

## Soybean Crop Quality 2019/20 – Summary of results

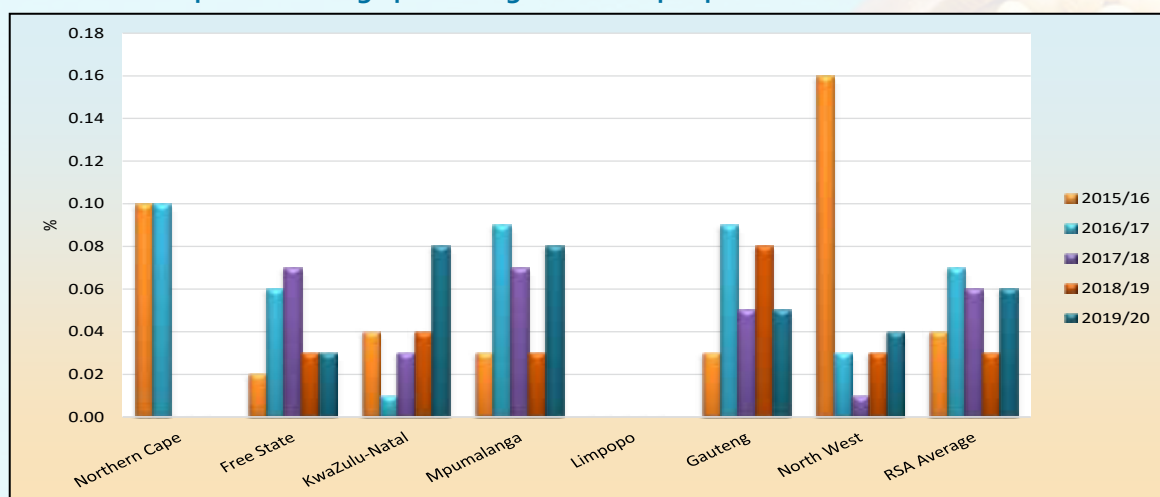
Seventy-three percent (109) of the 150 samples analysed for the purpose of this survey were graded as Grade SB1, while 41 (27%) of the samples were downgraded to COSB (Class Other Soya Beans). During the previous two seasons, 11% (2018/19) and 13% (2017/18) of the samples were downgraded to COSB.

- Four of the 41 samples were downgraded as a result of the percentage other grain exceeding the maximum permissible deviation of 0.5%.
- Eight of the samples were downgraded as a result of the percentage defective soybeans on the 4.75 mm round-hole sieve exceeding the maximum permissible deviation of 10%.
- Fifteen samples were downgraded as a result of the percentage soiled soybeans present in the samples exceeding the maximum permissible deviation of 10%.
- Six samples were downgraded as a result of the number of *Datura sp.* poisonous seeds present exceeding the maximum permissible number of 1 per 1000 g.
- The remaining eight samples were downgraded as a result of a combination of one or more of the following deviations exceeding the maximum permissible deviation: foreign matter, other grain, sunflower seed, stones, defective soybeans above the 4.75 mm sieve, soiled soybeans and poisonous seeds (*Datura* and *Ipomoea purpurea* Roth.)

Wet pods were not present in any of the 150 samples received and graded.

