6-second NIR Analysis of Fatty Acid Profile in Intact Canola Rapeseed, Soybeans and Sunflower Seeds

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Perten Instruments AB

Perten INSTRUMENTS

Introduction

- Increased interest in fatty acid profile, but previous instruments were slow and complex
- Diode array-based NIR instruments combine accuracy, speed and ease of use
- Three studies on unground oilseeds:
  - Canola Rapeseed
  - Soybean
  - Sunflower seed
- Fatty acid as % of total oil

Perten INSTRUMENTS

Grain
Flour
Food
Feed

Diode Array NIR instrument

DA 7200 from Perten Instruments

- 256 pixel InGaAs array
- 950-1650 nm
- Hg lamp for wavelength check
- 6 s analysis time
- No grinding of samples
- Sample size from a few seeds to 400 ml

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INSTRUMENTS

Grain
Flour
Food
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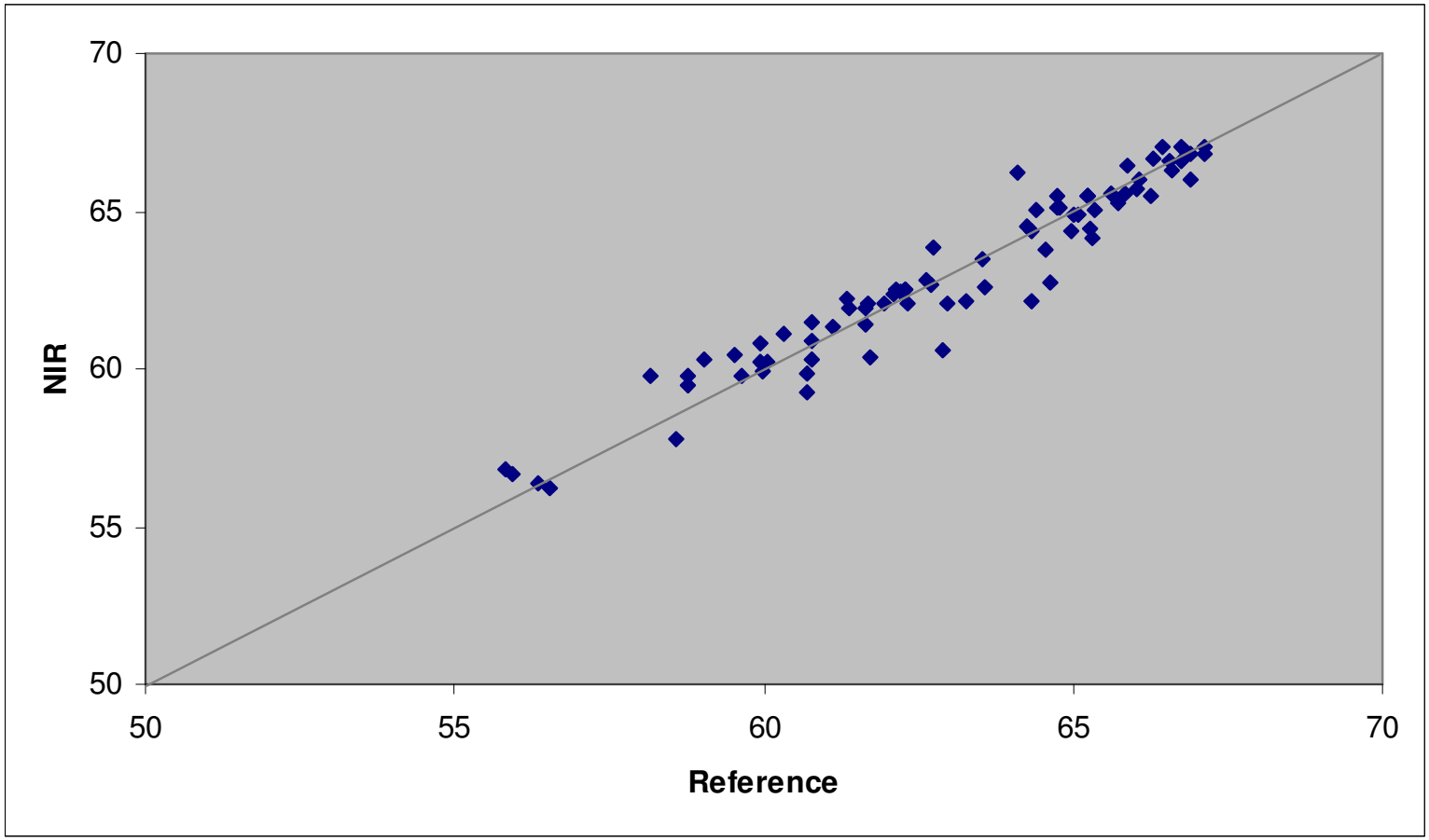
Canola Rapeseed

- ~300 samples
- Samples from the USA (Oklahoma State University and North Dakota State University
- Multiplicative Scatter Correction
- Savisky-Golay 1st derivative, 5 points

