



  
**WINTERSTEIGER**  
Thinking about tomorrow.



# Division SEEDMECH

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Harvesting, Sowing & Laboratory technology | Data management



# Turnkey solutions for plant breeding & research.

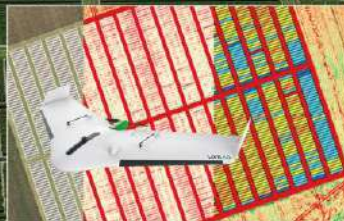
WINTERSTEIGER is the worldwide No. 1 in field research equipment and has established itself at the top of a niche market which covers the entire cycle of field research from the sowing to the harvesting.





The WINTERSTEIGER „one-stop-shop“ concept provides customers with everything they need from a single source.

As application specialists, WINTERSTEIGER's process expertise and proactive services along the entire value chain delights our customers.



## Product portfolio:

- Plot and seed increase combines
- Stationary threshers
- Plot forage harvesters
- Plot seeders
- Software solutions for data management
- Note taking, fertilization and crop protection equipment
- Laboratory equipment



# Full range for data management, note taking, fertilization and plant protection.

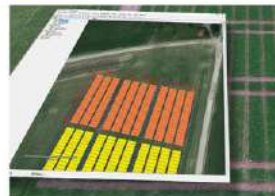
## Easy Breed

The flexible software solution for the entire breeding process.



## WINTERSTEIGER MiniGIS 2

Exact plot planning for precise and efficient implementation.



## Geo Link

Flexible GPS connection for maximum precision with your seeder.



## Easy Plant / Easy Harvest

Software for creation of a field plan and to carry out the planting and harvesting.



## Delair Note Taking

Delair UX11 AG long-distance drone and alteia platform.



## Weighing systems

To measure weight, moisture, and hectoliter weight.



# Full range for data management, note taking, fertilization and plant protection.

## NIR-Analysis

Infrared spectroscopy system solution for crop analysis.



## Hege 30

Tractor mounted plot sprayer for applying liquid preparations such as pesticides and liquid fertilizer.



## Plot Spreader

Belted cone fertilizer distributor for high-precision fertilizer trials with eMotion control unit.





# Full range for plot harvest.

## Plot combine

### Quantum Pro

Plot combine in the upper performance segment to meet the increasingly demanding challenges of state-of-the-art field research.



### Quantum Plus

Plot combine in the mid-range performance segment to meet the increasingly demanding challenges of state-of-the-art field research, from nursery to yield trial plots.



### Quantum Core

Entry model in the mid-range performance segment for state-of-the-art field research, from nursery to yield trial plots.



### Split NH

Powerful harvest of two plots in one operation.



### Classic Plus

Plot combine for mix-free harvest of nursery trials to small seed multiplication.



### Classic ST

Stationary thresher for all machine threshable crops.



## Stationary thresher



# Full range for precision planting.

## Precision spaced planters

### Dynamic Disc Plus

Powerful, tractor-mounted multi-crop precision spaced planter.



### Dynamic Disc Plus 8R

Eight-row pull-type precision spaced planter for maximum effectiveness.



### Dynamic Disc Plus 18R

Eighteen-row precision spaced planter for simultaneously planting three 6-row plots.







# Full range for precision planting.

## Plot drills

### Plot Motion

Plot drills with electric sowing drive.



### Plot Motion S

Lightweight model based on the frame system of the Plotseed S and sowing system of the Plot Motion, with total weight from 650 kg.



### Row Motion

Single row seeder with electric sowing drive.



### Plot / Row Motion

Combined plot drills and single row seeder with electric sowing drive.



### Plotseed S

Light, tractor mounted plot seeder.



### Rowseed S

Light, tractor mounted single row seeder.



# Full range for precision planting.

## Hand-pushed plot drills

### Rowseed 1 R

Hand-pushed single row seeder.



## Self-propelled unit

### Tool Carrier

Self-propelled unit for all WINTERSTEIGER seeders for planting, fertilizing, crop protection, and tilling.





# Full range for laboratory equipment.

## LD 350

Stationary thresher for all threshable crops.



## LD 180

Stationary thresher primarily for grain and small-grained crops.



## Hege 16

Laboratory thresher for cereals, rice, peas and small-grained seed.



## LS 230

Laboratory corn sheller for the gentle, complete shelling of corn.



