Sunflower Crop Quality 2021/22 – Summary of results

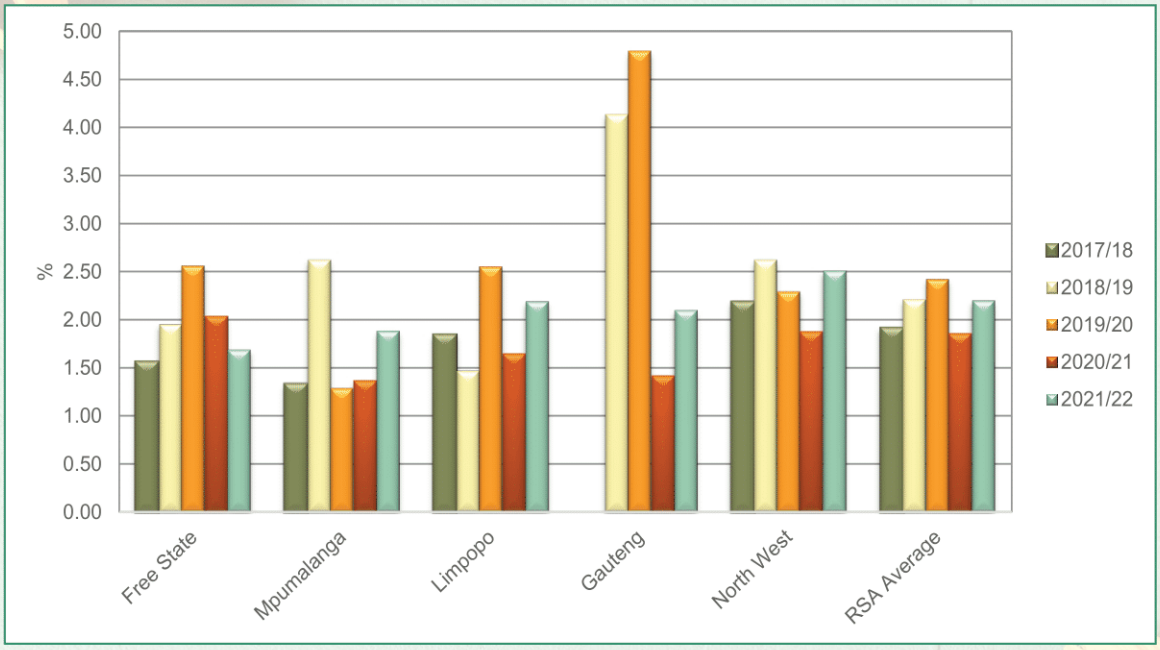
Seventy-five percent (132) of the 176 samples analysed for the purpose of this survey were graded as Grade FH1, with 44 (25%) of the samples downgraded to COSF (Class Other Sunflower Seed). The percentage of samples graded FH1 decreased compared to the previous season's 83%. The ten-year weighted average of the percentage samples graded as FH1 is 79%.

The grading results of the 44 samples downgraded to COSF can be summarised as follows:

- Percentage screenings exceeding the maximum permissible deviation of 4% was present in 21 samples.
- Percentage sclerotia from the fungus *Sclerotinia sclerotiorum* exceeding the maximum permissible deviation of 4% was present in nine samples.
- Percentage foreign matter exceeding the maximum permissible deviation of 4% was present in four samples.
- Percentage collective deviations exceeding the maximum permissible deviation of 6% was present in 30 samples.
- Poisonous seeds that exceeded the allowable number were present in a total of 15 samples. Eleven samples contained *Datura sp.* exceeding the maximum permissible number of 1 per 1000 g. Three samples contained *Ipomoea purpurea Roth.* (morning glory) seeds exceeding 7 per 1000 g and one sample contained *Xanthium sp.* seeds also exceeding 7 per 1000 g.
- Twenty-six of the 44 samples downgraded to COSF were as a result of a combination of two or more of the above mentioned deviations.