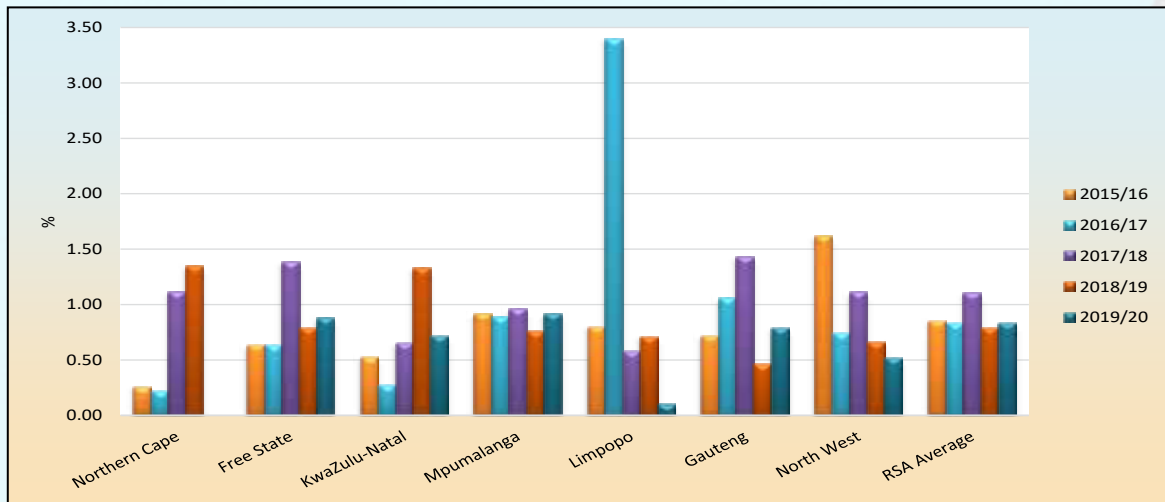
The percentage samples containing sclerotia from the fungus *Sclerotinia sclerotiorum*, increased from 27% (41 samples) in the previous season to 41% (62 samples) this season. In the 2017/18 season, 88 samples (59%) contained sclerotia. The three highest percentages sclerotia, 1.10%, 0.60% and 0.30% were all observed on samples originating in Mpumalanga. As a matter of fact, 52% of the samples that contained sclerotia originated in Mpumalanga. All these percentages sclerotia found to be present in the samples are however still well below the maximum permissible level of 4%. The national weighted average percentage this season was 0.06% compared to the 0.03% of the previous season. See Graph 16.

Graph 16: Average percentage sclerotia per province over five seasons



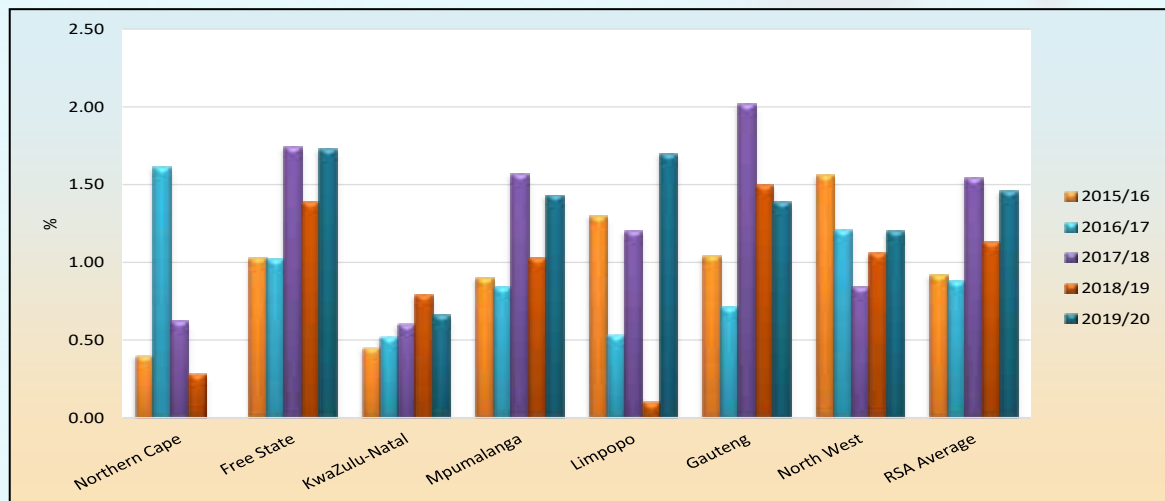
The samples received from Mpumalanga province (65 samples) had the highest percentage foreign matter (0.91%), followed closely by the 0.88% weighted average of the 51 samples from the Free State regions. The percentage foreign matter in the rest of the samples ranged from 0.10% in the sample from Limpopo to 0.79% in Gauteng (8 samples). The national weighted average of 0.83% was in line with previous seasons. Please refer to Graph 17.