## Hege 11

Liquid seed dresser for small quantities of seed (20 - 3000 g).



## Hege 14

Liquid seed dresser for larger quantities of seed (up to 15 kg).





# Full range for laboratory equipment.

## Hege 12

Liquid seed dresser for seed in magazines.



## Hege 44

Laboratory chopper for forage research plots, e.g. of all types of clover and grass, alfalfa and other forage plants.



## Hege 6

Sample divider for filling seed into bags or bowls.



## Hege 7

Sample divider for filling seed into magazines.



## MLN

Sample cleaner for all types of seed.



## SLN

Sample cleaner and sample sorter for all seed types.





# Full range for laboratory equipment.

## Seed Count R-60+

Seed counter designed for seed research with highest speed, precision and flexibility.



## Seed Count R-25+

Seed counter designed for seed research with highest speed, precision and flexibility.



## Seed Count S-60+

Seed counter with highest speed and precision for automatic calculation of the thousand grain weight.



## Seed Count S-25+

Seed counter with highest speed and precision for automatic calculation of the thousand grain weight.



## Seed Count & Fill S-60+

Seed counting and filling automate with highest speed and precision.



## Seed Count S-JR

Ultra-precise seed counter for small-grained crops up to 4 mm.



# Highest Quality.



Quality  
"MADE IN AUSTRIA"



In-house engineering  
department



In-house manufacturing  
facility



Test center for  
proven quality



# Custom solutions.

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- In-house developer team
- Workshop for special solutions in Ried
- Small batch production in the UK (TRIALS Equipment)

NIR su Quantum  
mietitrebbia  
parcellare





## Aspetti generali

Applicazioni agricole sono sfidanti a causa di

- sporco e polvere
- shock e vibrazioni
- variazioni di temperatura e umidità
- restrizioni meccaniche
- limitazioni elettriche.

Ulteriori requisiti per il sistema NIR:

- montaggio diretto
- funzionamento automatizzato
- tutte le proprietà essenziali



# Quantum mietitrebbia parcellare



# Installazione



Mietitrebbia parcellare Quantum  
B01 – Sensore a contatto  
p.e., dopo la pesa e il imbuto di scarico