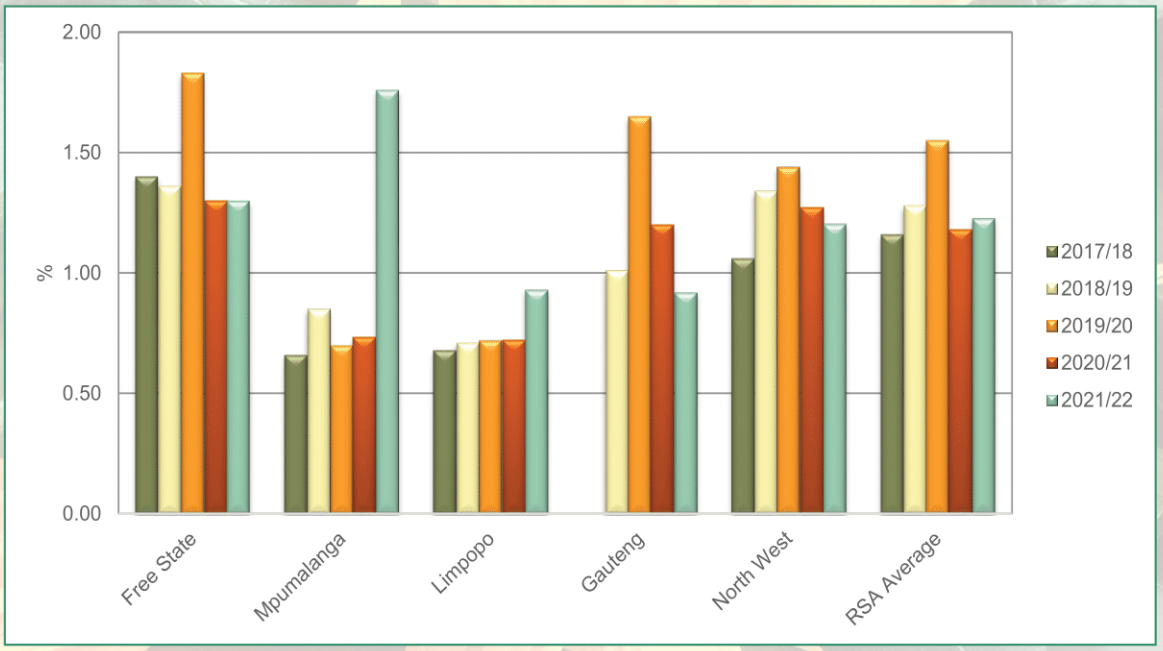
The samples from North West province (N = 89) reported the highest average percentage screenings namely 2.51%, followed by Limpopo (N = 27) and the single sample from Gauteng with 2.19% and 2.10% respectively. The Free State (N = 46) reported the lowest percentage screenings of 1.69%, while Mpumalanga averaged 1.88%. The weighted national average was 2.20% compared to the 1.86% of the previous season.

Graph 16: Average percentage screenings per province over five seasons



The highest weighted average percentage foreign matter (1.76%) was reported for the 13 samples from the Mpumalanga regions. The Free State and North West followed with 1.30% and 1.20% respectively. The lowest percentages were found in Limpopo (0.93%) and Gauteng (0.92%). The national average was 1.23% compared to the 1.18% and 1.55% of the previous two seasons. Please see Graph 17.

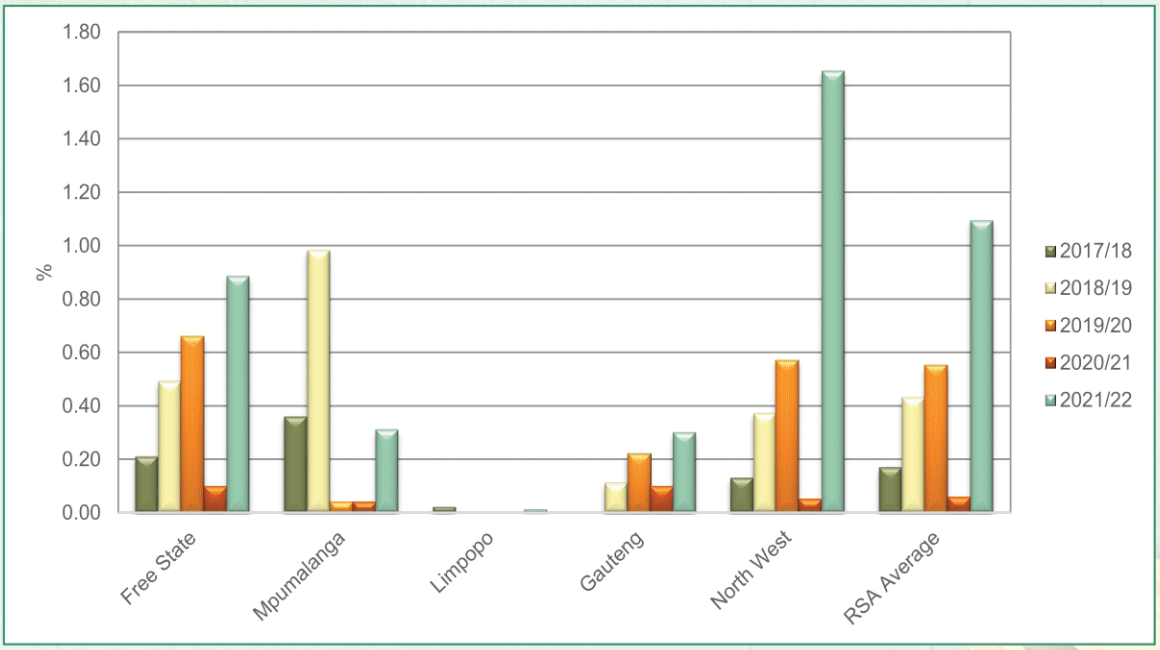
Graph 17: Average percentage foreign matter per province over five seasons



The percentage samples received for this survey that contained sclerotia from the fungus *Sclerotinia sclerotiorum*, increased from 22% in the previous season to 70% this season. In the 2019/20 season, 71% of samples contained sclerotia. 65% of the samples containing sclerotia this season originated in North West province, 25% in the Free State, 6% in Mpumalanga, 3% in Limpopo and the single sample from Gauteng also reported sclerotia.

