

QUALITY CONTROL IN AN **Oilseed Processing Plant**

Introduction to the Market



Process Control in an Oilseed Processing Plant

The oilseed processing industry is a diverse group of operators that process a wide variety of oil containing seeds into oil and by-products. These industries have several characteristics that make tight process control a requirement for profitable feed production.

The first requirement is that the plant must operate efficiently to extract the oil. The oilseeds are commodities and profit margins can be very low for processors, putting pressure on the plant to maximize yield with minimal resources.

A second aspect of oilseed processing that benefits from tight process control is the production of by-products. These are usually high protein feed ingredients and are often sold based on a compositional guarantee. Reliable analytical data and process control inputs will allow plant operators to hit protein targets maximizing return from the input feedstock and minimizing claims.

Process Control Analysis Points in an oil processing plant

Oilseed processing varies according to the oilseed and plant involved, but the process generally involves a cleaning or de-hulling step, a flaking step to open the seeds, one or more extraction steps involving pressure, heat or solvents, and final processing steps for the oil and meals. There are multiple points in an oil crushing plant where accurate and timely analytical values can help control the process, saving money and improving yield, including:

- Incoming seed testing to verify supplier integrity and produce claim evidence if out of specification
- Monitoring flake for oil content
- Monitoring in-process meal for residual oil
- Monitoring final meal after dryer for protein, oil and moisture
- Monitoring other by-products such as soy hulls for nutritional content
- Monitoring extracted oil quality for FFA and iodine value

QUALITY CONTROL IN AN Oilseed Processing Plant



NIR analysis is a proven technique that provides simultaneous results for moisture, protein, fat, fiber, ash, and other parameters in under a minute. The speed of analysis allows 100% measurement of incoming oilseeds, in-process meals and final products. Raw ingredients suppliers can be verified to ensure they are providing quality materials, and to flag out of specification loads for claims. The use of NIR ensures consistent quality in meals and can maximize return from the feedstock.

For all dairy products, virtually every step and ingredient must be of a specified quality and composition to produce a consistent end product. Strict control of the incoming materials maximizes the production from expensive ingredients.

Value Proposition



There are many areas in a oilseed processing plant where rapid analytical results can lead to increased efficiency and large cost savings, and some examples are below.

Optimizing Oil Extraction Process

Oilseeds can vary widely in composition based on growing conditions, seasonal variations and genetic background. The oil content in soymeal can vary up to 10% within one field alone. Protein, fiber and other parameters show similar variation. Knowing the composition of the incoming feedstock or flakes allows plant operators to control the process and maximize the extraction efficiency.

Additionally, extracted cake or meal can be analyzed for residual oil to monitor and control the extraction process. In a medium sized soymeal processing plant, a 0.3% increase in oil extraction can pay for an NIR instrument in a couple of months.

Meal Analysis

Oilseed meal is sold as a protein rich feed ingredient often sold on a guaranteed protein basis. Monitoring the composition of the meal produced allows the plant operator adjust operation to meet specification, avoid giving away higher value high protein product, and reduce claims.

Laboratory quality control costs

All oilseed processing plants must analyze at least a minimum number of samples to monitor the process and shipped products. At a cost of \$25 / sample for basic nutritional analysis, the plant will spend over \$35,000 / year analyzing 5 samples per day for quality data within 8 – 24 hours. At-line NIR analysis can analyze hundreds of in-process and finished product samples per day and deliver the results in less than a minute, when the plant operator has the opportunity to act on the results and realize increased value



Unity Solutions to this Industry



Oilseed Processing Plant Solutions

Unity Scientific offers a variety of ready-to-use solutions tailored to the oilseed industry, including models ready to analyze liquids, powders and slurries. All of our oilseed analyzer packages start with the SpectraStar XL analyzer, an advanced, high performance at-line scanning monochromator. All SpectraStar XL models come standard with the following features:

- TRUE NIR™ Spectrometer for ultra-performance
- Advanced TRUE NIR detector and electronics for low noise and high repeatability
- 17" high resolution touch screen for intuitive, easy operation
- Fast Windows®7 computer with Solid State Drive for reliability and speed
- Sealed case for reliable operation at-line
- 5 W 10,000 hr lamp
- Unity Check Cell for daily performance validation



Unity Oilseed Analyzers are based on the SpectraStar Analyzer, featuring a sealed analyzer case and touch screen operation ready for at-line process control in oilseed processing plants.

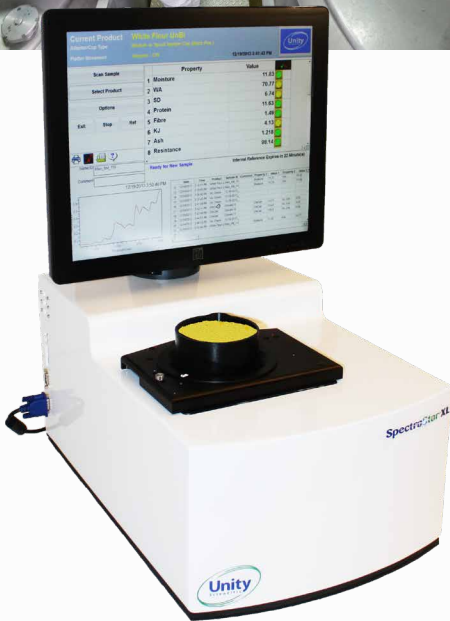
Oilseed packages are configured with several calibration options that provide ready-to-use operation and guaranteed performance.

The **US-2600FED1 Oilseed Analyzer Package** includes INGOT calibrations from Aunir for finished feeds and over 70 ingredients. The Oilseed Analyzer includes:

- SpectraStar 2600XL(Rotating) Spectrometer (1100 – 2600 nm)
- Large sample cups with plunger US-LGOP-0001
- Ingot calibrations for finished feeds including poultry, swine/pig, ruminants, horse, fresh/salt water fish
- Ingot calibrations for feed ingredients including cereals, oil seeds, nuts, vegetable and fruit pulps, legumes, roughage and animal meals
- 1 year calibration support and guarantee from Aunir

The **US-2600-FED2 Oilseed Analyzer XLR** includes the extended range XLR spectrometer for maximum versatility. The Oilseed Analyzer XLR includes:

- SpectraStar 2600XLR(Rotating) Spectrometer (680 – 2600 nm)
- Large sample cups with plunger US-LGOP-0001
- Ingot calibrations for finished feeds including poultry, swine/pig, ruminants, horse, fresh/salt water fish
- Ingot calibrations for feed ingredients including cereals, oil seeds, nuts, vegetable and fruit pulps, legumes, roughage and animal meals
- 1 year calibration support and guarantee from Aunir



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