## Predisposizione NIR

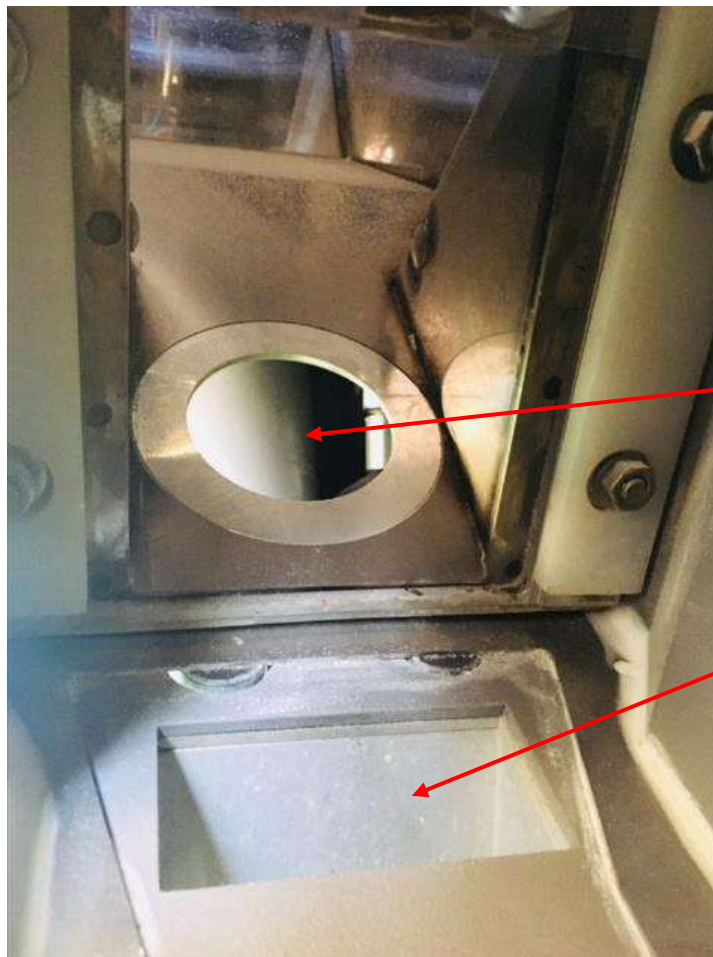
Polytec NIR  
Sensore



Raccogliitore  
di campioni



NIR scivolo a  
scorrimento  
con apertura



Spazio per  
NIR sensore  
ottico

Uscita per  
raccogliatore di  
campioni

## Valvola a ghigliottina per misurazione NIR di flusso

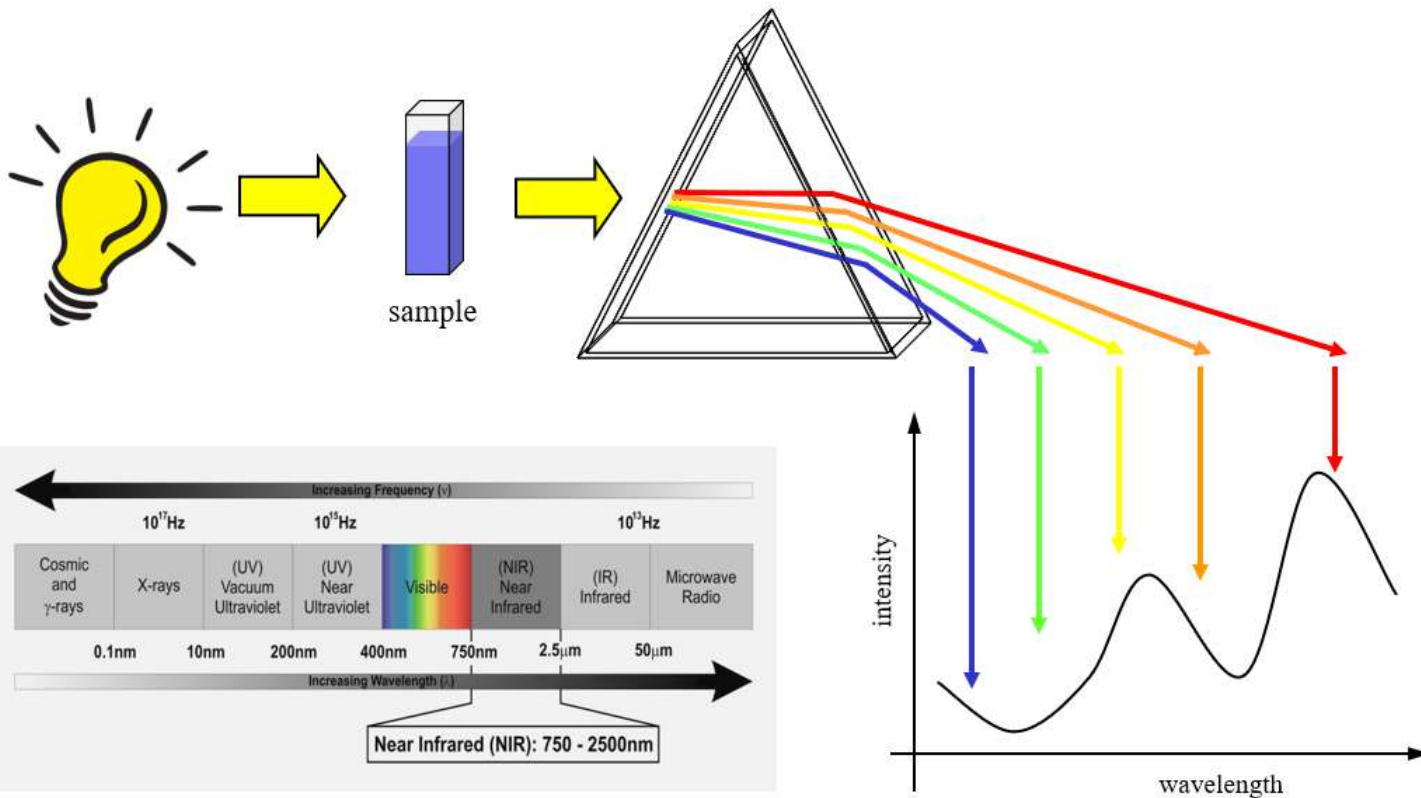


Flow after 2 seconds

## Altri esempi di installazione su macchinari Wintersteiger



# Principi







## Vantaggi dell'analisi NIR

Nella regione spettrale NIR, la luce può penetrare più a fondo nei materiali rispetto alla luce infrarossa o visibile. Anche se la luce è di intensità bassa, possiamo comunque ottenere informazioni cruciali sulla composizione dei materiali. Le implicazioni positive di questa capacità sono numerose:

- Possiamo facilmente ottenere spettri di assorbimento NIR anche da campioni in fase condensata, che vanno dai millimetri ai centimetri di spessore.
- La spettroscopia NIR in trasmissione e riflessione può essere eseguita anche su materiali altamente diffusivi, come quelli con molte interfacce ad alto indice di rifrazione.
- Possiamo analizzare volumi relativamente grandi di materiali utilizzando il fascio NIR, riducendo le preoccupazioni riguardanti la rappresentatività del campione.
- Non è richiesta alcuna preparazione del campione e non si generano sprechi di materiale.

# Tavola della banda vicino infrarosso

Near Infrared Band  
Assignment Table

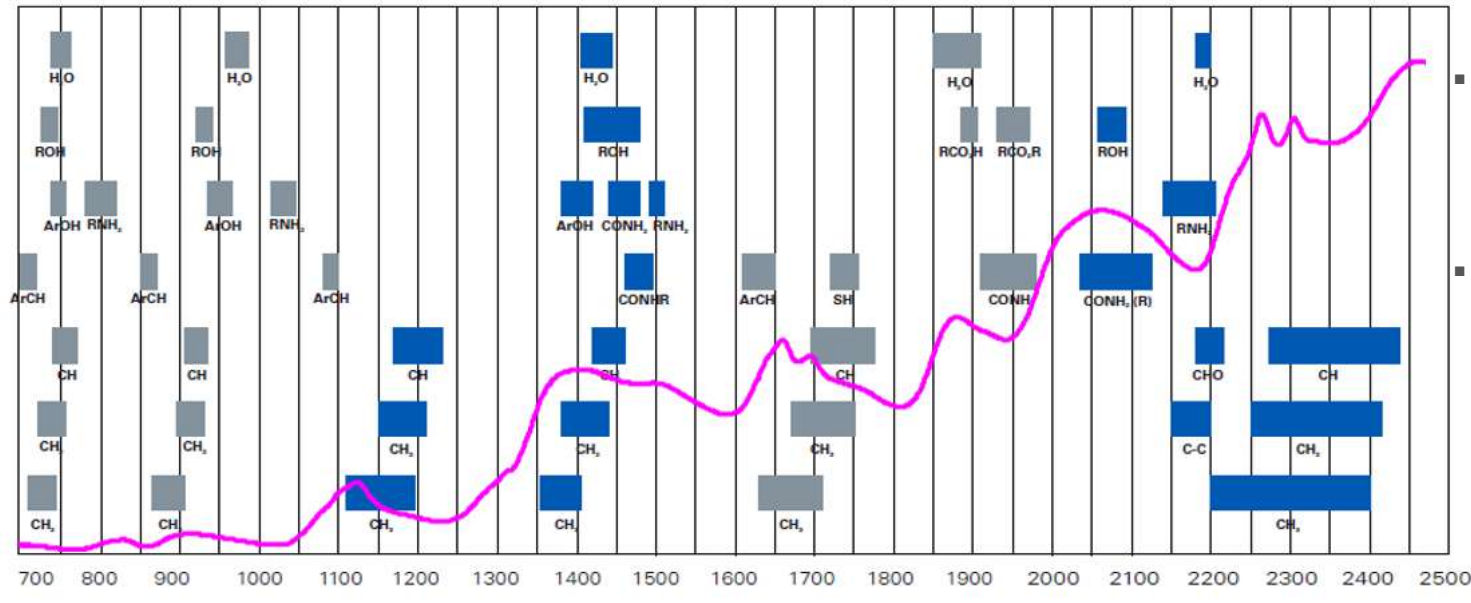
**Second Overtone Region**

**Combinations**

**Third Overtone Region**

**First Overtone Region**

4 <sup>th</sup> Overtone C-H	3 <sup>rd</sup> Overtone N-H	2 <sup>nd</sup> Overtone O-H		1 <sup>st</sup> Overtone O-H	1 <sup>st</sup> Overtone S-H		N-H Combinations	C-H + C-H Combinations	C-H + C-C Combinations
3 <sup>rd</sup> Overtone O-H	3 <sup>rd</sup> Overtone C-H	2 <sup>nd</sup> Overtone N-H	2 <sup>nd</sup> Overtone C-H	1 <sup>st</sup> Overtone of C-H Combinations	1 <sup>st</sup> Overtone C-H	C=O Stretch 2 <sup>nd</sup> Overtone	O-H Combinations	N-H & O-H Combinations	



- Acqua, grassi, proteine, zuccheri, amidi, glucosinolati, tiole

- La potenza del segnale diminuisce con lunghezza d'onda inferiore.