Perten INSTRUMENTS

Grain
Flour
Food
Feed

Canola Rapeseed – Oleic acid



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Grain
Flour
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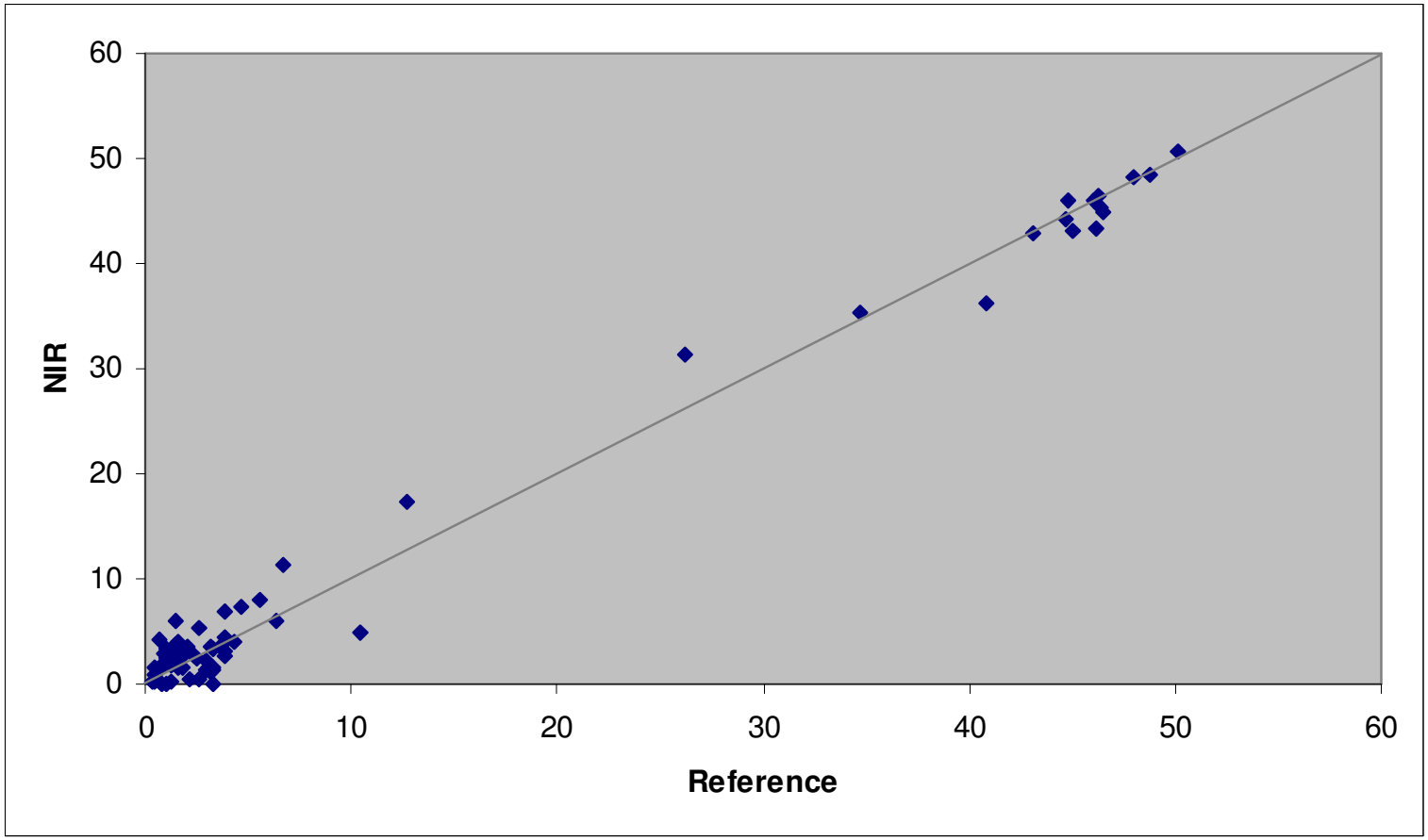
Canola Rapeseed – Erucic acid