**Graph 17: Average percentage foreign matter per province over five seasons**



The Free State reported the highest weighted average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve, namely 1.73%, closely followed by the 1.70% from Limpopo. The lowest weighted average value reported was 0.66% on the nine samples from KwaZulu-Natal. The national weighted average percentage increased from 1.13% the previous season to 1.46% this season. The 2017/18 season's average was 1.54%. Please see Graph 18.

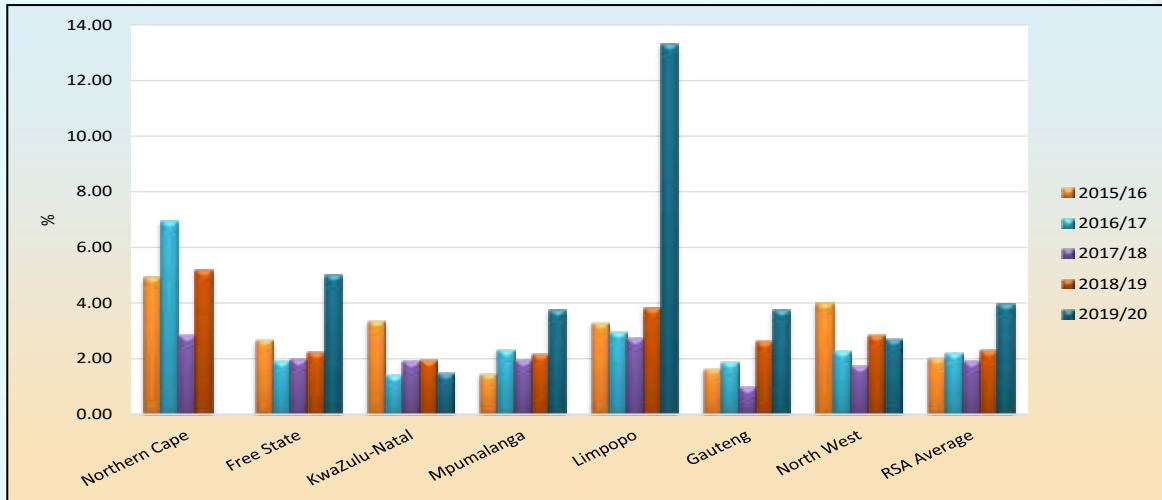
**Graph 18: Average percentage soybeans and parts of soybeans above the 1.8 mm slotted sieve which pass through the 4.75 mm round hole sieve per province over five seasons**



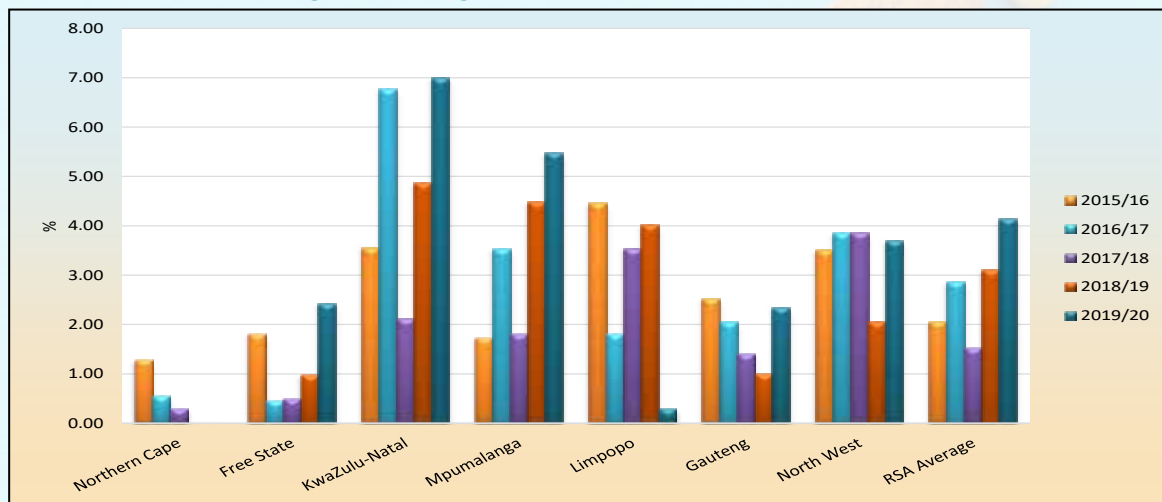
The lowest weighted average percentage defective soybeans on the 4.75 mm sieve was observed on the samples from KwaZulu-Natal, namely 1.47%. The sample from Limpopo province reported the highest percentage namely 13.30%. The averages in the other provinces ranged from 2.72% (North West N=16) to 4.99% in the Free State. The national weighted average increased from 2.30% last season to 3.98% this season. Please see Graph 19. This is the highest national average since the start of the crop surveys in the 2011/12 season.

