MultiScan

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RAPID ANALYSIS OF LIQUIDS, POWDERS, GRANULES AND SLURRIES

MultiScan

3000X NIT Analyser

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MultiScan 3000X NIT Analyser

Series 3000 Food Analyser

The MultiScan Series 3000X NIT Analyser is a NIR analyser designed to measure protein, fat, water, sugar, alcohol and other compounds in foods. The key benefit of the Series 3000 Food Analyser is the sample draw that provides a means of analysing a wide range of materials, i.e., granules, powders, liquids, slurries, emulsions, films and solids.

The Sample Transport mechanism provides a means of collecting Near Infrared Transmission (NIT) spectra over a wide area and then averaging the spectra to give more accurate results.

Applications for the Series 3000X NIT Analyser include;

Olives
- Oil and Moisture in crushed olives
- Oil and Moisture in pumace

Raw and Processed Meat
- Fat, Moisture and Protein in Sausage and Salami Mix.
- Fat, Moisture, Protein and Chemical Lean in Raw Meat including Beef, Pork, Lamb, Chicken.

Dairy Products
- Fat, SNF, Protein and Lactose in Whole Milk, Cream and Skim.
- Fat, Protein and Moisture in Milk Powder
- Fat and Moisture in Cheese, Yogurt, Butter and Cream Cheese.

Baked Goods
- Fat and Moisture in Whole Cookies
- Fat, Moisture and Sugar in Dough

Fruit and Vegetables
- Water, Fat, Protein and Starch Content in Whole Fresh and Cooked Vegetables.
- Moisture in Dried Fruits and Vegetables.
- Fat and Moisture in Pre-Cooked Vegetables.

Confectionery and Chocolate
- Moisture and Protein in jubes, jellies and soft lollies.
- Fat and Moisture in chocolate
- Fat and Moisture in nougat, creams and fondants.

Others: Fat, Sugar, Protein and Moisture in
- Mayonnaise, Peanut Butter, Jams and Conserves, Honey, Sauces, Margarine, Spreads etc.

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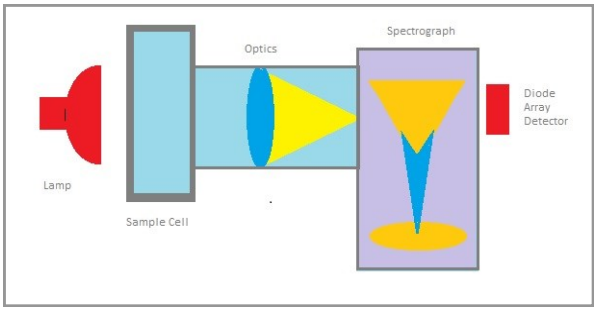
Near Infrared Spectroscopy … Multi Parameter Analyses

In the Near Infrared spectral region, 720 to 1100nm, chemical bonds such Carbon-Hydrogen, Oxygen-Hydrogen and Nitrogen-Hydrogen absorb light when it is passed through or reflected off a sample. The amount of light that is absorbed by these chemical bonds is proportional to the concentration of the chemical compounds containing C-H, O-H and N-H bonds. Compounds such as Protein (N-H), Fats and Oils (C-H), Sugars , Alcohols and Water (O-H) can be measured in slurries, emulsions, granules, liquids and powders. As such, NIR spectroscopy is an excellent analytical technique for measuring a broad range of foods and food ingredients.

The schematic below shows the optical configuration of the Series 3000X Analysers. Light from a tungsten halogen lamp passes through a sample cell containing liquids, slurries or solids. The light interacts with the C-H, O-H and N-H bonds in the sample where some of the light is absorbed.



The light that passes through the sample is focused onto the entrance slit of the spectrograph which uses a stationary diffraction grating to separate the light into the frequency domain. The diffracted light is directed onto a silicon photodiode array detector where the intensity of the light is measured at each frequency. The intensity is related to the concentration of the chemical component that absorbs at that frequency. A calibration model uses this data to compute the concentration of compounds in the sample.

