

South African

Soybean Crop
Quality Report
2011/2012 Season



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SOUTH AFRICAN

COMMERCIAL SOYBEAN QUALITY FOR THE 2011/2012 SEASON

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- *The Grain Silo Industry and its members for their cooperation in providing the samples to make this survey possible.*

Introduction

The seventh production forecast figure for soybeans released by the National Crop Estimates Committee on 28 August 2012 is 646 950 tons. This is 1.33% less than the sixth production forecast released in July 2012 and 8.88% less than the final calculated production figure (710 000 tons) for the 2010/2011 season.

Based on the production forecast figure, the average yield this season will be 1.37 tons/ha compared to the calculated average yield of 1.70 tons/ha the previous season. The lower yields are due to unfavourable weather conditions during the 2012 growing season and explains the slightly lower production figure for 2012 even though the area utilized for soybean production increased from 418 000 hectares to 472 000 hectares. The Mpumalanga and Free State Provinces are expected to contribute 70% of the soybeans (planted on 375 000 hectares) to the total crop.

This soybean crop quality survey was performed by the Southern African Grain Laboratory (SAGL). SAGL is an ISO 17025 SANAS accredited testing laboratory that serves as the reference laboratory for the grain industry. The SAGL SANAS Certificate and Schedule of Accreditation are shown on pages 21 to 23. SAGL is an independent Section 21 company.

The goal of this crop quality survey is to accumulate quality data on the commercial soybean crop on a national level. This valuable data reveal general tendencies, highlight quality differences in the commercial soybeans produced in different local production regions and provide important information on the quality of commercial soybeans intended for export. A detailed database containing information collected over several seasons is essential and will assist with decision making processes.

During the harvesting season, a representative sample of each delivery of soybeans at the various silos was taken according to the prescribed grading regulations. The sampling procedure for the samples used in this survey is described on page 17. 100 composite soybean samples, proportionally representing the different production regions, were analysed for quality. The samples were graded, milled and chemically analysed for moisture, protein, fat and ash.

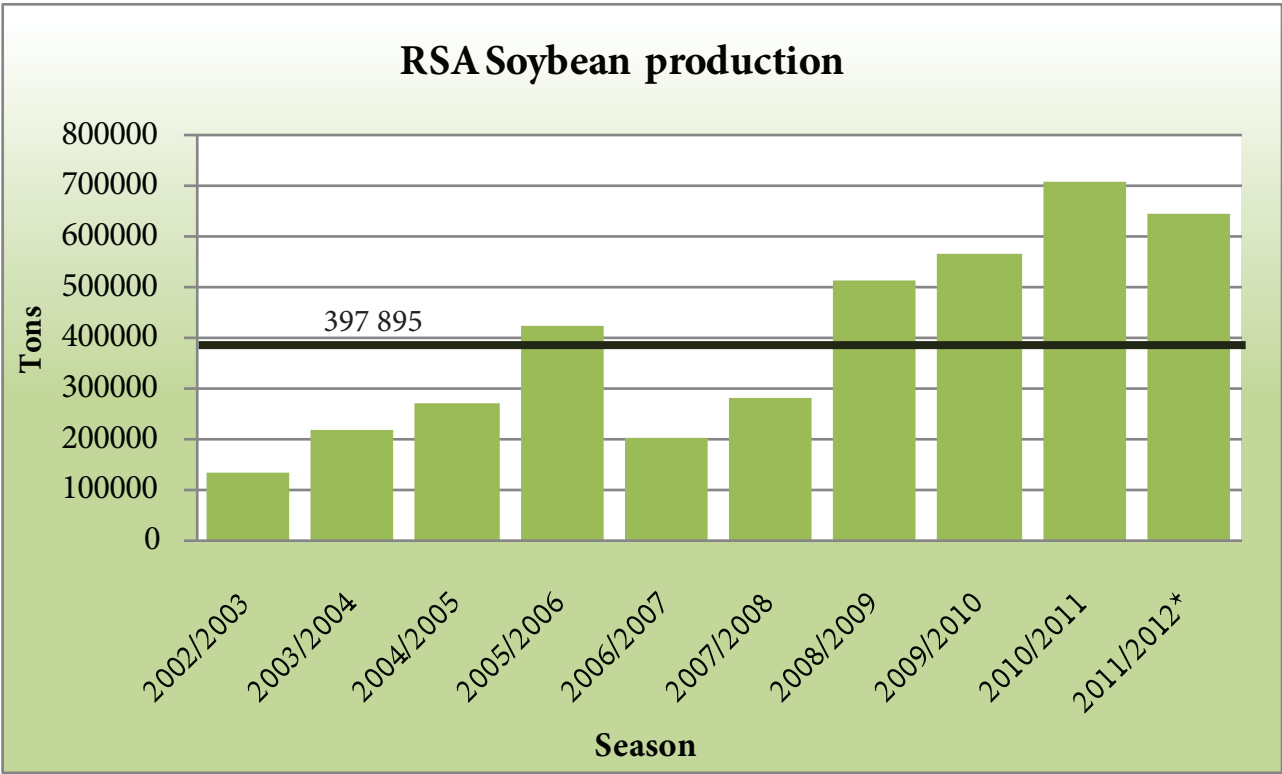
Eighty-five of the samples were graded as Grade SB1 and fifteen of the samples were downgraded to COSB (Class Other Soya Beans). The samples that were downgraded was mainly due to the percentage defective soybeans on the 4.75 mm round hole screen as well as the presence of other grain and noxious seeds in the samples.

The protein, fat and ash components are reported as % (g/100g) on a dry basis (db). The average protein content of these samples was 39.42% (db). The average fat content was 18.7% (db) and the average ash content 4.62% (db).

Ten randomly selected samples were analysed for mycotoxin residue levels, genetic modification and protein bound amino acid profile according to the Methods on pages 17 to 18.

The results are available on the SAGL website (www.sagl.co.za). The hard copy reports are posted to all the Directly Affected Groups and interested parties. The report is also available for download in a PDF format from the website.

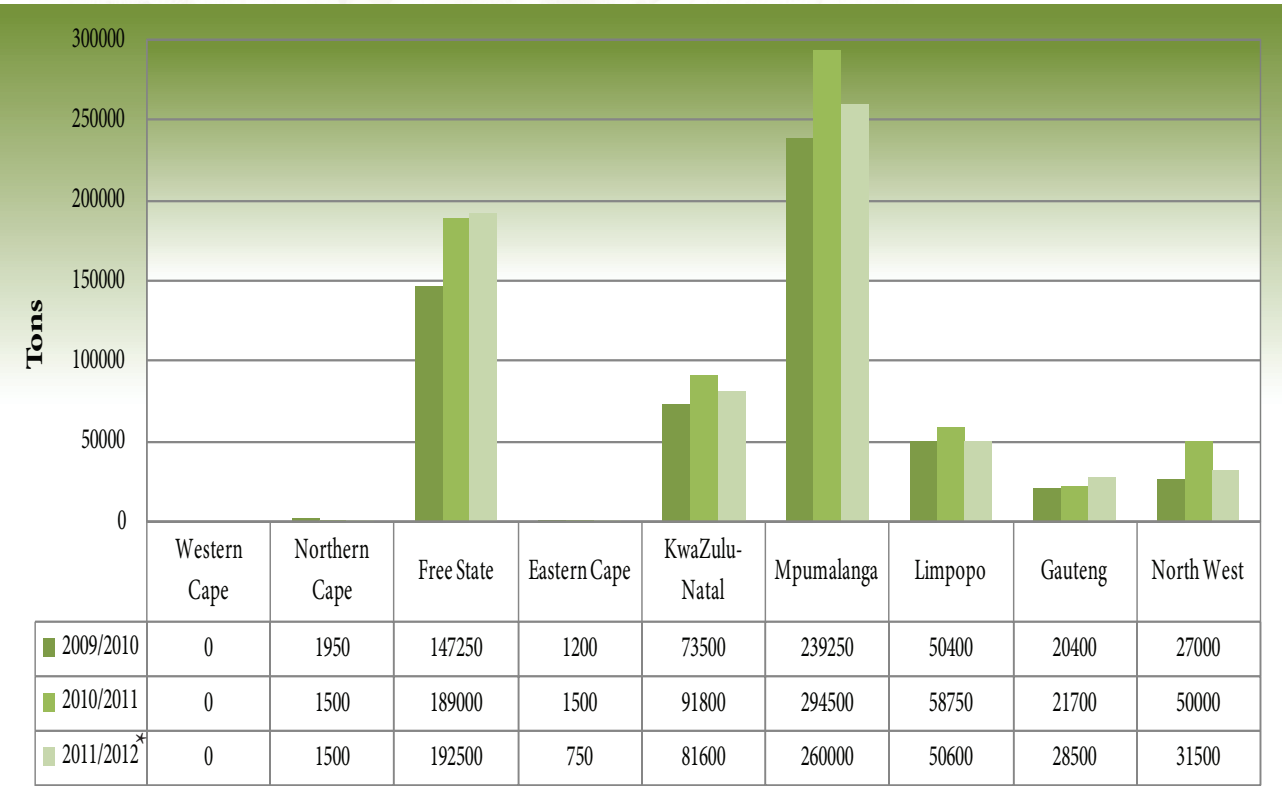
**Graph 1: SOYBEAN PRODUCTION IN THE RSA
OVER THE LAST 10 SEASONS**



Final production estimate figures obtained from the Crop Estimates Committees (CEC)

*The 2011/2012 season figure is obtained from the seventh production forecast of the CEC (28 August 2012)

**Graph 2: SOYBEAN PRODUCTION FIGURES PER
PROVINCE OVER THE LAST 3 SEASONS**



Final production estimate figures obtained from the Crop Estimates Committees (CEC)

*The 2011/2012 season figure is obtained from the seventh production forecast of the CEC (28 August 2012)

RSA Production Regions

The RSA is divided into 36 grain production regions.

