肥料品中的水分分析

Results in seconds with NIR Spectroscopy

Moisture content is one of the most commonly measured properties of fertilizers. Globally, regulations for different fertilizers vary, but local legal limits ensure that the maximum amount of water must not be exceeded. A number of analytical techniques are available for this purpose. Next to gravimetric methods, Karl Fischer titration is often used for accurate moisture determination.

Compared to these methods, near-infrared spectroscopy (NIRS) offers unique advantages: it generates reliable results within seconds, and at the same time does not create chemical waste. This Application Note explains how NIRS can offer fast, reagent-free analysis of moisture content in various fertilizer products.

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EXPERIMENTAL CONDITIONS

Different fertilizer product types with varying moisture content from 0.12% to 3.82% were measured using a Metrohm DS2500 Solid Analyzer. To overcome sample inhomogeneity, the measurement was performed with a large sample cup in rotation. Data collection and model development was carried out with the Vision Air complete package. Reference values were obtained by coulometric KF-titration coupled with KF oven. The NIRS prediction model was created with the settings described in the following table and validated using a cross validation algorithm.
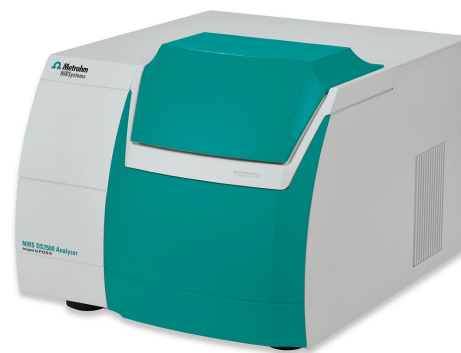

Figure 1. The DS2500 Solid Analyzer was used to collect the spectra of fertilizer samples.

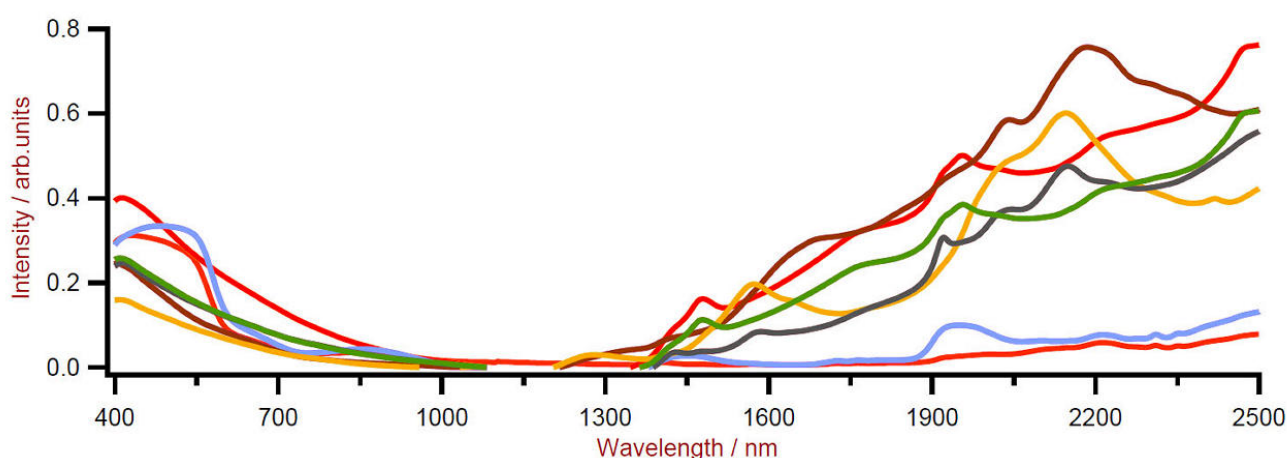| Pre-Processing	Algorithm	Validation Type
2nd derivative	PLS	Cross validation

Figure 2. Raw spectra of different fertilizer products with varying water content.

RESULT & CONCLUSION

The obtained graph displays a high correlation (R^2 = 0.98) between moisture predicted by the NIRS model and the KF-titration method. Although different fertilizer types were used to create the prediction model, a close ratio between SEC and SECV values proves the validity of the model.

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# Factors	R^2	SEC	SECV
3	0.98	0.29%	0.32%

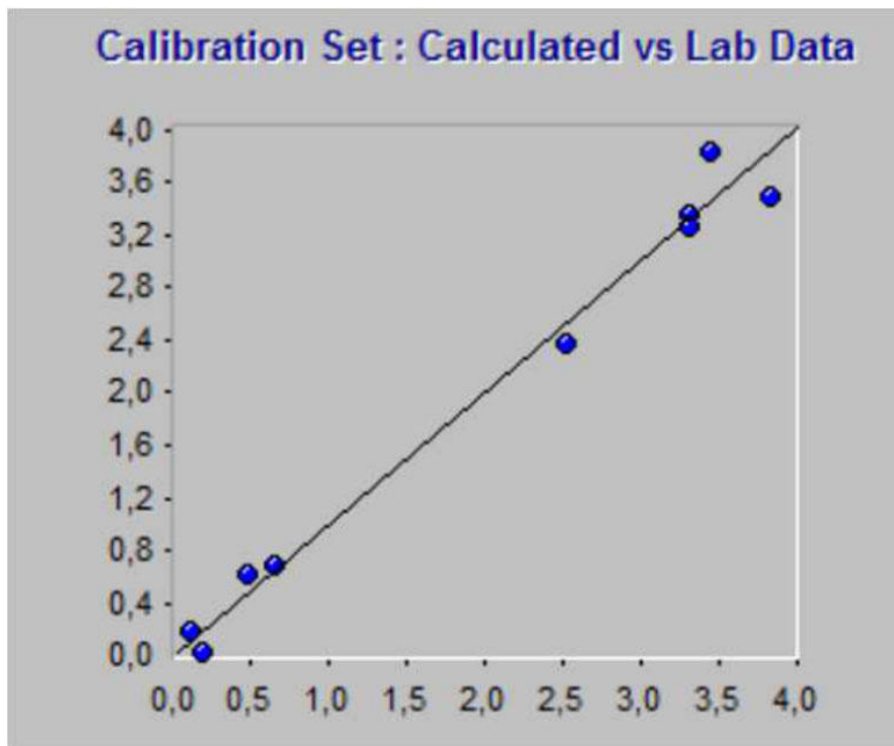## RESULT & CONCLUSION

Figure 3. Correlation graph for moisture predicted by NIRS vs titration.

CONTACT

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DS2500 Solid Analyzer

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DS2500 , DS2500 Analyzer ,

DS2500 400 2500 nm ,DS2500 Analyzer ,

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Vision Air 2.0 Complete

Vision Air –

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 Vision Air Complete :
  - 66072207 (Vision Air Network Complete)
  - 66072209 (Vision Air Pharma Complete)
  - 66072210 (Vision Air Pharma Network
    Complete)

DS2500

 NIRS DS2500 Analyzer

Metrohm