METHODS

SAMPLING PROCEDURE:

A working group determined the process which needs to be followed to ensure that the crop quality samples which are sent to the SAGL by the various grain silo owners, are representative of the total crop.

Each delivery is sampled as per the grading regulations for grading purposes.

After grading, the grading samples are placed in separate containers according to grade.

After 80% of the expected harvest has been received, the silo divides the content of each container with a multi slot divider in order to obtain a 3 kg sample. (This should be done for each grade separately).

If there is more than one container per grade, the combined contents of the containers is mixed thoroughly before dividing it with a multi slot divider to obtain the required 3 kg sample.

The samples are marked clearly with the name of the silo (depot), bin number(s) represented by each individual sample and grade and are then forwarded to the SAGL.

GRADING:

Full grading was done in accordance with the Regulations relating to the Grading, Packing and Marking of soybeans intended for sale in the Republic of South Africa (No. R 225 of 6 March 2009).

See pages 24 to 31 of this report.

Determination of percentage of wet pods
According to regulation 14 of the above mentioned grading regulations, the percentage of wet pods in a consignment of soybeans shall be determined by obtaining a working sample of at least 10 kg of soybeans from a representative sample of the consignment.

Due to the practical restriction on the sample size of the representative samples submitted to the SAGL by the grain silos, all wet pods in the total sample received where removed by hand as per the regulation and the percentage of wet pods was expressed as a percentage of the total actual mass of the sample received.

CHEMICAL ANALYSIS:

Milling
Prior to the chemical analyses, the soybean samples were milled on a Retch mill fitted with a 1.0 mm screen.

Moisture
The method prescribed under the ISTA International Rules for Seed Testing, Section 9, latest edition was used to determine the moisture content of the soya samples. This method determines moisture content as a loss in weight of a sample when dried in an oven at 103 °C for 17 hours.

Protein
The Dumas combustion analysis technique was used to determine the crude protein content, according to AACCI method 46-30.01, latest edition.

This method prescribes a generic combustion method for the determination of crude protein. Combustion at high temperature in pure oxygen sets nitrogen free, which is measured by thermal conductivity detection. The total nitrogen content of the sample is determined and converted to equivalent protein by multiplication with a factor of *6.25* to obtain the protein content.

Fat
In-House method 024 was used for the determination of the crude fat in the samples. After sample preparation the fat is extracted by petroleum ether with the aid of the Soxhlet extraction apparatus, followed by the removal of the solvent by evaporation and weighing the dried residue thus obtained. The residue is expressed as % crude fat.

Ash
Ash is defined as the quantity of mineral matter which remains as incombustible residue of the tested substance, after application of the described

working method. In-house method No. 011, based on AACCI method 08-02.01 Rapid (Magnesium Acetate) method, was used for the determination.

MYCOTOXINS:

Mycotoxins, produced by moulds or fungi, are natural contaminants of food and feedstuffs with serious implications for public health and economics, in particular with relation to the international food trade.

During 2010 SAGL implemented a multi-mycotoxin screening method using UPLC-MS/MS. This method also forms part of the SAGL scope of SANAS ISO 17025 accredited methodologies. 10 of the 100 soya crop samples were tested for Aflatoxin G1; B1; G2; B2, Fumonisin B1; B2; B3, Deoxynivalenol, Ochratoxin A, T2 toxin and Zearalenone.

GMO (Genetically Modified Organisms):

The EnviroLogix QuickComb kit for bulk soybeans was used to quantitatively determine the presence of genetically modified soybeans. The kit is designed to extract and detect the presence of certain proteins at the levels typically expressed in genetically modified bulk soybeans. The procedure prescribed in the EnviroLogix – QuickScan Instruction Manual, latest edition was followed. Results were scanned and interpreted quantitatively with the EnviroLogix QuickScan system.

AMINO ACIDS:

In-house method No. 009 , liquid chromatographic analysis of amino acids using a modified Pico-Tag method, was used for the determination of protein bound amino acids. Aspartic and glutamic acids, serine, glycine, histidine, arginine, threonine, alanine, proline, tyrosine, valine, isoleucine, leucine, phenylalanine and lysine were quantitatively determined after acid hydrolysis of the sample.

In-house method No. 015, where the sample is first oxidized and dried, was followed for the determination of cysteine (as cysteic acid) and methionine (as methionine sulfone). The samples were then analysed with liquid chromatography using a modified Pico-Tag method as for the other protein bound amino acids.

For the quantitative determination of tryptophan, In-house method No. 007, a liquid chromatographic analysis method, was used. The samples were hydrolysed under alkaline conditions prior to analysis.