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Grain
Flour
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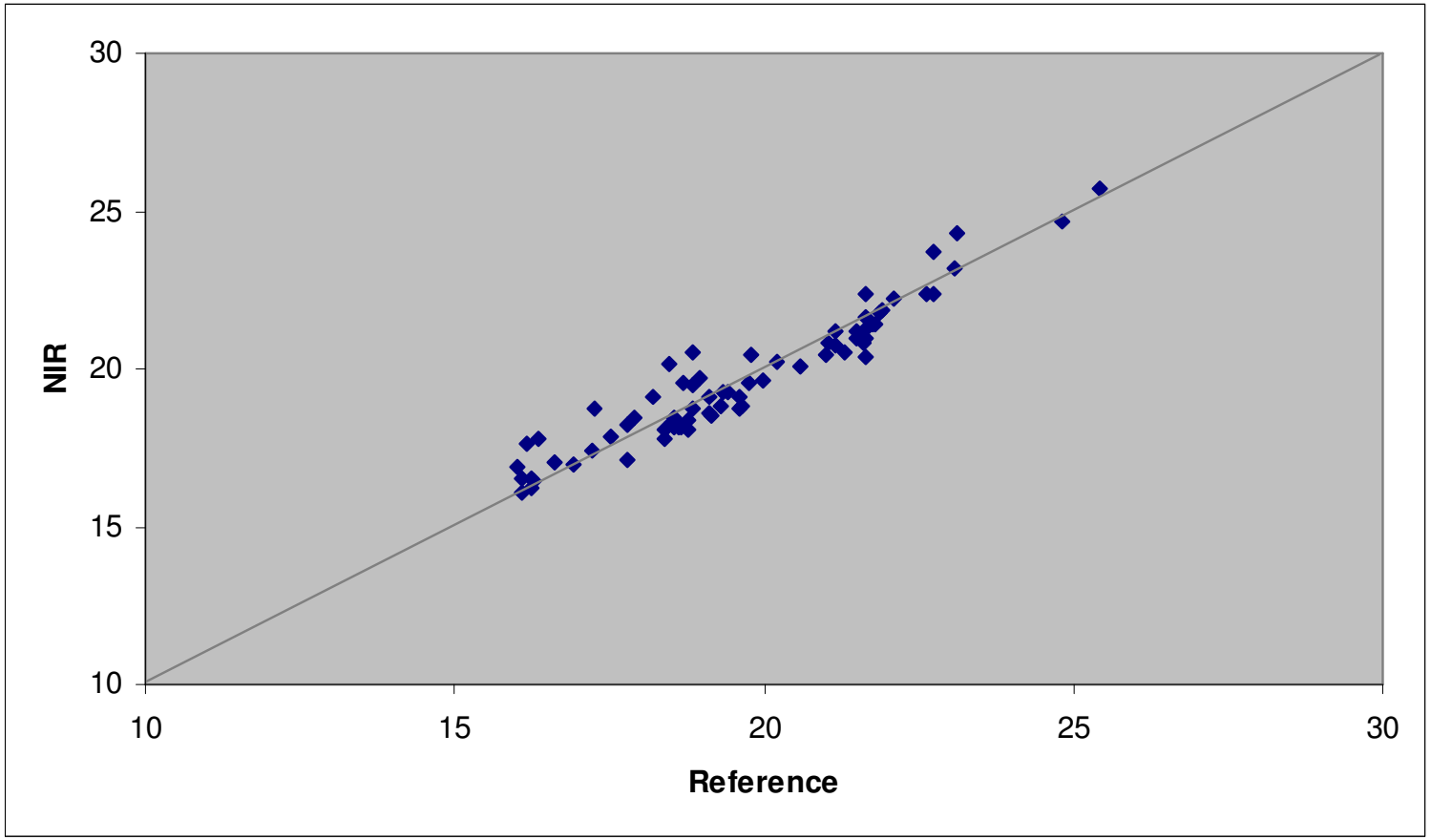
Canola Rapeseed – Linoleic acid



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INSTRUMENTS

Grain
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Food
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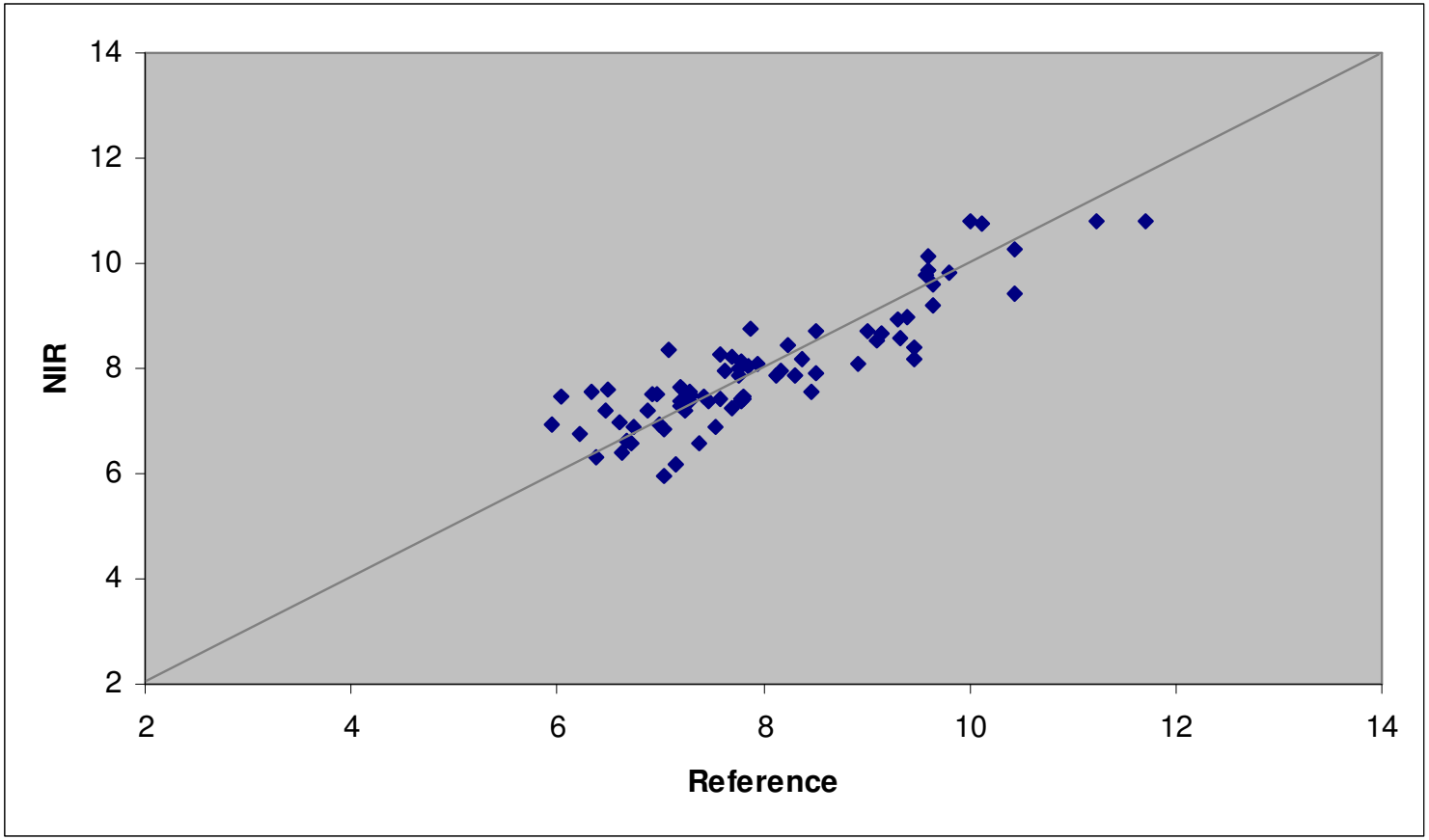
Canola Rapeseed – Linolenic acid