The regions are distributed as follows:

Region 1: Namakwaland
Regions 2 and 3: Swartland
Regions 4 to 6: Rûens
Regions 7 and 8: Eastern Cape
Region 9: Karoo
Region 10: Griqualand West
Region 11: Vaalharts
Regions 12 to 20: North West
Regions 21 to 28: Free State
Regions 29 to 33: Mpumalanga
Region 34: Gauteng
Region 35: Limpopo
Region 36: KwaZulu-Natal

Please see pages 10 to 16 for the average soybean quality per region.

The contribution of the three main production regions to the total crop is as follows:

Mpumalanga, 260 000 tons (40%)
Free State, 192 500 tons, (30%) and
KwaZulu-Natal, 81 600 tons (13%).

No soybeans are planted in the Western Cape. Canola is the key oilseed crop in the winter rainfall area. The Northern and Eastern Cape will only contribute 1500 and 750 tons respectively to the total crop. These figures were obtained from the Crop Estimates Committee's Seventh Production Forecast for 2012.

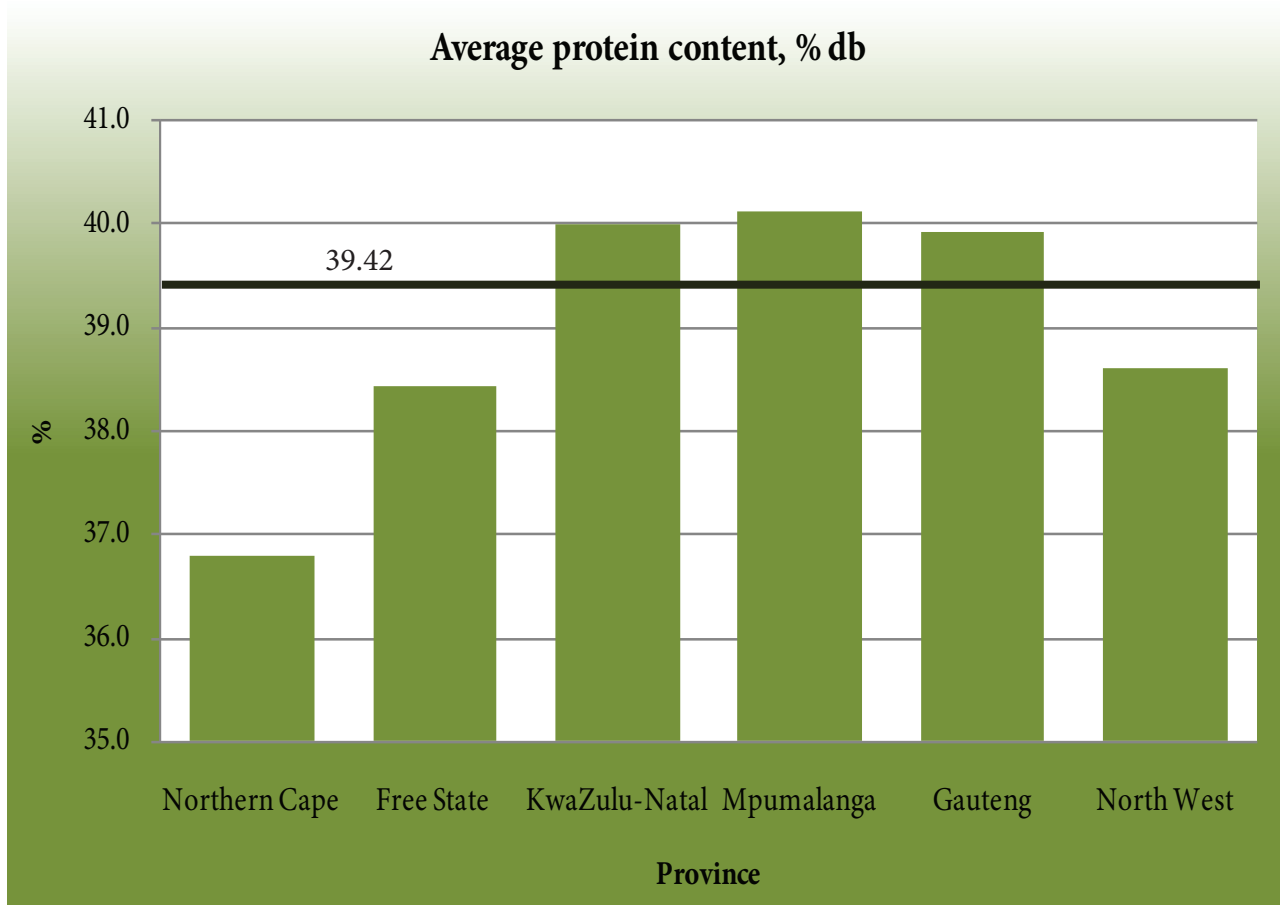
Figure 1: RSA Production Regions



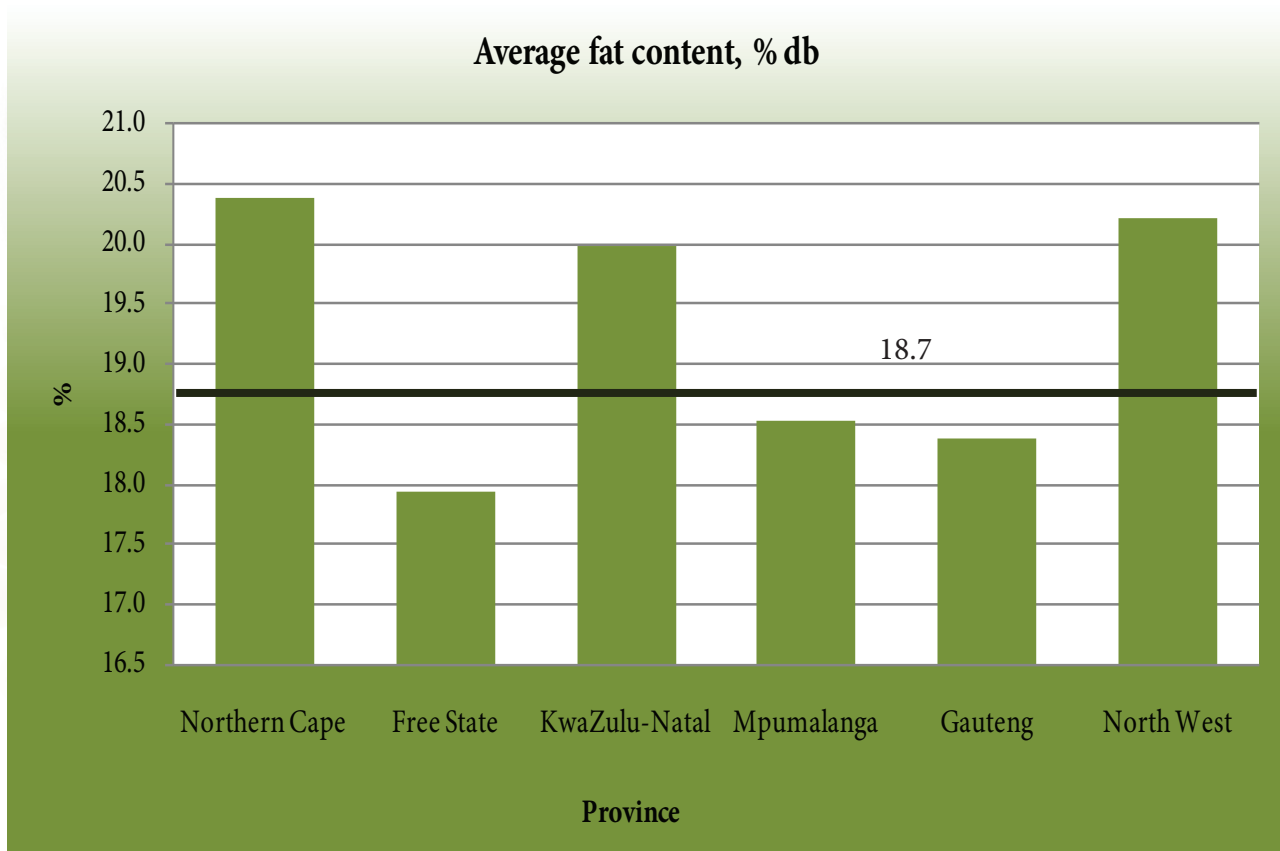
Table 1: South African Soybean Crop Quality Averages 2011/2012

Class and Grade Soya	SB1	COSB	Average
<u>Grading:</u>			
(A) Wet pods, %	0.01	0.04	0.02
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.26	0.79	0.34
(C) Other grain, %	0.06	0.31	0.10
(D) Sunflower seed, %	0.00	0.01	0.00
(E) Stones, %	0.03	0.02	0.03
(F) Sclerotinia, %	0.03	0.02	0.03
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	2.68	4.63	2.97
(H) Defective Soybeans on the 4.75 mm round hole screen, %	5.62	7.39	5.89
(I) Soiled Soybeans, %	1.29	3.37	1.60
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.29	0.81	0.37
Noxious seeds (<i>Crotalaria sp.</i> , <i>Datura sp.</i> , <i>Ricinis communis</i>)	0	5	1
Noxious seeds (<i>Argemone mexicana L.</i> , <i>Convolvulus sp.</i> , <i>Ipomoea purpurea Roth.</i> , <i>Lolium temulentum</i> , <i>Xanthium sp.</i>)	0	5	1
Undesirable odour	No	No	No
Live insects	No	No	No
Number of samples	85	15	100
<u>Chemical analysis:</u>			
Moisture, % (17hr, 103 °C)	6.8	6.8	6.8
Protein, % (db)	39.46	39.22	39.42
Fat, % (db)	18.6	18.8	18.7
Ash, % (db)	4.61	4.67	4.62
Number of samples	85	15	100

Graph 3: Average protein content per province



Graph 4: Average fat content per province



Mycotoxins

Mycotoxins are secondary metabolites produced by fungi on agricultural commodities intended for human and animal consumption. These mycotoxins are potentially dangerous to humans and animals since they are, amongst other also carcinogens. Aside from health risks, mycotoxin contamination can also reduce the value of the crops. Environmental factors such as temperature, humidity, soil and storage conditions influence toxin production.

