Application Notes AN N302

Quality Control of Rendering Products with FT-NIR Spectroscopy

More than a third of each animal produced for the production of meat, milk or eggs does not end up on the consumer's plate. These materials are subjected to rendering processes resulting in many valuable products like meat and bone meal, meat meal, poultry by-product meal, feather and blood meal, fish meal, or animal fats.

Animal Proteins

Animal proteins are higher in protein than soybean meal or any other plant material and therefore a desired ingredient for feed formulation in animal nutrition. Moreover, bone meals are a rich source of minerals.
To detemine the exact protein content, but also addidtional proximates like the moisture and ash content is important to estimate the value of the product.

Animal Fats

Rendered animal fats are a valuable source of energy for animal feed. However, the industry has strict quality regulations. Often, a specification for minimum and/or maximum Iodine Value (IV) is required by the purchaser to ensure product uniformity.
Another measure of fat quality is the FFA content. The presence of high levels of FFA indicates the fat was exposed to water, acids or enzymes.

Moreover, checking the Peroxide Value is critical to monitor the rancidity of the fat. Analyzing these and other parameters helps to maximize the profit selling the rendering products.

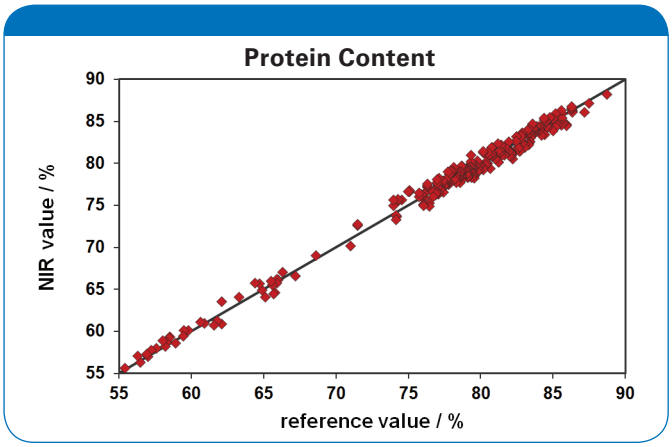
FT-NIR Analysis along the Production Chain

Bruker offers solutions for the analysis of raw materials, ingredients and finished products in the laboratory, at-line or on-line. With the FT-NIR spectroscopy standard parameters like moisture, protein, ash, fat and fibre can be measured in seconds without sample preparation in different sample forms like solids, pastes or liquids such as tallows and oils. A set of pre-calibrations for various industries is available for a quick and efficient start.

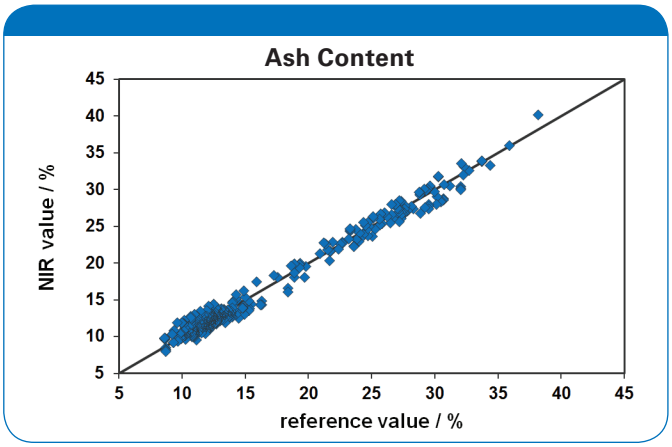
Parameters commonly analyzed with FT-NIR

Animal Proteins
- Fat
- Moisture
- Protein
- Fiber
- Ash

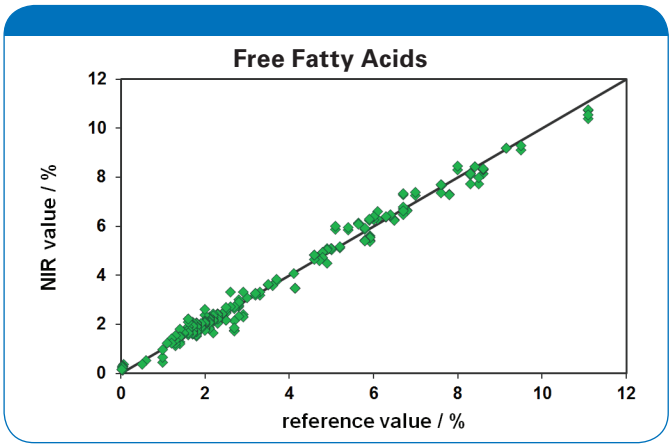
Animal Fats
- Free Fatty Acids (FFA)
- Iodine Value (IV)
- Peroxide Value
- Moisture
- Color
- Fatty Acid Profile



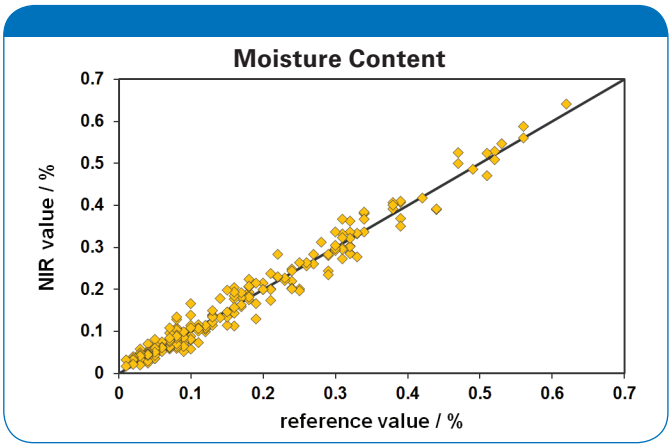
Validation results of Protein in Feather Meal with a standard error of 0.69% over a range from 52.2% to 90.7%.



Validation results of Ash in Meat Bone Meal with a standard error of 0.89% over a range from 8.4% to 39.6%.



Validation results of FFA in Animal Fat with a standard error of 0.29% over a range from 0.01% - 12.9%.



Validation results of Moisture in Animal Fat with a standard error of 0.023% over a range from 0 to 0.8%.

FT-NIR Spectrometers: Bruker Optics offers various FT-NIR spectrometer models for lab, at-line and on-line applications:

TANGO

FT-NIR analyzer for routine use in the lab.

MPA II

Multi Purpose Analyzer for maximum flexibility.

MATRIX-I

At-line analysis with optional NEMA4/IP66 protection.

MATRIX-F

Process monitoring with probes and measurement heads.

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