



## SOYBEAN OLEIC FATTY ACID CALIBRATION

**T**raditional soybeans contain about 23% oleic fatty acid, a monosaturated fatty acid whereas Plenish® or Visitive Gold® high oleic soybeans contain 75% to 80% oleic acid. This higher proportion of mono-unsaturated oil provides human nutritional health benefits and has been shown to provide nutrition benefits when feeding dairy cattle. These benefits provide opportunities for grower premiums.

A challenge arises in that there must be an easy means of verification of the Plenish bean genetics when they are accepted for sale or storage. CVAS has developed an NIR calibration to be used on the NeoSpectra™ portable NIR. This provides a rapid and cost-effective solution for identification of Plenish genetics in the field.

### Calibration Development

This calibration is based on samples provided by clients of Plenish and traditional soybeans from the South-Central PA region during May of 2023. All data is by chemistry methods:

#### Included Analytes

- **Dry Matter:** 2 hours, 135°C AOAC 930.15
- **Crude Protein:** Nitrogen combustion analysis, Leco 928,AOAC 990.03
- **Fat:** Ankom, AOAC Am 5-04
- **Fatty Acid Analysis:** Gas chromatography. J.Agric. Food Chem. 1988, 36, 1202-1206

### Calibration Analytes, Statistics and Calculated Values

Parameter	N	Mean	SD	Min	Max	SEC	R2	SECV	RPD
DM	1688	90.8	3.14	86.1	96.1	0.59	0.96	0.61	5.19
CP	1693	38.8	2.09	34.6	44.7	0.94	0.77	1.00	2.09
FAT	1684	21.8	1.58	17.5	24.0	0.72	0.77	0.76	2.08
OLEIC_FA	1695	11.7	6.30	3.67	20.7	2.13	0.88	2.20	2.86
LINOLEIC_FA	1689	5.79	5.36	0.63	14.8	1.59	0.91	1.61	3.33
TFA	1689	21.9	2.01	18.0	26.3	0.94	0.77	0.97	2.06

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## Calibration Development (continued)

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### Reported Calculations

- **Oleic acid % of Total Fatty Acids**
  - Standard soybeans 17.9% +/- 1.12 Oleic % of fat (calibration samples)
  - Plenish soybeans 79.3% +/- 3.24 Oleic % of fat (calibration samples)
  
- **Linoleic acid % of Total Fatty Acids**
  - Standard soybeans 56.9% +/- 1.16 Linoleic % of fat (calibration samples)
  - Plenish soybeans 4.96% +/- 3.15 Linoleic % of fat (calibration samples)

### Sample Type and Presentation

This calibration is based on raw soybeans. Soybeans should be coarsely ground in a coffee grinder or similar blade type grinder before presenting to the NeoSpectra NIR. Grind the soybeans so that >80% of the ground material passes through a #8 Sieve (2.36mm). This will provide the best instrument response.

Heat treated soybeans will be added to the calibration in the future. The current calibration may be adequate for use with heat treated soybeans, but this has not been verified.

### Planned Updates

This calibration was focused on a set of soybeans from a local region. Oleic and linoleic predictions should be good for universal use. All constituents will benefit from the addition of additional samples. Outlier samples will be accepted on a case-by-case basis for chemistry analysis and addition to the calibration.

Anticipated update release: October 15, 2023

Fatty acids will be part of a general soybean and heat-treated soybean calibration to be released this fall. Those leasing the Soybean Fatty Acid calibration may upgrade for the cost difference.

### Cost

#### Calibration Leasing Charge

Calibration lease charge for Soybean Oleic Fatty Acid equation use on NeoSpectra™ NIR is \$750 / year.

#### NeoSpectra™ Purchase and Leasing Costs

- CVAS will function as the distributor of this equation and NeoSpectra™ equipment during the introduction of this use concept. This will allow CVAS AgSpectra to oversee client engagement, training, and quality control.
- Equipment purchase cost for portable unit and sample rotator \$7925  
*Lease options available*
- Yearly NeoSpectra™ end-user license \$2000 / year