The national weighted average percentage soiled soybeans was 4.13%, also the highest since the 2011/12 season. The previous two seasons averaged 3.10% and 1.53% respectively. Weighted average percentages per province ranged from 0.30% in Limpopo to 7.00% in KwaZulu-Natal. Please see Graph 20. 17 samples exceeded the maximum permissible deviation of 10% according to the grading regulations. The highest percentage reported was 20.50% on a sample from Mpumalanga. The rest of these samples originated in North West, the Free State, Mpumalanga and KwaZulu-Natal. Last season, six samples originating in Mpumalanga, exceeded the grading limit.

**Graph 19: Average percentage defective soybeans on the 4.75 mm round hole sieve per province over five seasons**



**Graph 20: Average percentage soiled soybeans per province over five seasons**



Test weight does not form part of the grading regulations for soybeans in South Africa. An approximation of the test weight of South African soybeans is provided in Table 2 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2019, was followed. The g/1 L filling mass of the soybean samples was determined and divided by two. The test weight was then extrapolated by means of the following formulas obtained from the Test Weight Conversion Chart for Soybean of the Canadian Grain Commission:  $y = 0.1898x + 2.2988$  (291 to 350 g/0.5 L) and  $y = 0.1895x + 2.3964$  (351 to 410 g/0.5 L). Please see Graph 21 for a comparison of the test weight per province over the last five seasons.

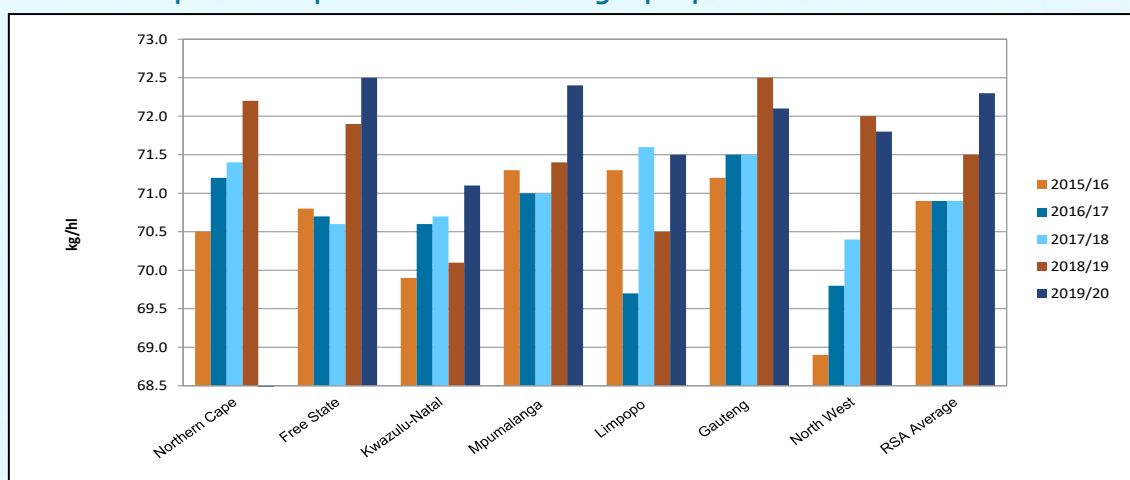
**Table 2: Approximation of test weight per province over three seasons**

