

Oilseed quality control using NMR



Nuclear magnetic resonance (NMR) is one of the most used techniques for the study of molecular structures. Using the Spinlock SLK 200 Time-Domain Spectrometer, a fast, precise and non-destructive method to determine the hydrogen content of the solid and liquid phase of materials is possible. This process permits the quantitative analysis of moisture, solids, fats and oils in food products.

Replacing the primary method

As opposed to the traditional chemical analysis methods, NMR technology is characterised by its speed, precision and, particularly, that it does not destroy the sample being analysed. This allows for unlimited re-runs on the same sample.

The chemical methods, however, while offering maximum precision (used for NMR calibration), require a complete laboratory for purposes of the analysis, several hours to process and obtain the result, and the sample is lost during the process. Lastly, while the chemical analysis utilises solvents and other potentially hazardous substances, NMR is completely safe and environmentally (ambient) friendly, thus avoiding the use of any chemical substances.

The sample is kept intact during the analytical process. Because of this, after being analysed, the seed may be used as normal. This characteristic of the NMR method is unique, as it allows for the selection of seeds depending on their quality. This method is used especially in research laboratories and hybrid-seed production companies to increase their product quality.

Applications

The Spinlock SLK 200 NMR can be used for a variety of oilseeds and food products in general. Among the most common oilseeds, it is possible to analyse sunflower, soya bean, canola, groundnut, maize, cotton, sesame and wheat, among others. For these crops, the SLK 200 is

unique in that it has the capability of measuring, besides oil and moisture, oleic acid. Oleic acid is a particularly sought-after fatty acid that is key in today's commercialisation efforts of oilseeds and vegetable oil.

In addition, for some crops, it is also possible to measure protein content, a parameter that is increasingly being monitored in the formulation of animal feed, as is the case with sunflower and soya meal. It is, furthermore, possible to analyse the intermediate products using Spinlock equipment.

For other food products, the SLK 200 is also capable of analysing olive paste and pomace, avocado, palm and chocolate for oil content applications, allowing for a unique quality control process during extraction. In the case of olive, avocado, palm and mayonnaise, the SLK 200 is the only NMR equipment that can perform an analysis without drying of the sample. This fact makes it a reality for the always desired online/at-line production control.

Unique advantage

The SLK 200 is capable of measuring oleic acid in a single seed. For applications such as sunflower and groundnut, the SLK 200 allows for the control and analysis of each single seed for oleic acid content – a Spinlock-only capability appreciated by breeders worldwide.

Main technical features

- The same equipment can be used to analyse all grains. Each type of grain has its own configured parameters in the operating software.
- The basic equipment includes the NMR spectrometer, two sample



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holders and the application software.

- Automation: The only oilseed NMR on the market that can be completely automated using the SLK AS 30 Autosampler.
- No moving or mechanical parts, which means low maintenance and zero operating costs.

Analysis speed

- Oil and moisture: 4 seconds.
- Oleic acid: 28 seconds.
- Protein: 3 minutes.

Service and support

The Spinlock SLK 200 has a constantly expanding support network with representatives on all continents. Agri Enviro Solutions (Pty) Ltd, based in South Africa, are the service and support partner for Spinlock within Southern, Central and East Africa. In addition, we offer the Spinlock Online Support Desk, with instant access to Spinlock engineers via WhatsApp, telephone and email. AES and Spinlock proudly commit to our customers, making technical support an absolute priority.

For more information, phone Agri Enviro Solutions on 012 940 5921 or visit www.aelab.co.za.