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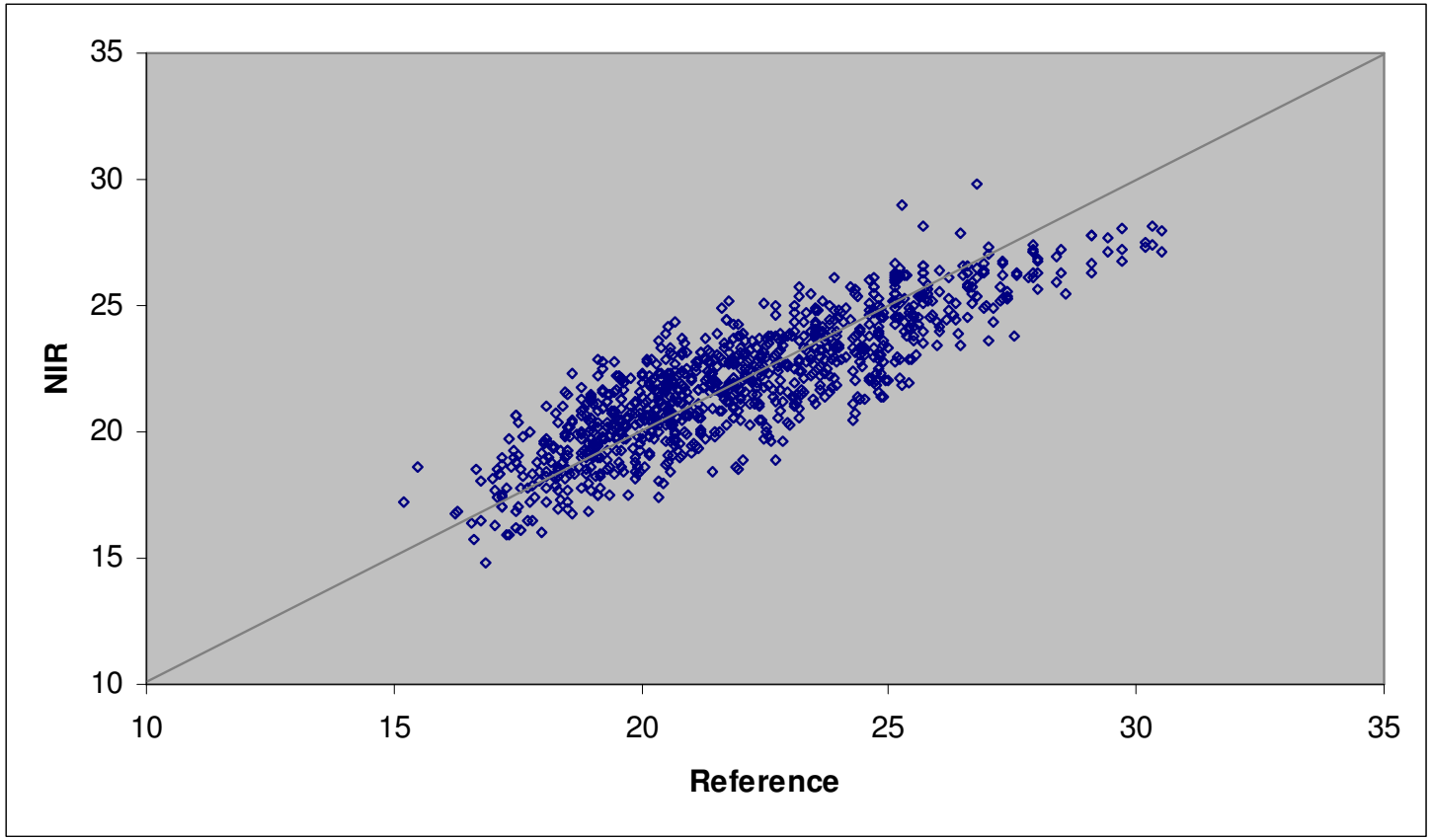
Soybeans