Province	Test weight, kg/hl								
	2019/20 Season			2018/19 Season			2017/18 Season		
	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples
Northern Cape (Regions 10 - 11)	-	-	-	72.2	-	1	71.4	70.2 - 72.5	2
Free State (Regions 21 - 28)	72.5	70.3 - 74.4	51	71.9	69.4 - 74.2	42	70.6	67.2 - 73.6	*44
KwaZulu-Natal (Region 36)	71.1	70.0 - 72.3	9	70.1	68.2 - 72.4	12	70.7	70.0 - 71.6	9
Mpumalanga (Regions 29 - 33)	72.4	70.2 - 74.0	*64	71.4	67.8 - 74.6	73	71.0	68.2 - 72.5	71
Limpopo (Region 35)	71.5	-	1	70.5	68.9 - 73.2	3	71.6	71.4 - 72.1	4
Gauteng (Region 34)	72.1	71.0 - 73.2	8	72.5	71.7 - 73.8	12	71.5	70.3 - 74.0	11
North West (Region 12 - 20)	71.8	68.7 - 73.3	16	72.0	72.1 - 73.5	**5	70.4	69.0 - 72.5	8
<b>RSA</b>	<b>72.3</b>	<b>68.7 - 74.4</b>	<b>149</b>	<b>71.5</b>	<b>67.8 - 74.6</b>	<b>148</b>	<b>70.9</b>	<b>67.2 - 74.0</b>	<b>149</b>

\* One sample with an outlier value was not taken into account for calculation purposes.

\*\*Two samples with outlier values were not taken into account for calculation purposes.

**Graph 21: Comparison of the test weight per province over five seasons**



The nutritional component analyses, namely crude protein, - fat, - fibre and ash are reported on a dry/moisture-free basis (db) for the current as well as the previous surveys. For comparison purposes the national average 'as is' or wet basis results for the last five seasons are provided in Table 3. These 'as is' average values were calculated by converting each individual value from dry basis to 'as is'.

**Table 3: Comparison of weighted average nutritional component values on a dry and 'as is' basis over five seasons**

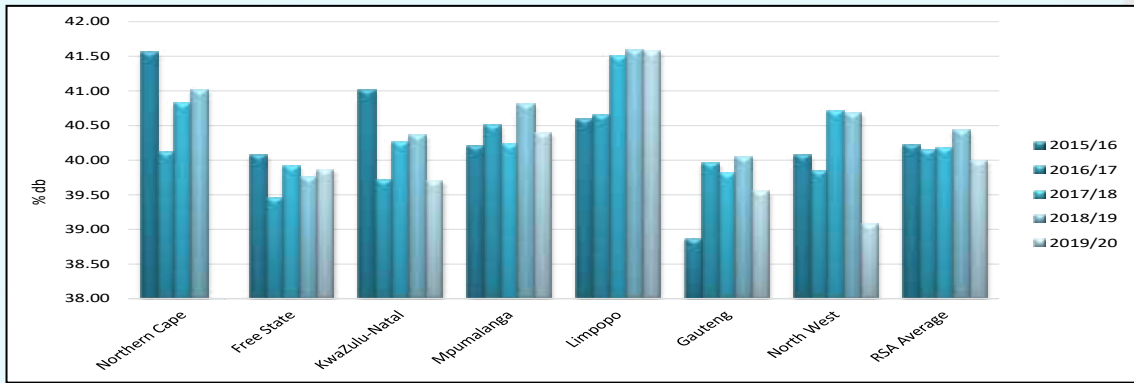
Season	2019/20		2018/19		2017/18		2016/17		2015/16	
Moisture, % (17hr, 103°C)	7.2		7.0		7.4		7.4		7.4	
<b>Moisture basis</b>	<b>Dry basis</b>	<b>As is</b>	<b>Dry basis</b>	<b>As is</b>	<b>Dry basis</b>	<b>As is</b>	<b>Dry basis</b>	<b>As is</b>	<b>Dry basis</b>	<b>As is</b>
Crude protein, %	39.99	37.12	40.43	37.60	40.18	37.40	40.15	37.20	40.22	37.22
Crude fat, %	18.0	16.7	19.1	17.8	19.3	18.0	19.8	18.5	19.4	17.9
Crude fibre, %	7.0	6.5	6.8	6.3	5.9	5.5	5.9	5.4	7.3	6.8
Ash, %	4.63	4.19	4.67	4.34	4.59	4.27	4.58	4.24	4.61	4.27
<b>No. of samples</b>	<b>150</b>		<b>150</b>		<b>150</b>		<b>150</b>		<b>150</b>	

