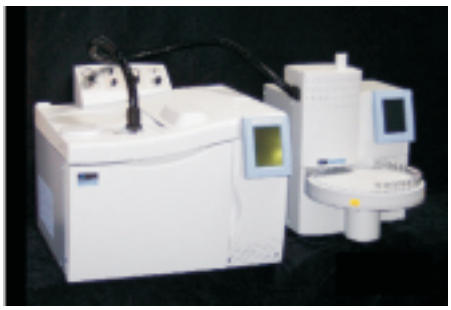

Model 4087 Transformer Oil Gas Analyzer System

Refinery Gas/Light hydrocarbon analyzers

15 Models of Refinery / Light Hydrocarbon Gas Analyzers analyze hydrogen, helium, O2, N2, CO, CO2, H2S and light hydrocarbons through C8 in gas and / or liquid samples. The various Models address all variables and conditions faced by users in the industry.

Transformer Oil Gas analyzer (TOGA)

The Model 4087 TOGAS System with Headspace Sampler and Model 4003 Transformer Oil Gas Analyzer, together with the Model 4081 Transformer Oil Gas Extraction Apparatus, perform the ppm level analysis of hydrogen, CO2, CH4, C2s and CO, as per the specifications of the method and requirements of the industry.

Furnace/combustion/Flue Gas/Mine Gas Analyzer

Models 4016 through 4019 analyze hydrogen, argon, oxygen, nitrogen, CO, CO2, H2S, methane and C2 hydrocarbons at various concentrations, depending upon component interest in the sample. This series of analyzers can be designed to perform both batch and on line process sample analysis.

Trace CO, CO2 Analyzers

Models 4021, 4022 and 4024 utilize a methanizer / Flame Ionization Detector to analyze trace CO and CO2 in various samples. Selection of model depends upon other component concentrations in the sample.

Standard Analyzer products based on PerkinElmer Clarus 500/600 GCs.

Trace H2, O2, N2 and CO in Ethane and Lighter Hydrocarbon Products Analyzer (ASTM D2504) utilizing a Pulsed Discharge Ionization Detector, performs ppb level measurements, meeting method specifications.

Trace Sulfur Compounds in Natural Gas, Gaseous Fuels and Light Petroleum Liquids Analyzers (ASTM D5504 / D5623)

utilizing a Sulfur Chemiluminescence Detector, performs this ppb level sulfur component analysis.

Ethers (MTBE etc.) and Alcohols in Gasoline Analyzers (ASTM D4815)

Model 4001 and 4002 are designed to perform this method. The use of a Flame Ionization Detector or Thermal Conductivity Detector is the option available in these Models.

Benzene and Oxygenates in Petroleum Analyzer (EN12177 / EN 13132 / IP 425)

For the analysis of any aromatic or oxygenated compound found in gasoline by varying the heart cut time and internal standard utilized. This versatile analyzer can be provided with an autosampler for automatic multi-sample analysis.

Benzene and Toluene (Aromatics) in Finished Gasoline Analyzers

Analyzers for single or multiple methodologies meeting or exceeding specifications of ASTM D3606, D4420 and / or D5580. These rugged, packed column analyzers are designed to be simple laboratory workhorses

Dissolved Gases in Heavy Hydrocarbons Analyzer (ASTM D2427)

This Model determines the C2 through C5 paraffinic and mono-olefinic hydrocarbons in gasoline.

Simulated Distillation Systems and Software (ASTM D2887, D3710, D5307, D6352, and D7169 methods)

Simulated Distillation (Sim Dis) is a gas chromatographic method designed, through hardware and software technology, to simulate the actual physical distillation (ASTM D2892) of petroleum raw materials and products. The American Society for Testing and Materials (ASTM) has five approved methods for simulated distillation that address defined hydrocarbon ranges (D2887, D3710, D5307, D6352 and D7169). Sim Dis Software may also be used to determine a sulfur component distillation, with the use of a Sulfur Chemiluminescence Detector and Flame Ionization Detector.

And custom solutions from PerkinElmer Variations of PerkinElmer-Arnel standard products, as well as any ASTM, UOP, DIN, ISO, EN, IP GPA or standard public or private method, are available by evaluation and quotation.

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The Plate Reader/ TLC Scanner for the LS55 Fluorescence Spectrometer

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Introduction

The well plate reader/ TLC Scanner accessory is an invaluable accessory for the LS55 fluorescence spectrometer. It can be easily fitted (the whole process taking about a minute) and then the instrument is set up to measure plate based assays or spots on TLC (thin layer chromatography) plates in either fluorescence or time-resolved fluorescence/ phosphorescence mode.