- About 1000 samples
- Samples and reference chemistry by University of Minnesota
- SNV detrending
- Savitsky-Golay 1st derivative, 5 points

Perten INSTRUMENTS

Grain
Flour
Food
Feed

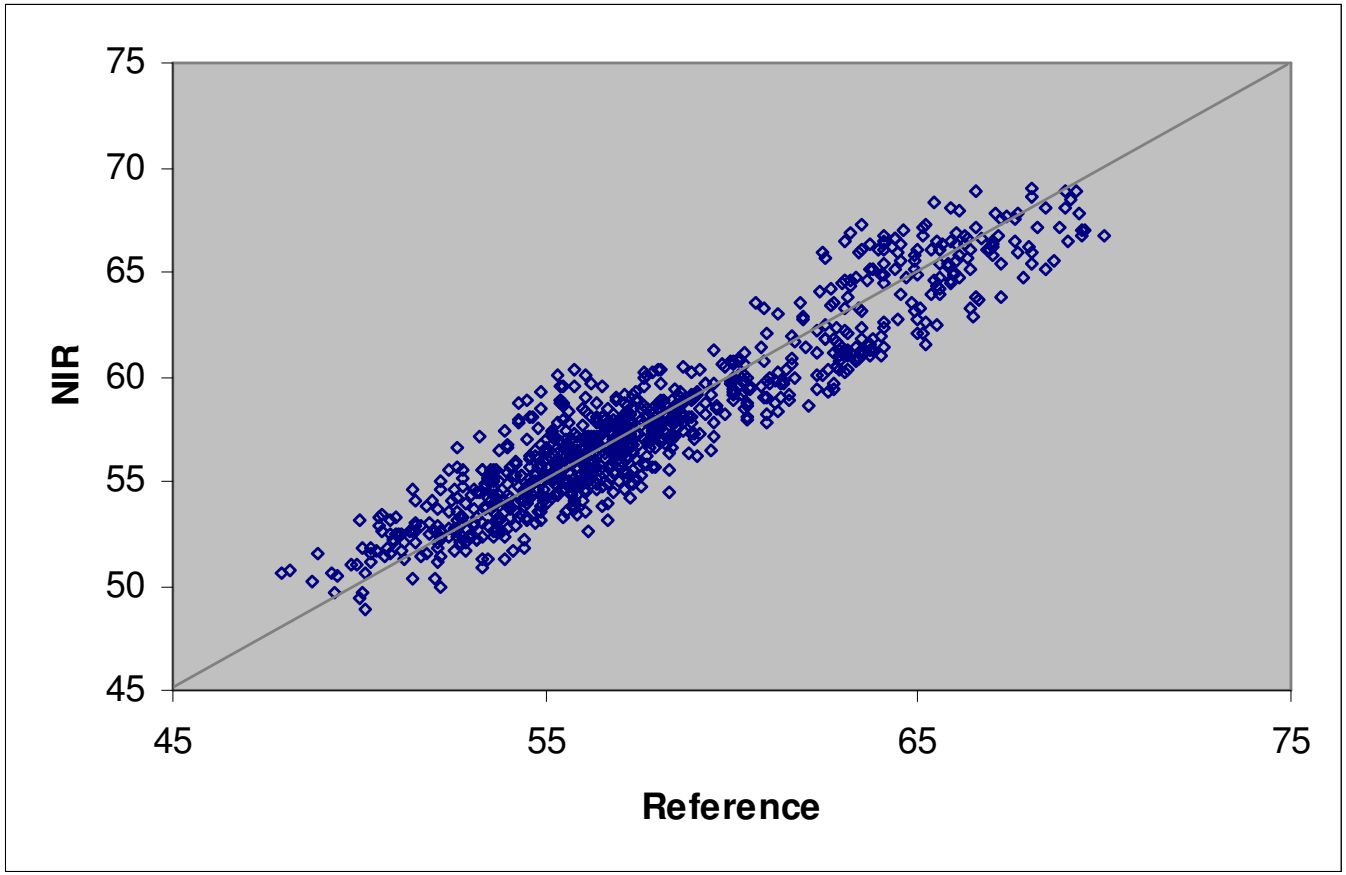
Soybean – Oleic acid



Perten INSTRUMENTS

Grain
Flour
Food
Feed

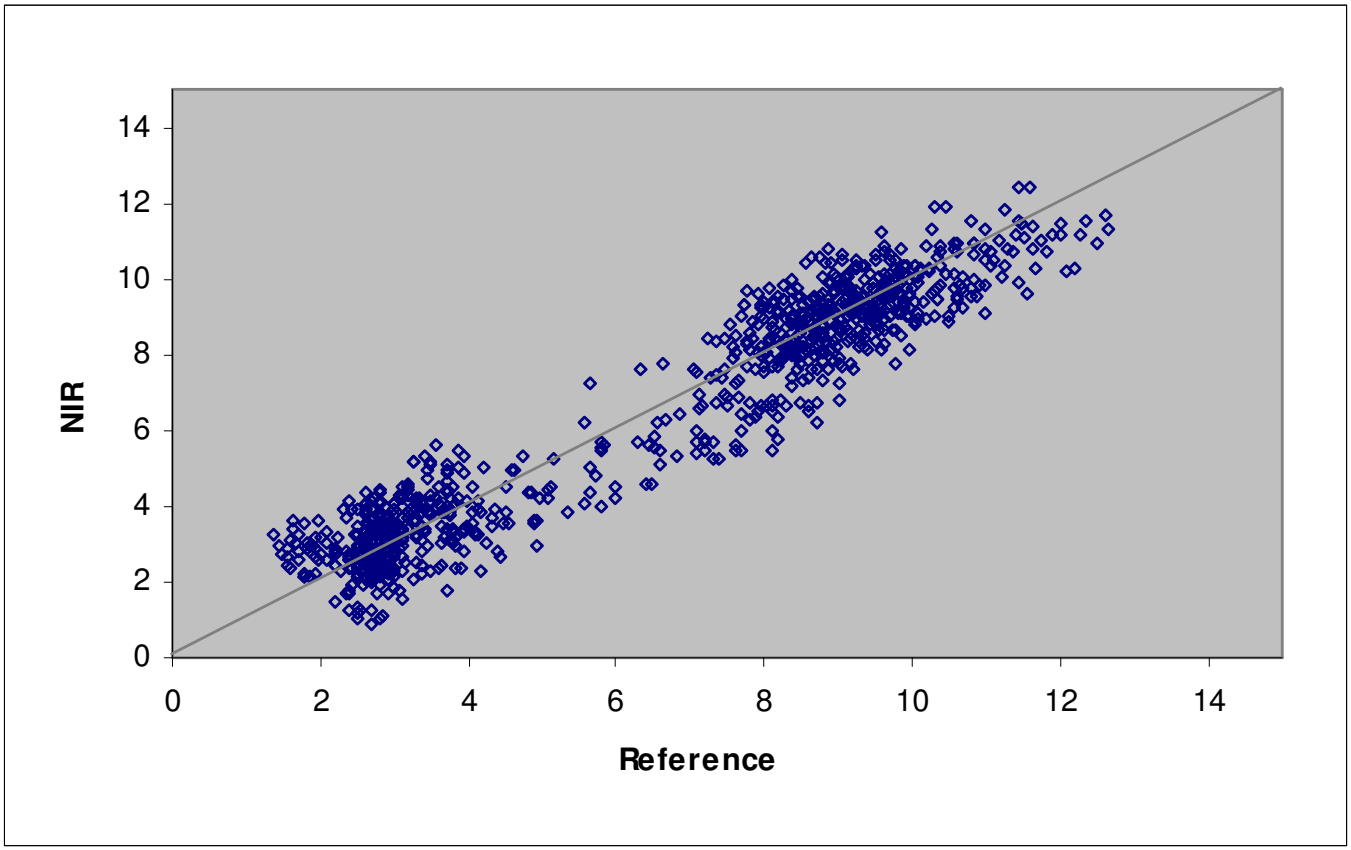