During 2010 SAGL implemented a multi-mycotoxin screening method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin G₁; B₁; G₂; B₂, Fumonisin B₁; B₂; B₃, Deoxynivalenol, T2-toxin, Zearalenone and Ochratoxin A are possible in one run.

Ten samples (representing different regions as well as different classes and grades) were selected randomly for mycotoxin analyses.

No mycotoxin residues were detected on any of the samples analysed.

Table 2: Mycotoxin results for the 2011/2012 season

Region	Grade	Aflatoxin µg/kg				Fumonisin µg/kg			DON µg/kg	Ochratoxin A µg/kg	Zearalenone µg/kg	T2 - Toxin µg/kg
		G ₁	B ₁	G ₂	B ₂	B ₁	B ₂	B ₃				
		LOD										
		5 µg/kg	5 µg/kg	5 µg/kg	5 µg/kg	100 µg/kg	40 µg/kg	40 µg/kg	100 µg/kg	5 µg/kg	20 µg/kg	20 µg/kg
11	SB1	0	0	0	0	0	0	0	0	0	0	0
13	SB1	0	0	0	0	0	0	0	0	0	0	0
19	COSB	0	0	0	0	0	0	0	0	0	0	0
20	SB1	0	0	0	0	0	0	0	0	0	0	0
21	SB1	0	0	0	0	0	0	0	0	0	0	0
25	SB1	0	0	0	0	0	0	0	0	0	0	0
28	SB1	0	0	0	0	0	0	0	0	0	0	0
31	SB1	0	0	0	0	0	0	0	0	0	0	0
34	SB1	0	0	0	0	0	0	0	0	0	0	0
36	COSB	0	0	0	0	0	0	0	0	0	0	0
Average		0	0	0	0	0	0	0	0	0	0	0
Number of samples		10	10	10	10	10	10	10	10	10	10	10

Note: All results <LOD and non detected are reported as 0 for calculation purposes

LOD: Limit of detection, see table

µg/kg = ppb (parts per billion)

Genetic Modification (GM)

The SAGL screened 10 of the crop samples to test for the presence of CP4 EPSPS (Roundup Ready).

The crop quality samples received by the SAGL are composite samples per class and grade, made up of individual deliveries to grain silos.

SAGL used the EnviroLogix QuickComb kit for bulk soybeans to quantitatively determine the presence of genetically modified soybeans.

All of the samples tested positive for the presence of CP4 EPSPS.

The detection range for the CP4 EPSPS trait is 0.125% to 3%. The limit of quantification (LOQ) is therefore 0.125%.

Values higher than 3%, the highest value of the detection range for the CP4 EPSPS trait, are reported as > 3%.

The Coefficient of Variation for this analysis is 20%.

Table 3: GM results for the 2011/2012 season

Region	Grade	CP4 EPSPS (RUR), %
11	SB1	>3
13	SB1	>3
19	COSB	>3
20	SB1	>3
21	SB1	>3
25	SB1	>3
28	SB1	>3
31	SB1	>3
34	SB1	>3
36	COSB	>3
<i>Average</i>		>3
<i>Number of samples</i>		10

Amino Acids

Soybean is an excellent source of protein and therefore the most important source of dietary protein for animal feed in South Africa and also most of the world. Eight essential amino acids, necessary for human nutrition and which are not synthesized naturally in the body, are found in soybeans.

Ten samples (representing different regions as well as different classes on grades) were selected randomly for amino acid analysis.

The protein bound amino acids determinations were done by liquid chromatographic analysis using a Pico-Tag method (Methods on page 18). The analyses were done in duplicate and the average values reported. The working standard concentration is 1.25 $\mu\text{mol/ml}$ and each amino acid value is calculated to ng/injection (8 μl). Results are reported as g amino acid / 100g sample, on an “as is” basis.

The amino acid values are reported with the crude protein values which were calculated to 16% nitrogen by multiplying the nitrogen value by 6.25. These crude protein values are also reported on an “as is” basis for comparison purposes.

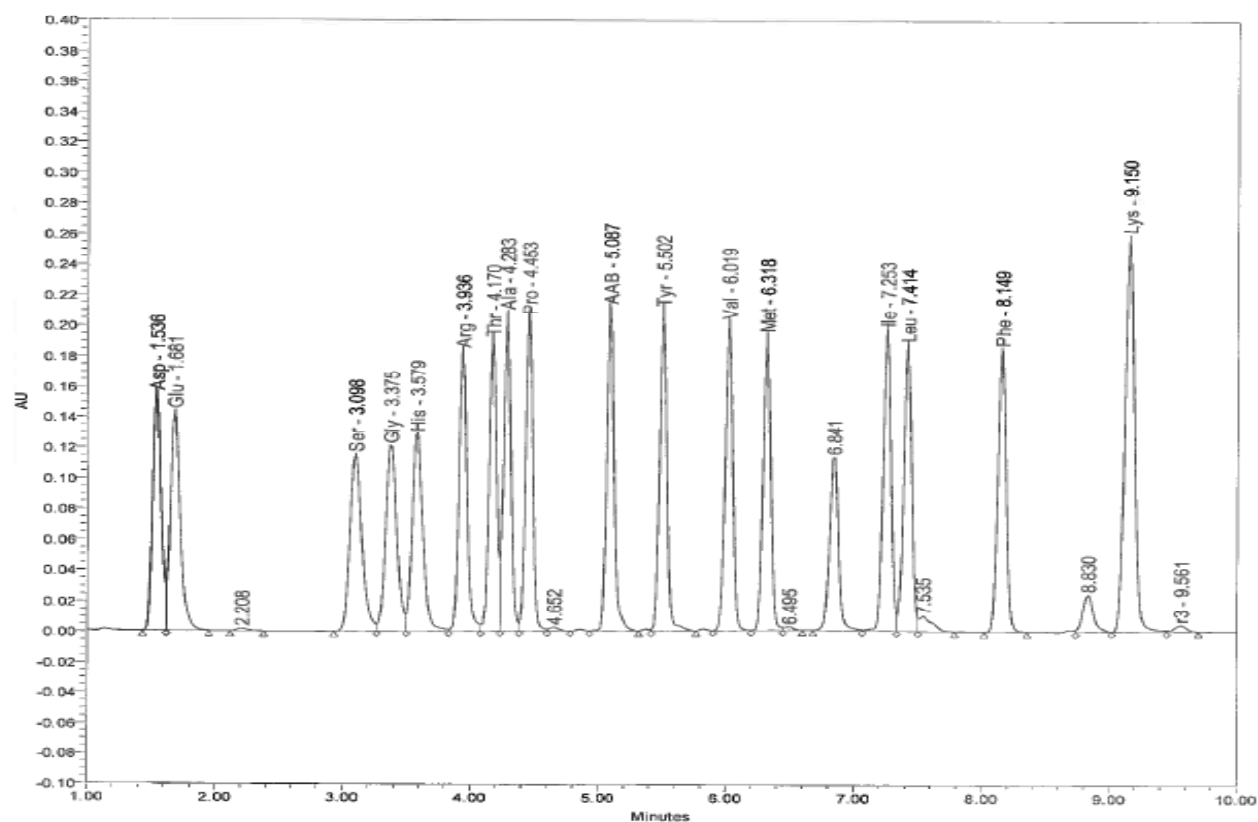
It is important to note that the amino acid analyses were done on the whole soybean samples and not on isolated soybean protein or heat processed soybean meal. It is well known that soybeans must be heat processed to destroy anti-nutritional factors and thereby improving the digestibility of all amino acids. Over-processing however will reduce the concentration and decrease the digestibility of the amino acids, most critically lysine and cysteine.