- La rilevazione e la differenziazione delle informazioni chimiche è più semplice a lunghezze d'onda più elevate.

# Polytec PAS 17xx

Near Infrared Band Assignment Table

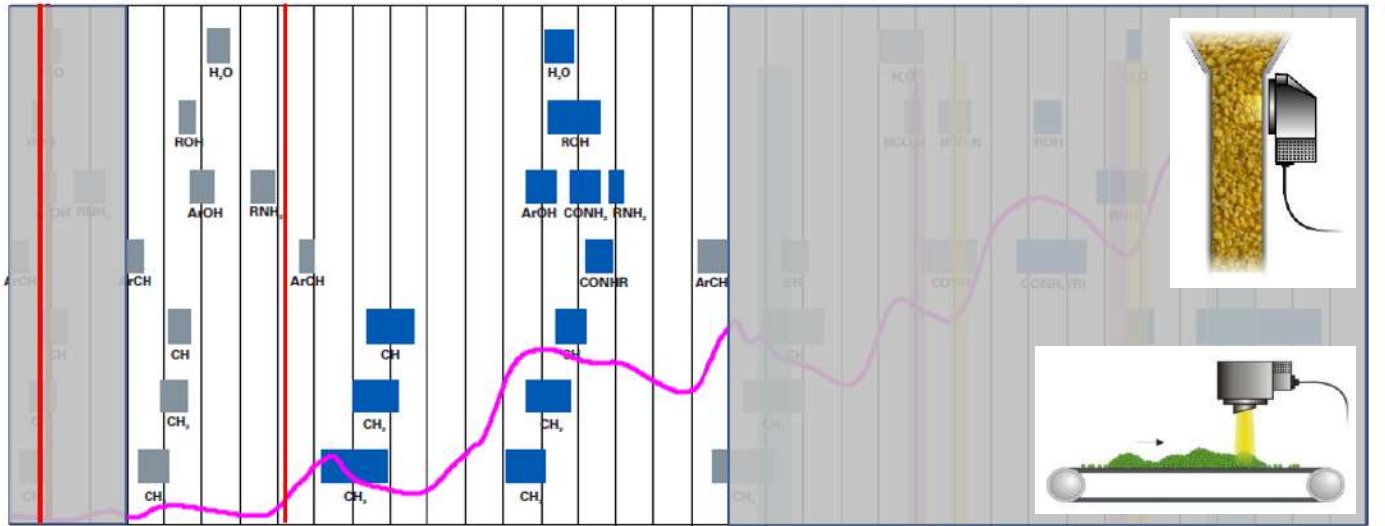
**Second Overtone Region**

**Combinations**

**Third Overtone Region**

**First Overtone Region**

4 <sup>th</sup> Overtone C-H	3 <sup>rd</sup> Overtone N-H	2 <sup>nd</sup> Overtone O-H		1 <sup>st</sup> Overtone O-H		1 <sup>st</sup> Overtone S-H		N-H Combinations	C-H + C-H Combinations	C-H + C-C Combinations
3 <sup>rd</sup> Overtone O-H	3 <sup>rd</sup> Overtone C-H	2 <sup>nd</sup> Overtone N-H	2 <sup>nd</sup> Overtone C-H	1 <sup>st</sup> Overtone of C-H Combinations	1 <sup>st</sup> Overtone N-H	1 <sup>st</sup> Overtone C-H	C=O Stretch 2 <sup>nd</sup> Overtone	C-H Combinations	N-H & O-H Combinations	



Informazioni chimiche dall'intero secondo e dalla maggior parte del terzo sopra tono

2 volte l'acqua,

3 volte gruppi di Metina, Metilene, Metile,

4 volte l'azoto

Wavelength  $\lambda$  [nm]