Soybeans – Linoleic acid



Perten INSTRUMENTS

Grain
Flour
Food
Feed

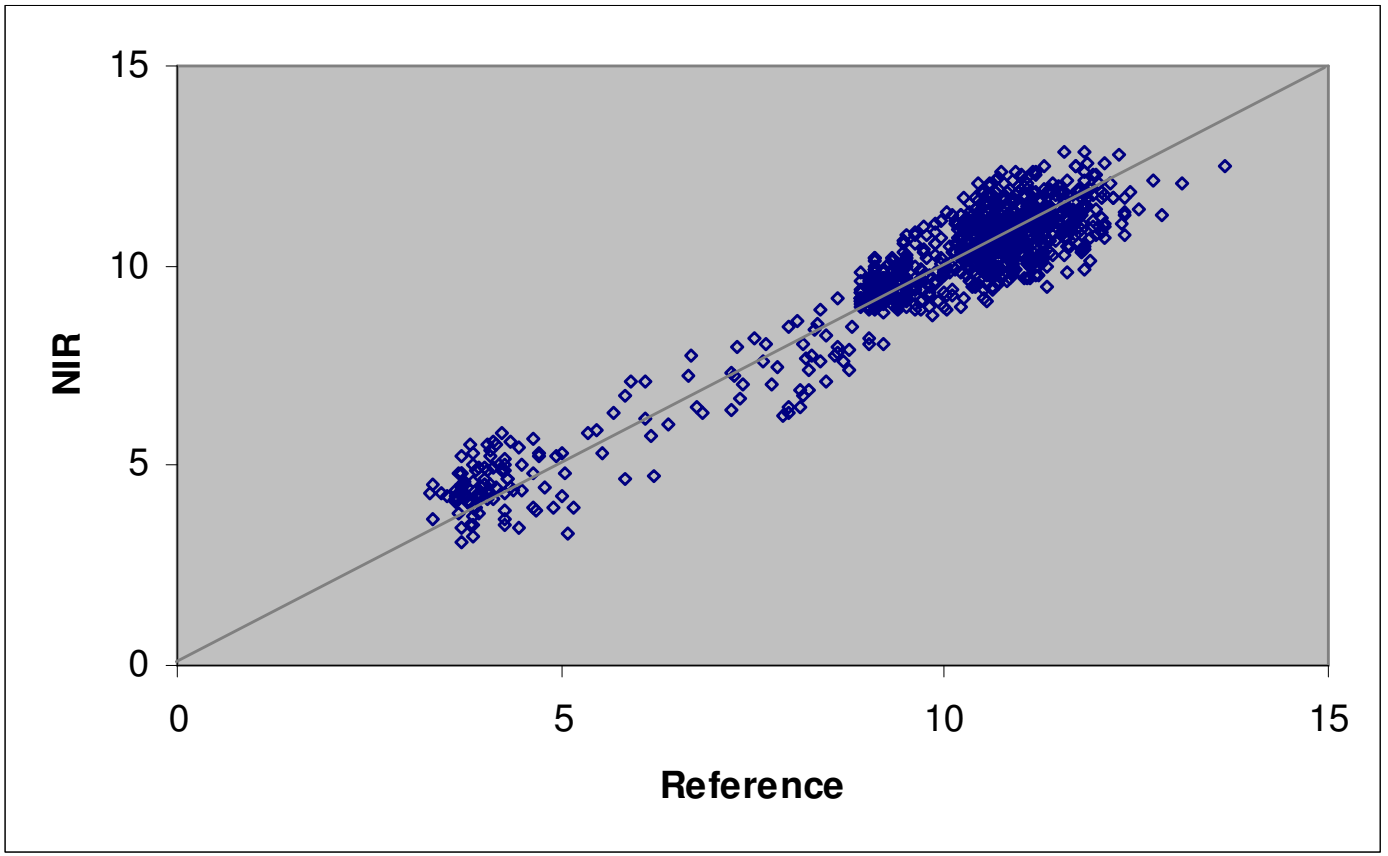
Soybean - Linolenic



Perten INSTRUMENTS

Grain
Flour
Food
Feed

Soybean – Palmitic acid



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INSTRUMENTS

Grain
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Sunflower seeds