The weighted average crude protein content this season was 39.99% compared to the 40.43% of the previous season. As in the previous three seasons, Limpopo had the highest weighted average crude protein content (41.58%). North West (39.08%) and Gauteng (39.55%) reported the lowest averages. The weighted average crude fat percentage of 18.0% was the lowest since the 2011/12 season. The samples from KwaZulu-Natal had (as in the previous season) the highest weighted average crude fat content, namely 20.0%. The lowest average fat contents were observed in the Limpopo and Free State provinces, with 16.6% and 17.5% respectively.

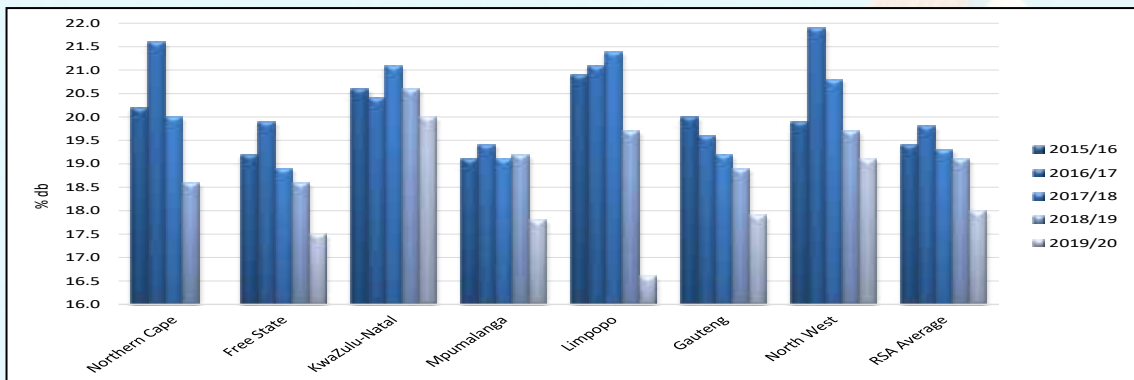
The weighted average percentage crude fibre varied from 6.2% in Gauteng to 7.5% in the Free State. The RSA weighted average, 7.0%, was the second highest of the annual surveys since the 7.3% reported in the 2015/16 season. A small variation of only 0.09% is observed with regards to the national weighted average ash content over the nine seasons that this survey has been conducted. This season, the average ash content was 4.63%. Last season this value was 4.67% and the highest of the nine seasons since 2011/12.

Graphs 22 to 25 on page 18 provide comparisons between provinces over seasons for the nutritional components mentioned above.

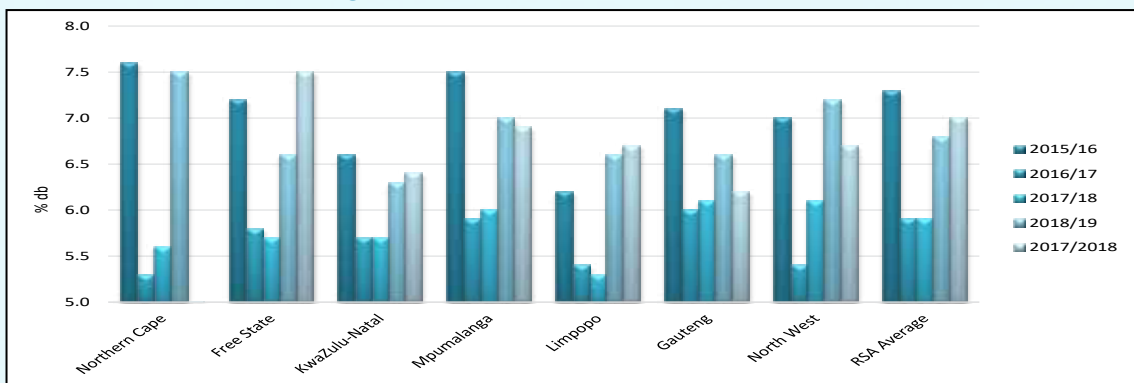
**Graph 22: Average crude protein content per province over five seasons**