Competitor 330 nm

Polytec PAS 21xx Spectrometer (1000 nm)

Polytec PAS 17xx Spectrometer (800 nm)

# Spettrometro Polytec PAS 2121 con range di 1000 nm

Near Infrared Band Assignment Table

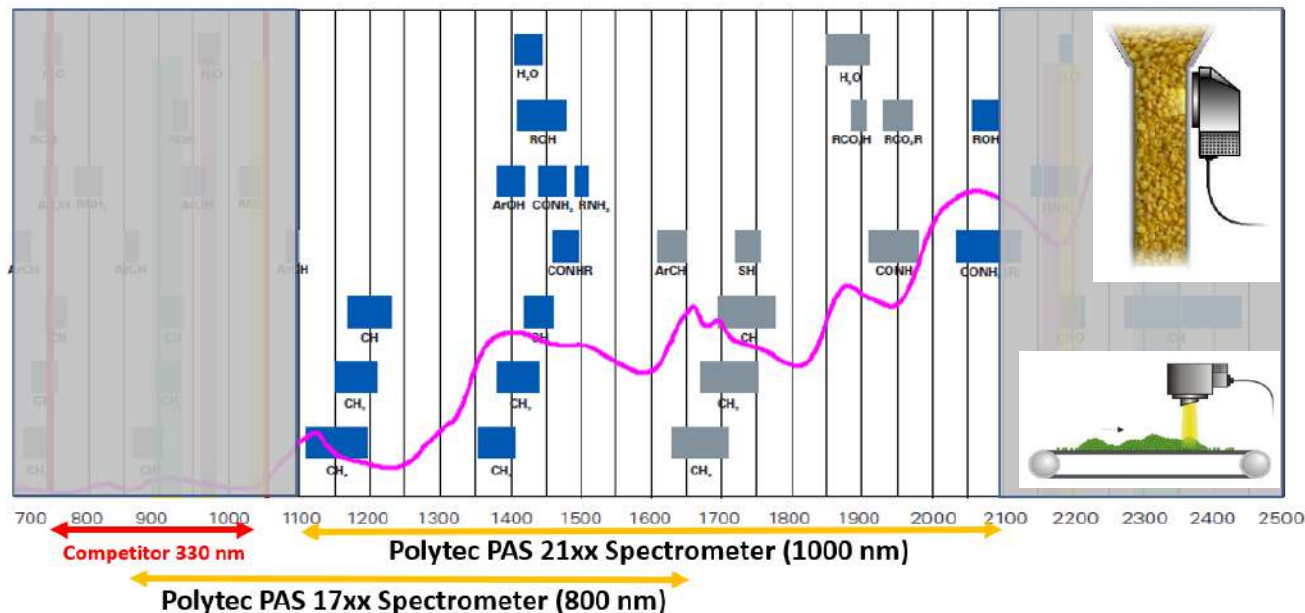
Second Overtone Region

Combinations

Third Overtone Region

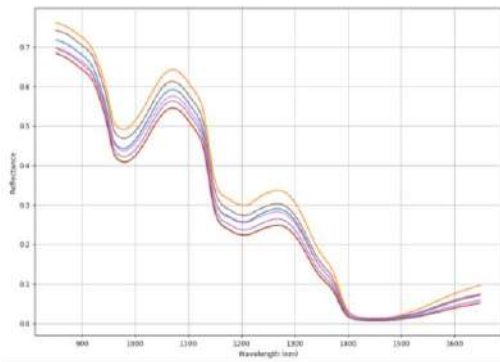
First Overtone Region

C-H 4 <sup>th</sup> Overtone	N-H 3 <sup>rd</sup> Overtone	O-H 2 <sup>nd</sup> Overtone		O-H 1 <sup>st</sup> Overtone	S-H 1 <sup>st</sup> Overtone	N-H Combinations	C-H + C-H Combinations	C-H + C-C Combinations
O-H 3 <sup>rd</sup> Overtone	C-H 3 <sup>rd</sup> Overtone	N-H 2 <sup>nd</sup> Overtone	C-H 2 <sup>nd</sup> Overtone	1 <sup>st</sup> Overtone of C-H Combinations	N-H 1 <sup>st</sup> Overtone	C-H 1 <sup>st</sup> Overtone	C=O Stretch 2 <sup>nd</sup> Overtone	O-H Combinations
								N-H & O-H Combinations



