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APPLICATION BRIEF

Quality 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 A COOKING 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

SpectraStar™ XT Series NIR Analyzers, shown above, offer outstanding accuracy and reliability for rapid compositional analysis of solid, slurry, or liquid samples.

WHAT IS NIR ANALYSIS?

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 PROPOSITIONS FOR NIR IN OILSEED PROCESSING PLANTS

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.

Labor 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.

ABOUT THE SPECTRASTAR™ XT SERIES NIR ANALYZER

From analyzing moisture, protein, fat, sugar, and fibers, to more complex parameters such as ash, fatty acids, and lignin, the SpectraStar™ XT NIR Analyzer Series is trusted by thousands of quality laboratories and production facilities to enhance their processes and make data-driven decisions.

- Obtain vital quality parameter data in about 30 seconds, enabling quick response for quality control.
- Access an extensive library of robust calibrations developed from hundreds-to-thousands of samples. Calibration customization is also available.
- Minimal sample preparation, only minimal training required, and environmentally friendly.
- Available with KPMLink™, a cloud-based software suite to support the real-time remote configuration of product settings, calibrations, and more.

Ready-to-Use SpectraStar XT-R Calibrations for Olives & Oilseeds			
SUBSTANCE	**CONSTITUENTS**	**SAMPLING ACCESSORIES**	**PART NUMBER**
Olive Oil	FFA, PV, K232, K270, DK, Polyphenol, Bitterness, Moisture, IND, Acidity, Stearic, Palmitoleic, Heptadecenoic, Heptadecanoic, Oleic, Palmitic, Linolenic, Linoleic, Arachidic, Eicosenoic, TotalSterols	US-SRCP-0025A Small Round Cup 25mm (and 0.3mm reflector)	APPS-CALB-002
Olive Oil	Acidity, PV, K270, K232, DK, ST, PA, HE, HA, OL, PA, LN, LI, AR,TS	US-LIQK-0003 Liquid Sampling Kit	US-CALB-140
Olive Pommace	Moisture, Oil	US-LGOP-0001 Large Open Cup with plunger	US-CALB-142
Olives	Fat, Moisture	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-003
Olives - Crushed	Moisture, Oil	US-LGOP-0001 Large Open Cup with plunger	US-CALB-141
Caraway Seeds	Essential Oils Total, Limonene, Carvone	US-ISIH-0307 Ring cup	APPS-CALB-159
Canola Cake	Moisture, Fat, Protein, Fiber	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-030
Canola Flakes	Oil	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-009
Canola Meal	Moisture, Protein, Oil, Fiber	US-LGOP-0001 Large Open Cup with plunger	US-CALB-177
Cotton Seed Oil	FFA	US-SRCP-0025A Small Round Cup 25mm (and 0.3mm reflector)	APPS-CALB-018
Oilseed Meal Mix	Moisture, Protein, Oil, Fiber	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-180
Rape Seed (Canola)	Moisture, Protein, Oil, Chlorophyll, Gluco, Oleic, Lenoleic, Erucic, SATS, IV, FFA	US-LGOP-0001 Large Open Cup with plunger	US-CALB-178
Sunflower Cake	Moisture, Protein, Fat	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-124
Sunflower Meal	Protein, Fiber, Fat, Moisture	US-LGOP-0001 Large Open Cup with plunger	APPS-CALB-123

CONTACT US TODAY

sales@kpmanalytics.com | +1 774.399.0500

KPM Analytics
8 Technology Drive | Westborough, MA 01581 USA
Phone: +1 774.399.0500
www.kpmanalytics.com | sales@kpmanalytics.com