Table 4: Amino Acid and crude protein results for the 2011/2012 season

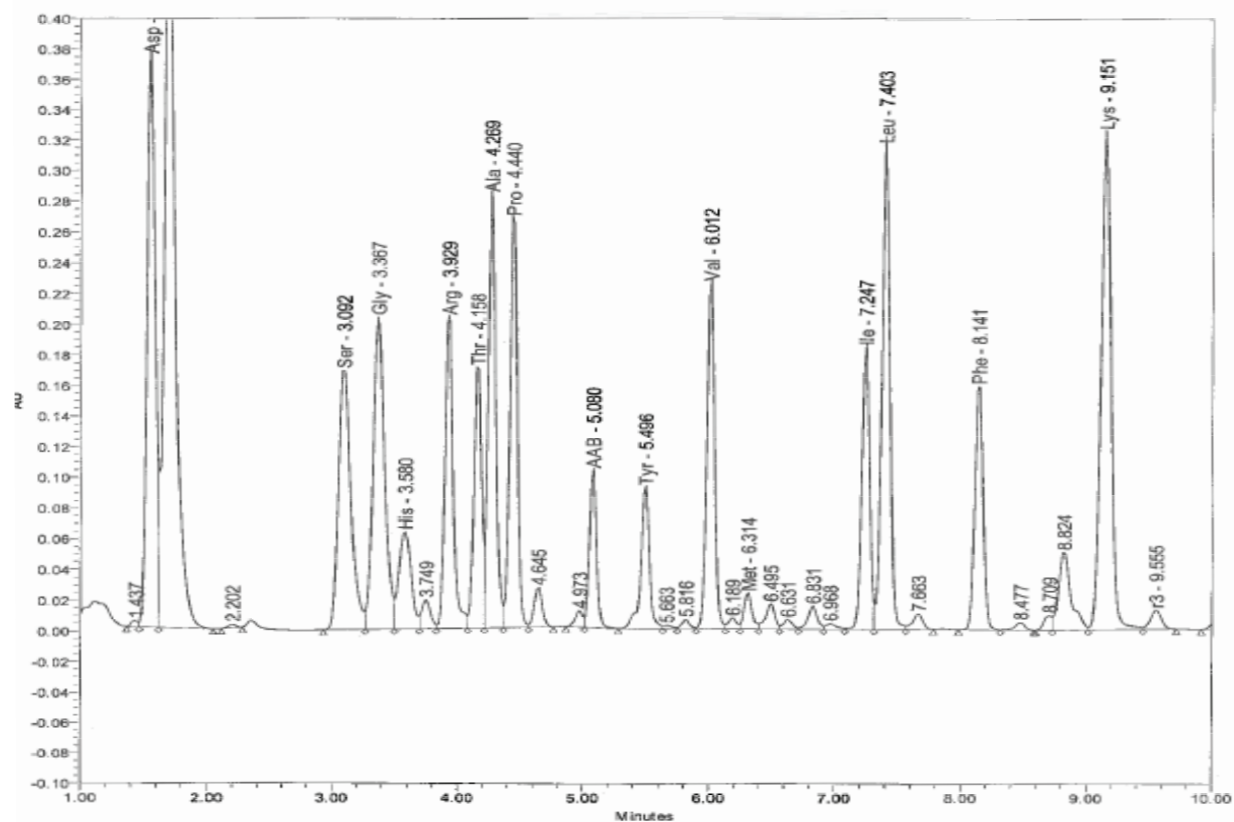
Region	11	13	19	20	21	25	28	31	34	36
Grade	SB1	SB1	COSB	SB1	SB1	SB1	SB1	SB1	SB1	COSB
Tryptophan, g/100g (as is)	0.43	0.43	0.43	0.44	0.37	0.40	0.42	0.36	0.41	0.42
Methionine, g/100g (as is)	0.50	0.50	0.49	0.49	0.41	0.50	0.47	0.48	0.49	0.48
Cysteic acid, g/100g (as is)	0.78	0.81	0.82	0.82	0.75	0.80	0.79	0.79	0.79	0.79
Aspartic acid, g/100g (as is)	3.84	3.92	3.83	4.05	3.35	3.89	4.00	3.80	3.93	4.11
Glutamic acid, g/100g (as is)	6.75	6.72	6.77	6.62	5.65	6.55	6.56	6.37	6.71	7.15
Serine, g/100g (as is)	2.04	2.04	1.96	2.04	1.66	1.95	2.00	1.90	1.96	2.07
Glycine, g/100g (as is)	1.65	1.66	1.58	1.67	1.41	1.54	1.61	1.51	1.59	1.64
Histidine, g/100g (as is)	1.13	1.17	1.07	1.07	0.94	1.03	1.07	1.01	1.09	1.13
Arginine, g/100g (as is)	2.64	2.63	2.50	2.60	2.14	2.52	2.61	2.42	2.62	2.67
Threonine, g/100g (as is)	1.47	1.45	1.46	1.49	1.34	1.46	1.47	1.46	1.49	1.51
Alanine, g/100g (as is)	1.59	1.62	1.56	1.62	1.44	1.54	1.60	1.54	1.58	1.63
Proline, g/100g (as is)	1.96	1.98	1.90	1.99	1.70	1.85	1.95	1.82	1.92	2.01
Tyrosine, g/100g (as is)	1.20	1.23	1.18	1.13	0.95	1.17	1.19	1.16	1.16	1.18
Valine, g/100g (as is)	1.79	1.84	1.76	1.75	1.52	1.67	1.70	1.66	1.68	1.71
Isoleucine, g/100g (as is)	1.52	1.54	1.47	1.54	1.29	1.46	1.48	1.46	1.49	1.59
Leucine, g/100g (as is)	2.68	2.67	2.67	2.75	2.35	2.59	2.55	2.61	2.58	2.78
Phenylalanine, g/100g (as is)	1.86	1.82	1.78	1.84	1.48	1.74	1.78	1.54	1.80	1.88
Lysine, g/100g (as is)	2.57	2.48	2.44	2.49	2.19	2.31	2.41	2.32	2.40	2.59
Crude protein, % (as is)	37.56	36.94	35.22	36.89	30.42	34.44	36.25	33.65	36.21	37.47
Number of samples	1	1	1	1	1	1	1	1	1	1

Amino Acids Chromatogram

Standard [1.25 µmol/ml]



Sample (including internal standard)



SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(11) Vaalharts	(13) North West Central Region (Sannieshof)	(15) North-West South-Eastern Region
Intake silos	Barkly-West Hartswater Jan Kemp Magogong Taung	Biesiesvlei Bossies Gerdau Oppaslaagte Sannieshof	Bloemhof Christiana Hertzogville Hoopstad Kingswood
<u>Grading:</u>	ave min max stdev	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.00 - - -	0.04 - - -	0.00 0.00 0.00 0.00
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.08 - - -	0.20 - - -	0.34 0.16 0.52 0.25
(C) Other grain, %	0.00 - - -	0.00 - - -	0.04 0.00 0.08 0.06
(D) Sunflower seed, %	0.00 - - -	0.00 - - -	0.00 0.00 0.00 0.00
(E) Stones, %	0.00 - - -	0.00 - - -	0.00 0.00 0.00 0.00
(F) Sclerotinia, %	0.00 - - -	0.00 - - -	0.02 0.00 0.04 0.03
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	0.24 - - -	2.62 - - -	1.18 0.24 2.12 1.33
(H) Defective Soybeans on the 4.75 mm round hole screen, %	2.92 - - -	8.06 - - -	3.78 3.48 4.08 0.42
(I) Soiled Soybeans, %	1.04 - - -	0.32 - - -	0.10 0.00 0.20 0.14
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.08 - - -	0.20 - - -	0.36 0.20 0.52 0.23
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinus communis</i>)	0 - - -	0 - - -	0 0 0 0
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	0 - - -	0 - - -	0 0 0 0
Number of samples	1	1	2
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	6.4 - - -	6.6 - - -	6.5 6.5 6.6 0.1
Protein, % (db)	36.79 - - -	38.81 - - -	40.89 39.31 42.46 2.23
Fat, % (db)	20.4 - - -	19.9 - - -	19.4 18.6 20.1 1.1
Ash, % (db)	5.34 - - -	4.79 - - -	4.97 4.89 5.04 0.11
Number of samples	1	1	2

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(17) North-West Central Northern Region (Ottosdal)	(18) North-West Central Region (Ventersdorp)	(19) North-West Central Region (Lichtenburg)
Intake silos	Bospoort Lethabong (Hartbeesfontein) Kleinharts Melliodora Ottosdal Rostrataville Vermaas Werda	Bodenstein Buckingham Coligny Enselspruit Makokskraal Potchefstroom Ventersdorp	Grootpan Halfpad Hibernia Lichtenburg Lottiehalte Lusthof
<u>Grading:</u>	ave min max stdev	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.02 - - -
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.31 0.08 0.54 0.33	0.21 0.08 0.34 0.18	1.54 - - -
(C) Other grain, %	0.15 0.00 0.30 0.21	0.00 0.00 0.00 0.00	1.20 - - -
(D) Sunflower seed, %	0.00 0.00 0.00 0.00	0.02 0.00 0.04 0.03	0.10 - - -
(E) Stones, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 - - -
(F) Sclerotinia, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 - - -
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	2.54 2.48 2.60 0.08	1.30 0.10 2.50 1.70	3.00 - - -
(H) Defective Soybeans on the 4.75 mm round hole screen, %	7.02 6.12 7.92 1.27	9.66 7.32 12.00 3.31	5.50 - - -
(I) Soiled Soybeans, %	0.39 0.24 0.54 0.21	1.46 0.40 2.52 1.50	23.20 - - -
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.31 0.08 0.54 0.33	0.21 0.08 0.34 0.18	1.54 - - -
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinis communis</i>)	0 0 0 0	0 0 0 0	38 - - -
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	0 0 0 0	0 0 0 0	0 - - -
Number of samples	2	2	1
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	7.2 6.7 7.6 0.6	6.6 6.4 6.8 0.3	7.6 - - -
Protein, % (db)	38.48 38.37 38.58 0.15	37.41 36.97 37.84 0.62	36.42 - - -
Fat, % (db)	21.1 20.9 21.3 0.3	19.1 18.5 19.7 0.9	22.8 - - -
Ash, % (db)	5.00 4.88 5.11 0.16	4.76 4.64 4.87 0.16	5.21 - - -
Number of samples	2	2	1