- ~200 samples from France and Czech Republic for oleic acid
- ~50 samples from Czech Rep. for linoleic acid
- SNV
- Savitsky-Golay 2nd derivative, 5 points

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Grain
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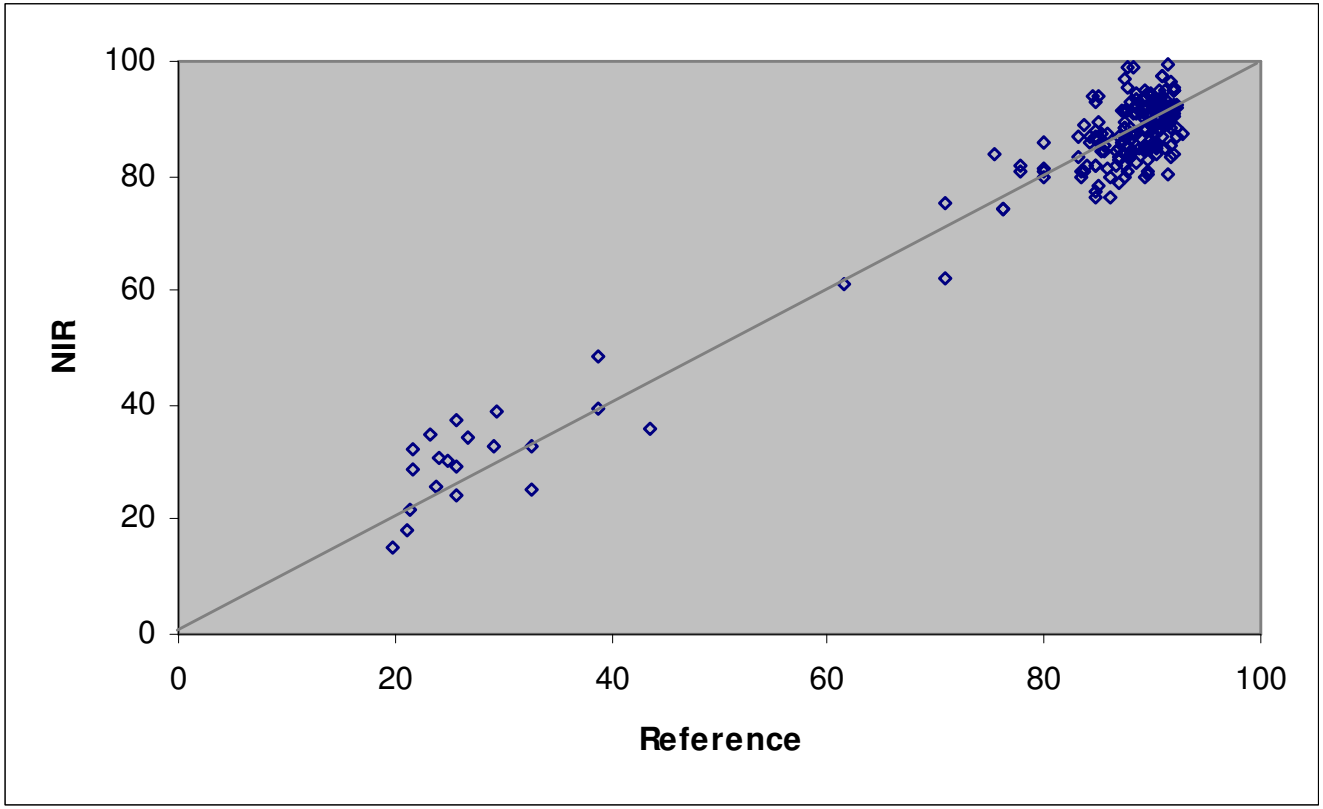
Food
Feed