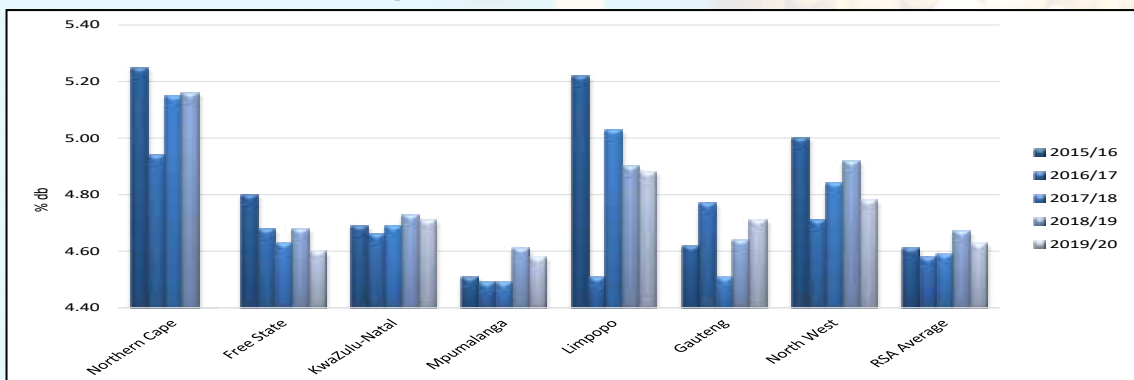
**Graph 23: Average crude fat content per province over five seasons**



**Graph 24: Average crude fibre content per province over five seasons**



**Graph 25: Average ash content per province over five seasons**



The 2019/20 season is the second season that the SAGL conducted the moisture, crude protein and crude fat analyses on the ARC Grain Crops soybean cultivar trials' samples. Please see a comparison of the results between the crop survey and cultivar samples in Table 4.

<b>Table 4: Comparison between the moisture, crude protein and crude fat results of the soybean crop quality and ARC cultivar trial samples of the 2019/20 season</b>					
<b>Analysis</b>	<b>Moisture, % (17hr, 103°C)</b>	<b>Crude Protein, % (db)</b>	<b>Crude Protein, % (as is)</b>	<b>Crude Fat, % (db)</b>	<b>Crude Fat, % (as is)</b>
<b>Soybean Crop Quality Survey results</b>					
<b>Average</b>	<b>7.2</b>	<b>39.99</b>	<b>37.12</b>	<b>18.0</b>	<b>16.7</b>
<b>Minimum</b>	6.4	33.81	31.54	15.4	14.3
<b>Maximum</b>	10.0	43.70	40.68	22.1	20.4
<b>Standard Deviation</b>	0.64	1.42	1.32	1.20	1.11
<b>No. of samples</b>	150	150	150	150	150
<b>ARC Grain Crops Cultivar trial sample results</b>					
<b>Average</b>	<b>7.8</b>	<b>40.87</b>	<b>37.68</b>	<b>19.9</b>	<b>18.4</b>
<b>Minimum</b>	6.9	38.47	35.33	15.8	14.6
<b>Maximum</b>	8.8	44.87	41.33	23.5	21.7
<b>Standard Deviation</b>	0.51	1.25	1.15	1.96	1.84
<b>No. of samples</b>	84	84	84	84	84
<b>% Difference between crop and cultivar samples</b>	<b>-0.6</b>	<b>-0.88</b>	<b>-0.56</b>	<b>-1.9</b>	<b>-1.7</b>

All fifteen samples tested for genetic modification (GM), tested positive for the presence of the CP4 EPSPS trait (Roundup Ready®). Please refer to the results in Table 5 on page 20 of this report.

A summary of the RSA Soybean Crop Quality averages of the 2019/20 season compared to those of the 2018/19 season, is provided in Table 6 on page 21.

Please see pages 26 to 33 for the average soybean quality per region.