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(20) North-West Eastern Region	(21) Free State North-Western Region (Viljoenskroon)	(24) Free State Central Region
Intake silos	Battery Boons Brits Derby Koster Rustenburg Swartruggens Syferbult	Attie Groenebloem Heuningspruit Koppies Rooiwal Vierfontein Viljoenskroon Vredefort Weiveld	Bloemfontein Brandfort De Brug Geneva Hennenman Koffiefontein Kroonstad Petrusburg Theunissen Van Tonder Welgeleë Winburg
<u>Grading:</u>	ave min max stdev	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.01 0.00 0.02 0.01	0.02 0.00 0.05 0.03	0.00 0.00 0.00 0.00
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.27 0.20 0.32 0.06	0.35 0.10 0.60 0.25	0.13 0.10 0.16 0.04
(C) Other grain, %	0.05 0.00 0.16 0.09	0.08 0.00 0.16 0.08	0.04 0.00 0.08 0.06
(D) Sunflower seed, %	0.05 0.00 0.08 0.05	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
(E) Stones, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
(F) Sclerotinia, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	5.15 4.54 6.10 0.83	2.91 2.14 4.00 0.97	0.85 0.20 1.50 0.92
(H) Defective Soybeans on the 4.75 mm round hole screen, %	6.53 6.00 7.28 0.67	5.73 4.90 6.88 1.03	5.36 5.12 5.60 0.34
(I) Soiled Soybeans, %	4.37 0.74 7.08 3.27	0.24 0.08 0.54 0.26	0.76 0.00 1.52 1.07
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.27 0.20 0.32 0.06	0.35 0.10 0.60 0.25	0.13 0.10 0.16 0.04
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinis communis</i>)	0 0 0 0	0 0 0 0	0 0 0 0
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	0 0 0 0	0 0 0 0	0 0 0 0
Number of samples	3	3	2
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	7.8 6.9 9.2 1.3	6.5 6.3 6.7 0.2	6.6 6.5 6.7 0.1
Protein, % (db)	38.64 37.06 39.85 1.43	38.30 35.60 39.77 2.34	36.11 34.91 37.30 1.69
Fat, % (db)	20.2 19.5 21.4 1.0	19.2 18.0 20.7 1.4	20.7 19.9 21.4 1.1
Ash, % (db)	4.72 4.48 5.15 0.37	4.79 4.66 4.90 0.12	5.21 4.98 5.43 0.32
Number of samples	3	3	2

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(25) Free State South-Western Region (Bethlehem)	(26) Free State South-Eastern Region (Senekal)	(27) Free State Northern Region
Intake silos	Bethlehem Clocolan De Wetsdorp Ficksburg Fouriesburg Marseilles Modderpoort Slabberts Tweespruit Westminster Zastron	Arlington Kaallaagte Libertas Marquard Meets Monte Video Senekal Steynsrus	Gottenburg Heilbron Hoogte Mooigeleë Petrus Steyn Wolwehoek
<u>Grading:</u>	ave min max stdev	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.00 0.00 0.01 0.00	0.01 0.00 0.03 0.01	0.02 - - -
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.27 0.20 0.54 0.13	1.06 0.14 4.82 1.85	0.16 - - -
(C) Other grain, %	0.03 0.00 0.10 0.05	0.00 0.00 0.00 0.00	0.00 - - -
(D) Sunflower seed, %	0.00 0.00 0.00 0.00	0.00 0.00 0.02 0.01	0.00 - - -
(E) Stones, %	0.00 0.00 0.00 0.00	0.14 0.00 0.34 0.13	0.00 - - -
(F) Sclerotinia, %	0.00 0.00 0.00 0.00	0.01 0.00 0.06 0.02	0.00 - - -
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	4.68 2.70 10.00 2.72	4.44 2.96 9.66 2.58	3.50 - - -
(H) Defective Soybeans on the 4.75 mm round hole screen, %	5.32 2.08 7.72 1.90	4.84 1.44 8.92 2.99	4.84 - - -
(I) Soiled Soybeans, %	0.22 0.00 1.00 0.39	0.30 0.00 1.12 0.43	0.00 - - -
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.27 0.20 0.54 0.13	1.07 0.14 4.88 1.87	0.16 - - -
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinis communis</i>)	3 0 15 6.1	3 0 18 7.4	0 - - -
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	0 0 0 0	0 0 2 0.8	0 - - -
Number of samples	6	6	1
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	6.6 6.5 6.8 0.1	7.1 6.7 8.4 0.6	6.6 - - -
Protein, % (db)	37.22 32.60 39.52 2.73	37.42 31.45 39.99 3.04	38.36 - - -
Fat, % (db)	16.3 15.1 18.1 1.1	19.1 17.4 22.7 2.1	16.4 - - -
Ash, % (db)	4.76 4.50 5.13 0.24	4.78 4.37 5.28 0.30	4.53 - - -
Number of samples	6	6	1

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(28) Free State Eastern Region				(29) Mpumalanga Southern Region				(30) Mpumalanga Eastern Region			
Intake silos	Afrikaskop Ascent Cornelia Daniëlsrus Eeram Frankfort Harrismith Jim Fouché Kransfontein Memel Reitz	Tweeling Villiers Vrede Warden Windfield			Balfour Grootvlei Holmdene Platrand Val Greylingstad Harvard Leeuspruit Standerton				Amersfoort Badplaas Carolina Davel Ermelo Estancia Lothair Maizefield Mkondo Morgenzon	Overvaal Panbult		
<u>Grading:</u>	ave	min	max	stdev	ave	min	max	stdev	ave	min	max	stdev
(A) Wet pods, %	0.01	0.00	0.02	0.01	0.01	0.00	0.04	0.01	0.02	0.00	0.06	0.02
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.33	0.04	0.98	0.27	0.28	0.08	0.58	0.17	0.25	0.02	0.80	0.26
(C) Other grain, %	0.15	0.00	0.46	0.14	0.10	0.00	0.36	0.13	0.02	0.00	0.10	0.04
(D) Sunflower seed, %	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.01
(E) Stones, %	0.03	0.00	0.20	0.06	0.03	0.00	0.16	0.06	0.03	0.00	0.28	0.08
(F) Sclerotinia, %	0.00	0.00	0.02	0.01	0.02	0.00	0.04	0.02	0.02	0.00	0.05	0.02
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	3.69	1.76	7.76	1.86	3.85	2.00	11.44	3.16	1.89	0.30	4.60	1.31
(H) Defective Soybeans on the 4.75 mm round hole screen, %	6.45	4.44	8.56	1.30	3.71	1.72	7.56	2.08	7.27	4.20	9.60	1.56
(I) Soiled Soybeans, %	0.75	0.00	7.60	2.28	0.15	0.00	0.84	0.29	1.92	0.08	6.76	1.89
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.33	0.04	0.98	0.27	0.30	0.12	0.60	0.17	0.26	0.02	0.80	0.26
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinus communis</i>)	0	0	0	0	0	0	0	0	0	0	5	1.4
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	1	0	10	3.0	0	0	0	0	0	0	5	1.4
Number of samples	11				8				12			
<u>Chemical analysis:</u>	ave	min	max	stdev	ave	min	max	stdev	ave	min	max	stdev
Moisture, % (17hr, 103 °C)	6.8	6.7	7.1	0.1	6.7	6.4	6.9	0.2	6.7	6.3	6.9	0.2
Protein, % (db)	40.14	35.05	45.25	2.70	40.68	39.30	41.48	0.87	40.21	38.85	41.65	0.83
Fat, % (db)	17.5	16.1	18.7	0.9	18.3	16.4	19.8	1.1	18.7	17.6	20.2	0.8
Ash, % (db)	4.63	4.32	4.89	0.20	4.57	4.47	4.72	0.09	4.34	4.09	4.53	0.13
Number of samples	11				8				12			

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(31) Mpumalanga Central Region	(32) Mpumalanga Western Region	(33) Mpumalanga Northern Region
Intake silos	Betja; Kinross Trichardt Devon Leandra	Argent Dryden Endicott Elof Hawerklip Kendal Ogies	Driefontein Lydenburg Marble Hall Middelburg Stoffberg Pan Arnot Wonderfontein
<u>Grading:</u>	ave min max stdev	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.02 0.00 0.04 0.02	0.08 0.00 0.52 0.18	0.00 0.00 0.02 0.01
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.27 0.08 0.48 0.17	0.18 0.08 0.34 0.09	0.36 0.14 1.24 0.35
(C) Other grain, %	0.04 0.00 0.18 0.07	0.07 0.00 0.20 0.08	0.21 0.00 1.00 0.32
(D) Sunflower seed, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00	0.00 0.00 0.02 0.01
(E) Stones, %	0.09 0.00 0.24 0.12	0.01 0.00 0.04 0.02	0.02 0.00 0.12 0.04
(F) Sclerotinia, %	0.21 0.02 0.68 0.23	0.04 0.00 0.12 0.04	0.02 0.00 0.06 0.02
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	4.01 0.42 10.00 3.23	1.66 0.40 3.42 1.28	2.58 1.38 3.52 0.75
(H) Defective Soybeans on the 4.75 mm round hole screen, %	5.11 3.10 7.64 1.47	6.48 2.24 11.80 3.30	5.62 1.58 8.14 1.90
(I) Soiled Soybeans, %	0.97 0.24 2.04 0.76	2.57 0.40 5.20 1.66	1.90 0.00 4.80 1.62
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.48 0.18 1.04 0.31	0.21 0.10 0.36 0.09	0.37 0.14 1.26 0.35
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinis communis</i>)	0 0 0 0	0 0 0 0	0 0 1 0.32
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	1 0 5 2.0	3 0 27 9.6	0 0 0 0
Number of samples	7	8	10
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	6.7 6.5 6.9 0.2	6.7 6.4 7.0 0.2	6.7 6.4 6.9 0.2
Protein, % (db)	40.61 39.82 41.85 0.82	39.75 37.76 41.15 1.12	39.60 37.86 41.52 1.36
Fat, % (db)	19.1 18.0 20.9 1.0	18.6 17.5 19.5 0.8	18.1 15.6 20.2 1.4
Ash, % (db)	4.56 4.50 4.63 0.05	4.59 4.28 4.99 0.25	4.43 4.08 4.75 0.20
Number of samples	7	8	10

