

The value of **RELIABLE** **ANALYTICAL RESULTS** to support the oilseeds industry

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Crop quality monitoring over different seasons and production regions with the purpose of measuring the desired characteristics of soya beans and sunflower seeds produced in South Africa, needs to be based on reliable analytical services and should be internationally accepted.

To ensure international acceptance of analytical results, testing laboratories should comply with ISO/IEC 17025, an international standard covering the general requirements for the competence of testing and calibration laboratories. The International Organisation for Standardisation (ISO) and the International Electrotechnical Commission (IEC) formed a specialised system for worldwide standardisation.

The South African National Accreditation System (SANAS) is a public entity responsible for carrying out accreditations in respect of conformity assessment, which includes accreditation of laboratories, certification and inspection bodies. The Southern African Grain Laboratory NPC (SAGL) has been operating under this accreditation system since 1999, covering a scope of analytical services aligned with the needs of the grain and oilseed related food and feed industries.

Technical competence

Under an international standard such as ISO 17025, participation in

international proficiency schemes as an ongoing proof of technical competence and international comparability, is a requirement and at the same time gives end-users the assurance that they can use the analytical results generated under ISO 17025 accreditation for decision-making processes.

The reliability of any analytical method depends on its accuracy and precision, and is established for every method applied in the laboratory. In laboratory testing accuracy means closeness to the true value, while precision refers to the reproducibility to ensure the same result every time.

These are equally important since getting the same result every time does not necessarily mean the correct result every time, hence the difference between accuracy and precision. To ensure both, SAGL annually participates in one national and twelve international proficiency testing schemes.

Since the 2011/2012 production season, SAGL has embarked on a process of accumulating data to determine the quality of the commercial soya bean crop on a



The 2012/2013 quality reports on soya beans and sunflower seeds.

national level with the financial assistance of the Oil & Protein Seed Development Trust. A similar annual survey was initiated since the 2012/2013 production season of sunflower seeds.

Representative sample

To ensure a representative sample of each season's production, a sampling plan for the collection of the samples was designed by the industry in collaboration with the SAGL. The members of Agbiz Grain representing the grain silo industry, provide the samples to the laboratory at no cost to make these surveys possible.

Each delivery at the silo is sampled by the participating companies as per the grading regulations for grading purposes. After grading, these samples are then placed in containers according to class and grade. When about 80% of the expected harvest has been received, the content of each

container is divided using a multi-slot divider to obtain a homogenous 3kg sample which is labelled with information relating to the depot, storage structure, the class and grade. The individual samples are then submitted to the laboratory for testing.

Reliable measurements

The sampling plan ensures representative samples from the different production regions which ensure a good reflection of each seasons' production. The final sample selection at the laboratory is based on the production figures released by the National Crop Estimates Committee (CEC). As per agreement with the members of Agbiz Grain, the results are then reported on a regional basis.

The specific analyses included in the first soya bean survey were grading, nutritional analyses to determine the protein, fat and ash content of the samples, screening of a selection of the samples for the presence of genetic modification (CP4 EPSPS – Roundup Ready), screening for the presence of residues of a range of mycotoxins using LC-MS/MS analyses, as well as a randomly selected set of samples which were analysed for their protein bound amino acid profile.

The sunflower seed samples in the sunflower quality survey were graded before it was milled and chemically analysed for moisture, crude protein, crude fat, ash and crude fibre content.



The benefit of generating results using accredited primary wet chemistry methods, is that these results can also be used to develop robust calibrations to ensure rapid and reliable near-infrared measurements which are widely used in the animal feed and human food industries.

The analysis results are updated weekly on the SAGL website as the samples are received and analysed in the laboratory. Annually, once all the samples for a particular season have been analysed, a report is compiled and hard copies are distributed to interested parties. The reports can be downloaded from the SAGL website where reports of previous seasons are also available for download.

Popular articles containing summaries of each season's results are also published in industry publications after the reports have been released. Feedback from the industry to better align the tests performed as part of crop quality surveys with the needs of the end users in mind, is important to improve and expand the survey reports.



A database containing reliable analytical data generated over several seasons and regions, can then be statistically evaluated to identify possible trends. Oilseeds and their derivatives, vegetable oil and meal, are in demand globally and there is a need to quantify the value for different stakeholders to develop and support actions that will ensure a viable future of oilseed crops.

Quality assurance

In addition to the crop quality surveys performed on soya beans and sunflower seeds, support for the oilseed industry also involves the offering of ring tests as a useful tool for equipment verification, method optimisation, training, confirmation of accuracy and benchmarking against other laboratories. Quality assurance to provide reliable measurements is essential, since these measurements form the basis of the different phases within the oilseed value chain.

Oilseeds are traded and processed based on grades and specific quality attributes evaluated according to a set of agreed standards. Nutritional data on raw materials as well as final food and feed products is needed for compliance with regulations such as labelling legislation.

Quality control procedures in the product development departments of food and feed companies, where compliance with standards such as ISO 17025 is not compulsory, require a tool to ensure accurate measurement. Participation in ring tests serves as such a tool. When properly applied, this can play a vital role in the global management of sustainable food and feed production to address the growing demand.

For more information visit the Southern African Grain Laboratory NPC website at www.sagl.co.za.