Application of Handheld Spectrometers for Chemical Content Measurements

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Agenda

1. Inline Solutions
2. Entering Business of Handheld Solutions

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Solutions and Applications from ZEISS Spectroscopy

Industries
ZEISS Spectroscopy for Inline Process Control and Quality Control

Spectrometer Systems for **Agriculture**

Spectrometer Systems for **Food Industry**

Spectrometer Systems for **Colour and Coating Analysis**

Industries
Spectrometer Solutions for Agriculture

Grain mills

Quality control of delivered grain
(protein, moisture)

Seed breeders

Quality evaluation
(protein)

Feed production

Process optimization
(protein, dry matter, crude fiber, oil)

Animal farms

Optimization of TMR (total mixed ration)
(protein, moisture, crude fiber, starch)

Industries
Spectrometer Solutions for Foodstuff Industry

Malting plants

Grain categorization, process and quality control
(protein, moisture, soluble nitrogen, viscosity, et al)

Snacks and potato products

Process und quality control
(moisture, bulk density, color)

Fish, meat and bone meal products

Process control
(moisture, fat, protein)

Cheese production

Process control
(fat, dry matter)

Spectrometer Systems
Corona extreme

The Spectrometer System for Agriculture
For Working Under Extreme Conditions

Spectral range 950 – 1,650 nm

- High shock resistance and unaffected by temperature fluctuations
- For ATEX Zone 22
- In moist and dusty conditions
- Automatic internal referencing does not require frequent external calibration
- Sensor protection due to integrated measuring head and sapphire flange
- Suitable for lab applications and vehicle’s on-board installation

Spectrometer Systems
Corona process

The Spectrometer System
For any Technological Process

Spectral range 380 – 1,650 nm

- Protected against shock and vibrations
- For ATEX Zone 22
- Unaffected by temperature fluctuations
- Accurate measurement even at a distance of 80 to 600 mm from the sample
- Automatic internal referencing and compensation of sample distance influence
- Long service life and long-term stability; does not require frequent external calibration

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Summer 2015 – the starting point of market testing

Goal

To gain insights in the agricultural handheld market, especially

- the general acceptance of handheld devices and potential sales numbers per year,
- handling workflows and
- essential requirements

➔ 5 Handheld Demonstrators were built initially

➔ Creating calibrations for forage and feed were started

Results are looking promising

- ✓ Similarity of optical engine to inline systems makes transfer of calibration easy and fast
- ✓ There is a small but growing market for handheld devices in agriculture we might be able to address.
- ✓ We recognized an increasing interest in handheld devices in China.

  - Asia-Pacific is expected to fuel the growth of handheld and portable spectroscopy equipments specially in countries such as China and India is expected to accept the portable technologies at a higher rate as compared to other developed economies

- ✓ Additional demonstrators have been built for partners
- ✓ Handling workflows and essential requirements were defined and validated with our partners

Source: Data Bridge Market Research: Global Molecular Spectroscopy Market - Trends and Forecast to 2022

Now we go one step further: Development of Serial Product

Goal

To provide handheld series products for the agricultural market,

- Incorporating the validated essential requirements
- and handling workflows

Focus is on

➔ Setting up a small series production

➔ Ensuring easy calibration transfer from Corona extreme and Handheld demonstrators

➔ Reducing COGS to achieve an attractive market price

The result is the **AURA® handheld NIR by ZEISS**

Preliminary release date / first delivery date for series products: 1.7.17

Customer value and key features

The **AURA® handheld NIR**

- ✓ Is a **portable** NIR sensor with a **broad range of calibrations** developed by GraiNit s.r.l.
- ✓ Can be transported easily in a **carrying case**.
- ✓ It is powered by a **smart battery pack**, hot swappable with a spare battery or powered by **external power supply**.
- ✓ Is robust due to protection class **IP 54** and comes with a **wrist strap**
- ✓ Is easy to use due to the **touch display** and the well known **InProcess software**.

- ✓ Compliant to environmental standards: RoHS, China RoHS, WEEE, REAC
  Compliant to device security standards: EMC, low voltage directive, battery directive

Scope of delivery

Items delivered:

- ✓ AURA® handheld NIR
- ✓ 2 smart battery packs
- ✓ Battery charging unit
- ✓ Wrist strap (drop protection)
- ✓ User Manual (DE, EN)
- ✓ Carrying case

Accessories:

- ○ Spare battery pack
- ○ Battery charging unit
- ○ Bluetooth mouse
- ○ Bluetooth keyboard


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