SOUTH AFRICAN REGIONAL SOYBEAN QUALITY

PRODUCTION REGION	(34) Gauteng	(36) KwaZulu-Natal
Intake silos	Bloekomspruit Bronkhorstspuit Glenroy Goeie Hoek Kaalfontein Middelvlei Nigel Oberholzer Raarthsivlei	Bergville Bloedrivier Dannhauser Dundee Mizpah New Amalfi Paulpietersburg Vryheid Winterton
<u>Grading:</u>	ave min max stdev	ave min max stdev
(A) Wet pods, %	0.02 0.00 0.06 0.02	0.00 0.00 0.01 0.00
(B) Foreign matter, including stones, other grains, sunflower seeds and stones: Provided that such deviations are individually within the limits specified in items (c), (d), and (e), %	0.50 0.08 1.58 0.56	0.19 0.10 0.58 0.16
(C) Other grain, %	0.27 0.00 1.42 0.56	0.09 0.00 0.48 0.16
(D) Sunflower seed, %	0.00 0.00 0.00 0.00	0.00 0.00 0.00 0.00
(E) Stones, %	0.06 0.00 0.34 0.14	0.00 0.00 0.02 0.01
(F) Sclerotinia, %	0.03 0.00 0.16 0.06	0.03 0.00 0.10 0.04
(G) Soybeans and parts of Soybeans which pass through the 4.75 mm round hole screen, %	3.62 0.88 9.40 3.05	1.81 0.10 3.30 1.09
(H) Defective Soybeans on the 4.75 mm round hole screen, %	7.13 3.42 11.40 2.86	5.48 1.16 9.88 2.87
(I) Soiled Soybeans, %	0.95 0.00 2.06 0.85	3.60 0.16 8.24 2.95
(J) Deviations in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items, %	0.53 0.10 1.58 0.55	0.22 0.10 0.64 0.18
Noxious seeds (<i>Crotalaria</i> sp., <i>Datura</i> sp., <i>Ricinis communis</i>)	0 0 0 0	0 0 0 0
Noxious seeds (<i>Argemone mexicana</i> L., <i>Convolvulus</i> sp., <i>Ipomoea purpurea</i> Roth., <i>Lolium temulentum</i> , <i>Xanthium</i> sp.)	0 0 2 0.8	4 0 20 7.9
Number of samples	6	8
<u>Chemical analysis:</u>	ave min max stdev	ave min max stdev
Moisture, % (17hr, 103 °C)	6.8 6.7 6.9 0.1	6.8 6.7 6.9 0.1
Protein, % (db)	39.93 38.18 41.72 1.15	40.01 39.10 41.24 0.80
Fat, % (db)	18.4 17.1 19.5 0.8	20.0 18.8 20.8 0.8
Ash, % (db)	4.59 4.43 4.81 0.17	4.55 4.05 4.76 0.24
Number of samples	6	8

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 were 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.

SOYBEANS: SUPPLY AND DEMAND TABLE BASED ON SAGIS' INFO ('000t)																	Publication date: 2012-08-23				10 Year average
Season (Jan - Dec)																		Current Season Jan - Jul			
	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012						
CEC (Crop Estimate)	200.9	174.8	148.7	209.7	202.4	136.5	220.0	272.5	424.0	205.0	282.0	516.0	566.0	710.0	655.7	7	353.4				
SUPPLY																					
Opening stock (1 Jan)	61.0	86.0	42.1	56.5	61.0	105.0	48.7	100.5	89.1	131.6	96.5	89.5	112.6	102.7	306.1		93.7				
Prod deliveries	215.0	199.0	153.9	226.1	218.0	127.2	217.0	262.9	409.3	196.4	264.3	503.6	534.7	685.1	600.4		341.9				
Imports	0.0	14.0	91.9	13.9	34.8	23.4	18.0	14.3	10.4	120.1	16.3	1.4	2.3	0.3	0.0		24.1				
Surplus	5.0	0.0	0.0	0.0	0.2	1.2	0.0	0.0	2.1	3.6	1.7	0.0	3.7	1.6	2.1		1.4				
Total Supply	281.0	299.0	287.9	296.5	314.0	256.8	283.7	377.7	510.9	451.7	378.8	594.5	653.3	789.7	908.6		461.1				
DEMAND																					
Processed*	173.0	213.0	217.6	215.5	193.5	194.0	172.5	266.8	368.7	347.0	274.7	311.9	413.6	427.0	344.5		297.0				
-human	4.0	9.0	15.8	17.3	19.3	23.4	16.6	23.1	24.7	21.4	27.3	29.6	30.7	30.1	17.1		24.6				
-animal feed (full fat soya)	79.0	91.0	132.3	147.7	141.7	139.8	123.4	189.5	216.4	191.9	110.4	167.1	198.8	149.6	90.6		162.9				
-crush (oil/oilcake)	90.0	113.0	69.5	50.5	32.5	30.8	32.5	54.2	127.6	133.7	137.0	115.2	184.1	247.3	236.8		109.5				
Withdrawn by producers	0.0	0.0	5.3	2.3	3.8	3.8	2.3	2.9	5.2	2.9	3.9	4.9	4.8	3.9	3.0		3.8				
Released to end-consumers	0.0	0.0	1.3	4.4	6.3	2.3	2.1	3.4	1.9	1.2	1.0	1.2	3.6	3.0	1.0		2.6				
Seed for planting purposes	2.0	10.0	1.2	1.0	2.9	2.7	2.5	2.5	2.5	1.5	3.1	5.3	4.9	5.2	2.9		3.3				
Net receipts(-)/disp(+)	7.0	21.0	1.1	6.4	1.3	0.2	0.0	2.7	-0.2	1.4	1.2	2.6	2.4	1.7	5.2		1.3				
Deficit	0.0	10.0	2.1	4.5	0.0	0.0	1.6	1.9	0.0	0.0	0.0	0.4	0.0	0.0	0.0		0.4				
Exports	13.0	2.0	2.8	1.4	1.2	5.1	2.2	8.4	1.2	1.2	5.4	155.6	121.3	42.8	123.5		34.4				
Total Demand	195.0	256.0	231.4	235.5	209.0	208.1	183.2	288.6	379.3	355.2	289.3	481.9	550.6	483.6	480.1		342.9				
Ending Stock (31 Des)	86.0	43.0	56.5	61.0	105.0	48.7	100.5	89.1	131.6	96.5	89.5	112.6	102.7	306.1	428.5		118.2				
- processed p/month	14.4	17.8	18.1	18.0	16.1	16.2	14.4	22.2	30.7	28.9	22.9	26.0	34.5	35.6	49.2		24.8				
- months' stock	6.0	2.4	3.1	3.4	6.5	3.0	7.0	4.0	4.3	3.3	3.9	4.3	3.0	8.6	8.7		4.8				
Note: * 1997/98-2007 updated May - Jul 2007																					
Note: Figures in red: opening stock and ending stock difference																					
Note: Figures in green: current season up to date																					

Accuracy Award

SAGL participates in several international proficiency schemes including AACC International, BIPEA and FAPAS, as part of our quality assurance procedures to demonstrate technical competency. SAGL has received the 2010 AACC International Accuracy Award for the Mixograph analysis (also received in 2006, 2007, 2008 and 2009). SAGL received the Accuracy Award for Feed analysis (moisture, crude protein, crude fibre and ash) in 2004 and 2009.





CERTIFICATE OF ACCREDITATION

In terms of section 22(2)(b) of the Accreditation for Conformity Assessment, Calibration and Good Laboratory Practice Act, 2006 (Act 19 of 2006), read with sections 23(1), (2) and (3) of the said Act, I hereby certify that:-

SOUTHERN AFRICAN GRAIN LABORATORY
Co. reg no: 1997/018518/08

Facility Accreditation Number: **T0116**

is a South African National Accreditation System accredited Testing laboratory
provided that all SANAS conditions and requirements are complied with

This certificate is valid as per the scope as stated in the accompanying schedule of accreditation,
Annexure "A", bearing the above accreditation number for

CHEMICAL & PHYSICAL ANALYSIS

The facility is accredited in accordance with the recognised International Standard

ISO/IEC 17025:2005

*The accreditation demonstrates technical competency for a defined scope and the operation of a
laboratory quality management system*

While this certificate remains valid, the Accredited Facility named above is authorised to
use the relevant SANAS accreditation symbol to issue facility reports and/or certificates