Sunflower seed – Oleic acid



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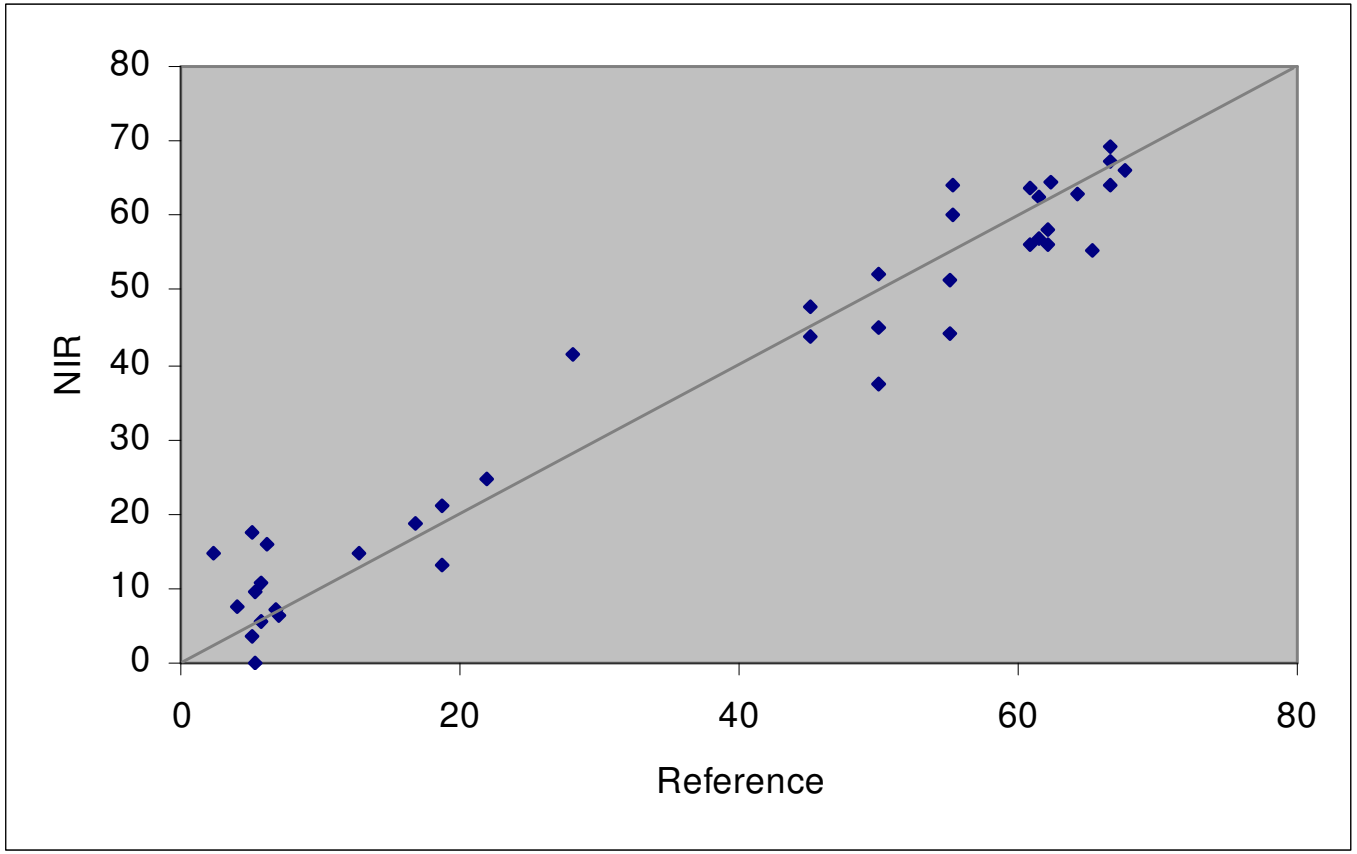
Sunflower seed – Linoleic acid



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Conclusions

- Fatty acids can be determined with high accuracy
- No grinding is necessary
- Speed, robustness and ease of use make the DA 7200 suitable for both breeders and processors

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