- Segnale forte
- Informazioni chimiche da gruppi funzionali
- Interi primi e secondi sovratoni
- 1 x Zolfo (Tirole)
- 2 x Acqua,
- 3 x Gruppi di Metina, Metilene, Metile,
- 5 x Azoto

# Struttura generale di una calibrazione NIR - Dallo spettro ai dati

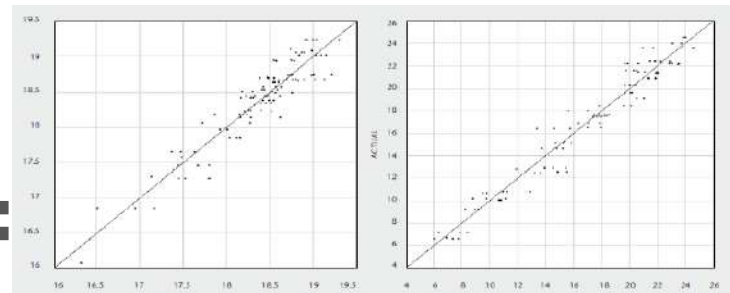


NIR-Spectrum



File Name	Parameter 1	Parameter 2
Margarine	19.02	0.18
Margarine	19.02	0.18
Margarine	19.02	0.18
Margarine	19.02	0.18
Margarine	19.02	0.18
Margarine	19.02	0.18
Margarine	18.39	0.38
Margarine	18.39	0.38
Margarine	18.39	0.38
Margarine	18.76	0.19
Margarine	18.76	0.19
Margarine	18.76	0.19
Margarine	18.5	0.1
Margarine	18.5	0.1
Margarine	18.5	0.1
Margarine	29.88	0.04
Margarine	29.88	0.04
Margarine	29.88	0.04
Margarine	19.09	0.8
Margarine	19.09	0.8
Margarine	19.09	0.8
Margarine	18.07	0.73
Margarine	18.07	0.73
Margarine	18.95	0.61
Margarine	18.95	0.61
Margarine	18.95	0.61

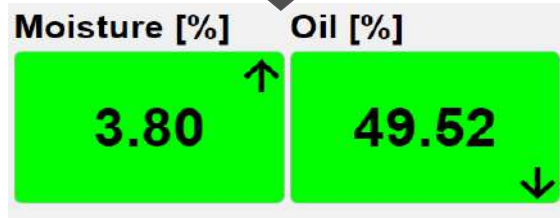
Valori di riferimento  
per i parametri



Modello di calibrazione chemiometrica



La calcolazione ('previsione') di campioni con concentrazione sconosciuta fornirà i valori.



# Considerazioni generali su NIR

- Gamma spettrale e proprietà fisico-chimiche?
- Velocità e completezza della rilevazione? -> raccolta dati senza soluzione di continuità e complessivi delle parcelle?
- Prestazioni? -> 1 secondo = 1 scansione = 1 dato NIR vs 1 secondo = 3 scansioni = 30 sotto-campioni
- "Potenza", dimensione, volume, presentazione del campione? -> Polytec consente una forte penetrazione e si adatta meglio alle applicazioni a contatto e a distanza (dimensione 2 ... 30 mm)
- -> Quantità comparabile di campioni misurata sul NIR?
- Implementazione tra le applicazioni?
- -> Uno spettrometro Polytec può essere spostato tra macchine per la raccolta
- Software e filtri: ad esempio, per conservare spettri deboli, campioni con paglia, individuare valori anomali?
- Costo dell'abbonamento annuale / accesso a tutti i dati e vera proprietà?
- Prezzo del NIR vs incertezza NIR specifica vs costi di laboratorio vs accoppiamento / ritardo nella selezione genetica





## Vantaggi della Quantum con Polytec NIR

- **Soluzione completa:**
  - Predisposizione della mietitrebbia per Polytec NIR
  - Sensore, spettrometro, software e calibrazioni
- **Esperienza:** collaborazione a lungo termine per NIR su mietitrebbie parcellari
- **Affidabilità:** tecnologia provata per l'analisi dati in tempo reale in campo
- **Precisione:** spettri ampi e precisi -> misurazioni multiparametro reali
- **Servizio:** configurazione, installazione e assistenza clienti
- **Privacy:** accesso e proprietà dei dati sempre garantiti, con conoscenza sui trattamenti.



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