Mr R Josias
Chief Executive Officer

Effective Date: **01 November 2009**
Certificate Expires: **31 October 2014**

ANNEXURE A

SCHEDULE OF ACCREDITATION

Testing Laboratory Number: T0116

Permanent Address of Laboratory: Southern African Grain Laboratory Grain Building 477 Witherite Road The Willows 0040 Postal Address: PostNet Suite # 391 Private Bag X 1 The Willows 0041 Tel : (012) 807-4019 Fax : (012) 807-4160 E-mail : info@sagl.co.za	Technical Signatories - Ms J Nortjé (All) - Ms M Hammes (Chemical) - Ms M E Vorster (Physical) - Mr B van der Linde (Grading) - Ms A de Jager (Nutrients & Contaminants) - Mrs M Henning (Chemical) - Ms H Schoeman (In House Method 24 & Grading) - Ms D Moleke (Physical) - Ms J Delport (Physical) - Mrs W Louw (In House Methods 1, 2, 3, 10 & 26) - Ms J Kruger (Chemical excluding In-House Method 12) Nominated Representative : Mrs S du Preez Management Representative : Mrs W Louw Issue No. : 18 Date of issue : 22 November 2011 Expiry date : 31 October 2014	
Materials/Products Tested	Types of Tests/Properties Measured, Range of Measurement	Standard Specifications, Equipment/ Techniques Used
CHEMICAL		
Ground barley Ground grains, semolina and flour, milled-wheat, bran, rice (hulled, paddy), millet, rye & oats as grains, milled pasta, brown bread flour. Whole and milled maize and soya beans, milled maize products All flours, cereal grains, oil seeds and animal feeds Food stuffs Food Stuff and Feeds Food Stuffs and Feeds, Semolina and Milled Pasta Wheat Kernels	Moisture (Oven method) Moisture (Oven method) Moisture (Oven method) Nitrogen and protein (Combustion method) Dietary fibre (total) Carbohydrates (by difference) (calculation) Energy Value (calculation) Total Digestible Nutritional Value (calculation) Determination of Ash Moisture (oven method)	Analytical EBC 3.2, Latest Edition ICC No 110/1, Latest Edition AACC 44-15.02, Latest Edition AACC 45-30.01, Latest Edition In-House Method 12 SOP MC-23 In-House Method 11 Government Gazette Wheat Grading Regulation, Latest Edition

Original date of accreditation: 01 November 1999

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ANNEXURE A

Laboratory No: T0116
Date of issue: 22 November 2011
Expiry date: 31 October 2014

Expiry date: 31 October 2017

Materials/Products Tested	Types of Tests/Properties Measured, Range of Measurement	Standard Specifications, Equipment/ Techniques Used
CHEMICAL Continued...		
Flours of grains, e.g. barley, triticale, maize, rye, sorghum and wheat, oilseeds, feeds, mixed feeds and foodstuffs	Crude fat (Ether extraction by Soxhlet)	In-House Method 24
Meal and flour of wheat, rye, barley, other grains, starch containing and malted products	Falling Number	ICC No 107/1, Latest Edition
NUTRIENTS & CONTAMINANTS		
Grain based fortified food and feed products and fortification mixes	Vitamin A as all trans Retinol (Saponification) (HPLC)	In-House Method 1
	Thiamine Mononitrate (HPLC)	In-House Method 2
	Riboflavin (HPLC)	In-House Method 2
	Nicotinamide (HPLC)	In-House Method 2
	Pyridoxine Hydrochloride (HPLC)	In-House Method 2
	Folic Acid (HPLC)	In-House Method 3
Grain based fortified food and feed products and fortification mixes	Total Iron and Total Zinc (AA)	In-House Method 10
Food and Feed	Mycotoxins - Aflatoxins - Deoxynivalenol (DON) - Fumonisin - Ochratoxin A - T2 - Zearalenone	In-House Method 26 UPLC-MS/MS
GRADING		
Maize	Defective Kernels (white maize/ yellow maize)	Government Gazette Maize Grading Regulation, Latest Edition
Cereals as grain (Wheat, barley, rye and oats)	Hectolitre mass (Kern 222)	ISO 7971-3, Latest Edition
Wheat	Screenings	Government Gazette Wheat Grading Regulation, Latest Edition
PHYSICAL		
Wheat flour	Alveograph (Rheological properties)	ICC No 121, Latest Edition
Wheat Flour and brown bread flour	Farinograph (Rheological properties)	AACC 54-21.01, Latest Edition Constant Flour Weight Procedure
Wheat flour and whole wheat flour of hard/soft wheat	Mixograph (Rheological properties)	Industry Accepted Method 020 (Based on AACC 54-40.02, Latest Edition.)

Original date of accreditation: 01 November 1999

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ISSUED BY THE SOUTH AFRICAN NATIONAL ACCREDITATION SYSTEM


Field Manager

GOVERNMENT NOTICES GOEWERMENTSKENNISGEWINGS

DEPARTMENT OF AGRICULTURE DEPARTEMENT VAN LANDBOU

No. R. 225

6 March 2009

AGRICULTURAL PRODUCT STANDARDS ACT, 1990
(ACT No. 119 OF 1990)

REGULATIONS RELATING TO THE GRADING, PACKING AND MARKING OF SOYA BEANS INTENDED FOR SALE IN THE REPUBLIC OF SOUTH AFRICA

The Minister of Agriculture has under section 15 of the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990) --

- (a) made the regulations in the Schedule; and
- (b) determined that the said regulations shall come into operation on date of publication.

SCHEDULE

Definitions

1. In these regulations any word or expression to which a meaning has been assigned in the Act, shall have that meaning and, unless the context otherwise indicates --

"**bag**" means a bag manufactured from --

- (a) jute or phormium or a mixture of jute and phormium; or
- (b) polypropylene that complies with SABS specification CKS 632;

"**bulk container**" means any vehicle or container in which bulk soya beans is transported or stored;

"**consignment**" means --

- (a) a quantity of soya beans of the same class, which belongs to the same owner, delivered at any one time under cover of the same consignment note, delivery note or receipt note, or delivered by the same vehicle or bulk container, or loaded from the same bin of a grain elevator or from a ship's hold; or
- (b) in the case where a quantity referred to in paragraph (a), is subdivided into different grades, each such quantity of each of the different grades;

"**container**" means a bag or a bulk container;

"**cultivar list**" means the list of cultivars determined from time to time by the Executive Officer: Agricultural Product Standards and which is obtainable from the Executive Officer: Agricultural Product Standards, Private Bag X258, Pretoria, 0001;

"**defective soya beans**" means soya beans and pieces of beans which --

- (a) have been damaged by frost, heat or weather conditions;
- (b) have been visibly damaged by insects;
- (c) are contaminated by moulds or plant diseases;
- (d) have a distinctly immature form or which are covered with a whitish membrane or where the testa have a green discoloration; and
- (e) when the testa is removed, display discolouration, excluding green discolouration:

Provided that soya beans which were damaged by insects in the green pod stage and of which the discolouration as a result of the damaged is not larger than half of the surface of the soya beans, shall not be deemed as defective soya beans;

"foreign matter" means all matter other than soya beans, glass, coal, dung, sclerotinia or metal and loose seed coats of soya beans as well as pods;

"frost damaged" means soya beans with green to green brown seed-lobes with a waxy appearance;

"heat damaged" means soya beans with light to dark brown seed-lobes in a cross section;

"insect" in relation to soya beans, means any live insect which is injurious to stored soya beans, irrespective of the stage of development of the insect;

"mould infected" means soya beans that is shrivelled and deformed in appearance with a colour that varies from medium to dark brown, parts of infected beans covered in mould;

"other grains" means kernels or pieces of kernels of wheat, barley, oats, triticale, maize, rye and sorghum;

"pods" means all whole or damaged soya bean pods;

"poisonous seeds" means seeds or part of seeds of plant species that may, in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972), represent a hazard to human or animal health when consumed, including seeds of *Argemone mexicana* L., *Convolvulus* spp., *Crotalaria* spp., *Datura* spp., *Ipomoea* spp., *Lolium temulentum*, *Ricinus communis* or *Xanthium* spp.;

"sclerotinia" *Sclerotinia sclerotiorum* is a fungus that produces hard masses of fungi tissue and is also known as sclerotinia. The sclerotinia varies in size and form and consists of a dark black exterior, a white interior and a rough surface texture;

"soiled soya beans" means whole soya beans which do not pass through the 4,75 mm screen and which are discoloured by soil or any other substance: Provided that if the discolouration is caused by plant material such soya beans shall not be regarded as soiled soya beans;

"soya beans" means the threshed seed and parts of seeds of the plant *Glycine max* and where the word "soya beans" is used in conjunction with the word "consignment", it includes matter other than soya beans that is included in a consignment;

"the Act" means the Agricultural Product Standards Act, 1990 (Act No. 119 of 1990);

"the 4,75 mm round-hole sieve" means a sieve --

- (a) with a flat metal sheet of 1,0 mm thickness perforated with round holes of 4,75 mm in diameter that are arranged with the centers of the holes at the points of intersection of an equilateral triangular grid with a pitch of 8 mm;
- (b) of which the upper surface of the sieve is smooth;
- (c) the frame of which is at least 40 mm high;
- (d) with the inner width of at least 200 mm and the inner length of at least 300 mm. or, in the case of a circular sieve, the inner diameter of at least 278 mm;
- (e) that fits onto a tray with a solid bottom; and must be at least 20 mm above the bottom of the tray; and

"wet pods" means all whole or damaged soya bean pods with a moisture content higher than the permissible moisture content.

Restriction on sale of soya beans

2. (1) No person shall sell soya beans in the Republic of South Africa --
- (a) unless the soya beans are sold according to the classes set out in regulation 3;
 - (b) unless the soya beans comply with the standards for the class concerned set out in regulation 4;
 - (c) unless the soya beans, where applicable, comply with the grades of soya beans and the standards for grades set out in regulation 5 and 6 respectively;
 - (d) unless the soya beans are packed in accordance with the packing requirements set out in regulation 7;
 - (e) unless the containers or sale documents, as the case may be, are marked in accordance with the marking requirements set out in regulation 8; and
 - (f) if such soya beans contains a substances that renders it unfit for human or animal consumption or for processing into or utilisation thereof as food or feed.
- (2) The Executive Officer may grant written exemption, entirely or partially to any person on such conditions as he or she may deem necessary, from the provision of subregulation (1): Provided that such exemption is done in terms of section 3(1)(c) of the Act.