The MultiScan Series 3000X Analyser makes the analysis of foods simple and rapid. The analyser can be used in a lab or on the production floor to provide instant results that can improve quality and reduce costs.

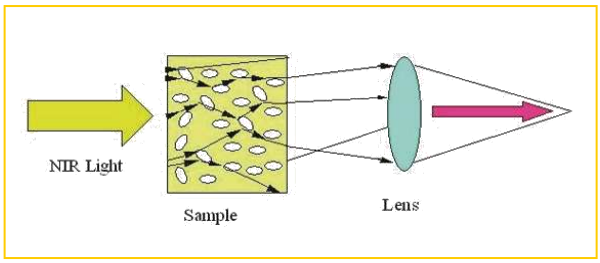
For materials that are clear, the light passes through the sample without deviation. This technique is classical Transmission spectroscopy. For materials that are granular, i.e., grains, pellets, crystals, or have a high solids to water content, i.e., slurries, pastes or emulsions, the light actually passes through the material by internal reflectance off the solid particles and through the liquid phase. This is referred to as Transflectance, i.e., a combination of reflectance and transmission. For samples with high water content, transflectance offers the advantage in that the NIT spectrum represents the whole of the sample not just the surface. In this spectral region, NIR light can pass through a sample up to 20mm thick. Typically cheese, meat and high moisture content foods are measured using a 10mm pathlength dish. Powders are measured using a 5mm pathlength dish where as liquids are measured using a 20mm pathlength dish.

Technical Specifications and Calibrations:

How the MultiScan S3000 Food Analyser works.

The MultiScan series of analysers consist of the following components; Lamp, Sample Compartment, Optics, Detector. Light from the lamp, passes through a sample of grains or oil seeds. The light bounces off the surfaces of the grains or oil seeds and propagates through the sample until it reaches the other side. The emerging light is focused into the slit of a flat field spectrograph that separates the light into its individual frequencies, across the wavelength range from 720-1100nm. The separated light is then directed onto a silicon photo diode array detector. This array detector measures the intensity of the light at each frequency to produce what is called the NIT spectrum of the sample.

Within this region of the electromagnetic spectrum, N-H (protein), C-H (fats and oils) and O-H (water) and C-O-H (carbohydrates) absorb NIR light at specific wavelengths. The NIT spectrum contains information about the concentration of these components. A calibration model, stored in the analyser's memory, converts this information to % concentration for each component.



Next Instruments has developed a range of calibrations for foods and food ingredients .
The following table shows the matrix of products vs constituents.

Product	Constituent
Olivesand Pumice	Oil and Moisture
Beef	Protein, Moisture, Fat, CL
Chicken	Protein, Moisture, Fat, CL
Pork	Protein, Moisture, Fat, CL
Lamb	Protein, Moisture, Fat, CL
Salami	Protein, Moisture, Fat
Sausage, Hot Dog	Protein, Moisture, Fat
Hard Cheese	Protein, Moisture, Fat
Soft Cheese	Protein, Moisture, Fat
Cream Cheese	Moisture, Fat
Yogurt	Moisture, Fat
Feta, Ricotta	Moisture, Fat
Milk Powder	Protein, Moisture, Fat, Lactose
Whey Powder	Protein, Moisture
Butter	Fat, Moisture
Ice Cream	Sugar, Moisture, Fat
Flour	Protein, Moisture
Starch	Protein, Moisture
Breakfast Cereal	Protein, Moisture
Mayonnaise	Fat, Moisture

Specification	MultiScan Series 3000X
Wavelength Range	720-1100nm
Optical Detector	Silicon Diode Array
Lamp	Halogen 12VDC, 10W
Scan Rate	2-4 sec per scan
Sample Cell Pathlengths:	5, 10, 15 mm
Display:	Touch Screen PC
Power:	12VDC using 110 –240VAC
Operating Temp Range:	5-45^{0}C, 41-113^{0}F,
Dimensions(cm) Weight(Kg)	40 W x 40 D x 33 H 12Kg

Manufactured by:
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