The accessory uses a short quartz fiber optic to transfer the beam from the instrument to the plate and back through the emission side of the instrument. The optic is fixed and the plate moves on an X-Y stage under the optic. The short fiber used minimizes energy losses but, more importantly, it removes the need for any optical alignment compared to designs based on direct reading using mirrors. The design also makes measurement with any volume of liquid easy as there is

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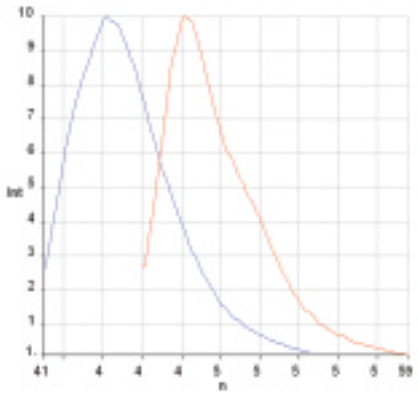
no need to perform any kind of optical re-optimisation for each volume of liquid used.. The use of quartz fiber optics permits UV-based fluorescent assays such as the analysis of native proteins. The design of the accessory coupled with the low stray light features of the instrument (such as the holographic excitation grating) produces high sensitivity approaching that found on dedicated plate readers. The accessory can also be used to measure TLC plates and some gel types.

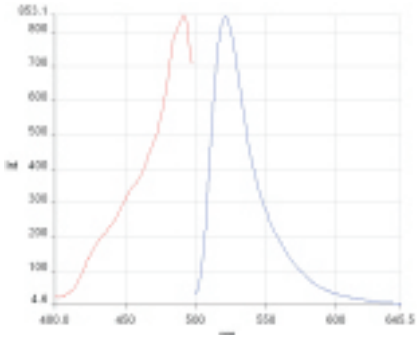
Control of the accessory is provided by FL WinLab ™ software that is shipped with the instrument. Data is collected and stored as an Excel® compatible file. The software allows either single- or multiprobe applications (such as reporter-quencher assays). Spectra can also be scanned in a well.

Multiprobe microsphere assay setup

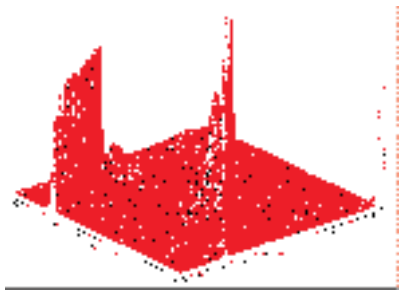
White plates will give the highest signal with this unit but black ones can also be used as an alternative. They will produce a lower signal (as there is less back-reflection from the well bottom)



Emission spectra of microspheres coated with two different labels measured in the plate reader accessory (normalized for clarity).



Excitation and emission spectra of 10-8 M solution of fluorescein in PBS in a 96 well plate



Assay Development using the 3d scanning feature of FL WinLab ™ to identify potential interferences within a well such as Rayleigh Tindall Scatter (straight ridges)

but this will also result in a lower background and so the best choice of plate will depend on the assay. Clear plates should not be used as the crosstalk levels between wells will be unacceptable.

Application Areas
The Well Plate Reader is ideal for the following application areas

- DNA quantitation using PicoGreen™ or similar labels.
- Fluorescent ELISAs (FELISA)
- Reporter-Quencher Assays
- Time-resolved assays (eg Eu, Tb etc.)
- Environmental assays using dye tracing
- Microsphere-based assays
- Protein assays - (either native or involving labels such as ANS)

Summary of Results
The plate reader attachment is a versatile accessory for the LS55 it is optimized for 96 well plates (users requiring higher throughput 384 and 1536 well plates should consider using one of our dedicated plate reader systems such as the VICTOR3 or EnVision as these offer other features suited for high throughput applications such as plate stackers).

The plate reader delivers sensitivity approaching that of a dedicated system. From the data shown here, it is possible to detect a 10-10 Molar solution of fluorescein in a 96 well plate (equivalent to 30 fmol/well). The coefficient of variation (CV) for well-to-well variability obtained using a test plate was determined to be 2.84%. This figure includes the plate manufacturer's own estimate of dispensing errors which is claimed to have a CV of 2% & so the true figure for the plate reader accessory, alone, will be significantly less than this we estimate it to be in the region of 1%.

(The detail experimental procedure is available from PerkinElmer Application support team)

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NEW

Purge & Trap Solutions

PerkinElmer signs an agreement to sell the Tekmar's Purge and Trap automated sample-concentration systems. These include: the Stratum PTC Sample Concentrator, the AQUATek 70 Vial Autosampler, the SOLATek 72 Multi-Matrix Vial Autosampler and the Atomx Automated VOC Sample Prep System.

This agreement enhances PerkinElmer's market-leading gas chromatography (GC) sample-handling capabilities, coupling Teledyne Tekmar's Purge and Trap technology to PerkinElmer's family of high-performance Clarus® GC or GC/MS systems, now offering from a single supplier a complete system that complies with established regulatory requirements. Furthermore, PerkinElmer's renowned service organization will provide complete system support.

For the Better tour begins in India at Pune India

On 29th April 2009 PerkinElmer launched new Thermal Analyzers in India in a glittering ceremonial function.

The 20th year of establishment of PerkinElmer's Pune office celebrated in presence of more than 100 customers.