**PART I
QUALITY STANDARDS**

Classes of soya beans

3. There are two classes of soya beans, namely Class SB and Class Other soya beans.

Standards for classes of soya beans

4. (1) A consignment of soya beans shall --
- (a) be free from a musty, sour, khaki bush or other undesired odour;
 - (b) be free from any substance that renders it unsuitable for human or animal consumption or for processing into or utilisation as food or feed;
 - (c) contain no more poisonous seeds than permitted in terms of the Foodstuffs, Cosmetics and Disinfectants Act, 1972 (Act No. 54 of 1972);
 - (d) shall be free from glass, metal, coal or dung;
 - (e) with the exception of Class Other soya beans, be free from insects; and
 - (f) with the exception of Class Other soya beans, have a moisture content of not more than 13 percent.
- (2) A consignment of soya beans is classified as Class SB if it --
- (a) consists of any cultivar of soya beans; and
 - (b) complies with the standards for the grade of Class SB soya beans as set out in regulation 6.
- (3) A consignment of soya beans is classified as Class Other soya beans if it does not comply

with the standards for Class SB.

Grades for soya beans

5. (1) Soya beans of Class SB shall be graded as Grade SB1.
- (2) No grades are determined for Class Other soya beans.

Standards for grades of soya beans

6. A consignment of soya beans shall be graded as --
 - (a) Grade SB1 if the nature of the deviation, specified in column 1 of Table 1 of the Annexure, in that consignment does not exceed the percentage specified in column 2 of the said table opposite the deviation concerned.

**PART II
PACKING AND MARKING REQUIREMENTS**

Packing requirements

7. Soya beans of different classes and grades shall be packed in different containers or stored separately.

Marking requirements

8. Each container or the accompanying sales documents of a consignment of soya beans shall be marked or endorsed with the class and grade of the soya beans.

**PART III
SAMPLING**

Obtaining sample

9. (1) A representative sample of a consignment of soya beans shall --
 - (a) in the case of soya beans delivered in bags and subject to regulation 10, be obtained by sampling at least ten per cent of the bags, chosen from that consignment at random, with a bag probe: Provided that at least 25 bags in a consignment shall be sampled and where a consignment consists of less than 25 bags, all the bags in that consignment shall be sampled; and
 - (b) in the case of soya beans delivered in bulk and subject to regulation 10, be obtained by sampling that consignment throughout the whole depth of the layer, in at least six different places, chosen at random in that bulk quantity, with a bulk sampling apparatus.
- (2) The collective sample obtained in subregulation-(1)(a) or (b) shall --
 - (a) have a total mass of at least 10 kg; and
 - (b) be thoroughly mixed by means of dividing before further examination.
- (3) If it is suspected that the sample referred to in subregulation (1)(a) is not representative of that consignment, an additional five per cent of the remaining bags, chosen from that consignment at random, shall be emptied into a suitable bulk container and sampled in the manner contemplated in subregulation (1)(b).
- (4) A sample taken in terms of these regulations shall be deemed to be representative of the

consignment from which it was taken.

Sampling if contents differ

10. (1) If, after an examination of the soya beans taken from different bags in a consignment in terms of regulation 9(1), it appears that the contents of those bags differ substantially --

- (a) all the bags in the consignment concerned shall be sampled in order to do such separation;
- (b) the bags concerned shall be placed separately; and
- (c) each group of bags with a similar contents in that consignment shall for the purpose of these regulations be deemed to be a separate consignment.

(2) If, after the discharge of a consignment of soya beans in bulk has commenced, it is suspected that the consignment could be of a grade other than that determined by means of the initial sampling, the discharge shall immediately be stopped and the part of the consignment remaining in the bulk container, as well as the soya beans that is already in the collecting tray, shall be sampled anew with a bulk sampling apparatus or by catching at least 20 samples at regular intervals throughout the whole off loading period with a suitable container from the stream of grain that is flowing in bulk.

Working sample

11. A working sample shall be obtained by dividing the representative sample of the consignment according to the ICC 101/1 method.

**PART IV
INSPECTION METHODS**

Determination of undesired odours, harmful substances, poisonous seeds, glass, metal, coal, dung and insects

12. A consignment or a sample of a consignment of soya beans shall be sensorially assessed or chemically analysed in order to determine --

- (a) whether it has musty, sour, khaki bush or other undesired odour;
- (b) whether it contains soya beans in which or on which a substance is found, that renders it unfit for human or animal consumption or for processing into or for utilisation as food or feed;
- (c) whether it contains poisonous seeds;
- (d) whether it contains glass, metal, coal or dung; and
- (e) whether it contains any insects.

Determination of moisture content

13. The moisture content of a consignment of soya beans may be determined according to any suitable method: Provided that the result thus obtained is in accordance with the maximum permitted deviation for a class 1 moisture meter as detailed in ISO 7700/2, based on results of the 72 hour, 103°C oven dried method (AACC Method 44-15A).

Determination of percentage of wet pods

14. The percentage of wet pods in a consignment of soya beans shall be determined as follows:

- (a) Obtain a working sample of at least 10 kg of soya beans from a representative sample of the

consignment.

- (b) Remove all wet pods by hand from the working sample and determine the mass thereof.
- (c) Express the mass thus determined as a percentage of the mass of the working sample concerned.
- (d) Such percentage represents the percentage of wet pods in the consignment concerned.

Determination of percentage of other grains, sunflower seed, stones and foreign matter

15. The percentage of other grains, sunflower seed, stones and foreign matter in a consignment of soya beans shall be determined as follows:

- (a) Obtain a working sample of at least 200g from a representative sample of the consignment.
- (b) Remove all other grains, sunflower seed, stones and foreign matter by hand from the working sample and determine the mass of the other grain, sunflower seed, stones and foreign matter separately.
- (c) Express the respective masses thus determined as a percentage of the mass of the working sample concerned.
- (d) Such percentages represent the percentage of other grains, sunflower seed, stones and foreign matter respectively in the consignment concerned.

Determination of the percentage defective soya beans

16. The percentage of defective soya beans shall be determined as follows:

- (a) Obtain a working sample of at least 100g soya beans, which is free of other grains, sunflower seed, stones and foreign matter, from the representative sample of the consignment
- (b) Sieve the working sample over the 4, 75 mm round hole sieve and a pan.
- (c) Sort the soya beans on the 4, 75 mm round hole sieve so that the defective soya beans retained.
- (d) Determine the mass of the defective soya beans on the 4, 75 mm round hole sieve and express it as a percentage of the mass of the working sample concerned.
- (e) Such percentage represents the percentage of defective soya beans in the consignment.

Determination of the soya beans and pieces of soya beans which pass through the 4,75 mm round hole sieve

17. The percentage of soya beans and pieces of soya beans which pass through the 4, 75 mm round hole sieve shall be determined as follows:

- (a) Determine the mass of the soya beans and pieces of soya beans in the pan as obtained according to 16(a) and (b) and express it as a percentage of the mass of the working sample obtained in 16(a).
- (b) Such percentage represents the percentage soya beans and pieces of soya beans in the consignment which passes through the 4, 75 mm round hole sieve.

Determination of percentage of soiled soya beans

18. The percentage of soiled soya beans in a consignment of soya beans shall be determined as follows:

- (a) Remove all soiled soya beans from the working sample obtained in 16(a) by hand and determine the mass thereof.
- (b) Express the mass thus determined, as a percentage of the mass of the working sample in 16(a) obtained.
- (c) Such percentage represents the percentage of soiled soya beans in the consignment concerned.

Determination of percentage sclerotinia

19. The percentage sclerotinia in a consignment of soya beans shall be determined as follows:
- (a) Remove all sclerotinia in the working sample in 16(a) obtained by hand and determine the mass thereof.
 - (b) Express the mass thus determined as a percentage of the mass of the working sample in 16(a) obtained.
 - (c) Such percentage represents the percentage sclerotinia in the consignment.

**PART V
OFFENCES AND PENALTIES**

20. Any person who fails to comply with any provision of these regulations shall be guilty of an offence and upon conviction be liable to a fine or imprisonment in accordance with article 11 of the Act.

ANNEXURE/AANHANGSEL

TABLE/TABEL

STANDARDS FOR GRADES OF SOYA BEANS/STANDAARDE VIR GRADE VAN SOJABONE

Nature of deviation/Aard van afwyking	Maximum percentage permissible deviation (m/m)/ Maksimum persentasie toelaatbare afwyking (m/m)
	Grade/Graad SB1
1	2
(a) Wet pods/Nat peule	0,2%
(b) Foreign matter, including stones, other grain and sunflower seeds: Provided that such deviations are individually within the limits specified in items (c), (d), (e) and (f)/Vreemde voorwerpe, insluitende klip-pies, ander graan en sonneblomsaad: Met dien verstande dat sodanige afwykings individueel binne die perke gespesifiseer in items (c), (d), (e) en (f) is	4%
(c) Other grain/Ander graan	0,5%
(d) Sunflower seed/Sonneblomsaad	0,1%
(e) Stones/Klippies	1%
(f) Sclerotinia	4%
(g) Soya beans and parts of soya beans which pass through the 4,75 mm round hole screen/Sojabone en gedeeltes van sojabone wat deur die 4,75 mm-rondegatsif gaan	10%
(h) Defective soya beans on the 4,75 mm round hole screen/Gebrekkige sojabone op die 4,75 mm-rondegatsif	10%
(i) Soiled soya beans/Vuilgesmeerde sojabone	10%
(j) Deviation in (b) and (f) collectively: Provided that such deviations are individually within the limits of said items/Afwykings in (b) en (f) gesamentlik: Met dien verstande dat sodanige afwykings individueel binne die perke van genoemde items is	6%

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