Nine of the samples received exceeded the maximum permissible deviation of 4%. The highest percentage reported was 14.86%, followed by 11.60%. Seven of the nine samples originated in North West and the remaining two samples originated in the Free State. The national average of 1.09% is the highest of the last ten seasons.

Graph 18: Average percentage sclerotia per province over five seasons

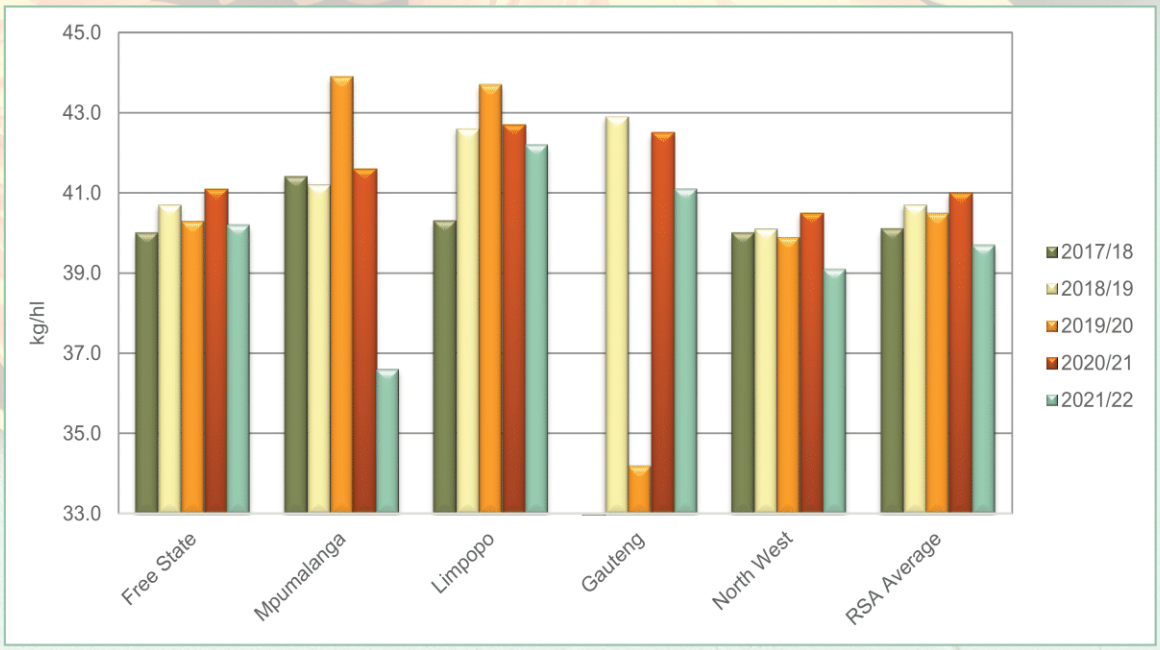


Test weight does not form part of the grading regulations for sunflower seed in South Africa. An approximation of the test weight of South African sunflower seed is provided in Table 3 for information purposes. The standard working procedure of the Kern 222 instrument, as described in ISO 7971-3:2019, was followed. The g/1 L filling mass of the sunflower seed 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 Sunflower Seed, Oil of the Canadian Grain Commission: $y = 0.1936x + 2.2775$ (138 to 182 g/0.5 L) and $y = 0.1943x + 2.1665$ (183 to 227 g/0.5 L). Please also see Graph 19 for a comparison of the test weight per province over the last five seasons.

Table 3: Approximation of test weight per province over three seasons									
Province	Test weight, kg/hl								
	2021/22 Season			2020/21 Season			2019/20 Season		
	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples	Weighted average	Range	No. of samples
Free State (Regions 21 - 28)	40.2	33.1 - 43.9	*45	41.1	38.0 - 44.9	*44	40.3	27.3 - 47.3	84
Mpumalanga (Regions 29 - 33)	36.6	35.2 - 44.5	13	41.6	40.4 - 42.5	7	43.9	43.7 - 44.0	6
Limpopo (Region 35)	42.2	39.9 - 47.3	27	42.7	40.5 - 44.4	19	43.7	38.7 - 47.4	13
Gauteng (Region 34)	41.1	-	1	42.5	-	1	34.2	-	1
North West (Region 12 - 20)	39.1	32.0 - 42.4	**86	40.5	30.4 - 43.7	85	39.9	30.9 - 48.4	72
RSA	***39.7***	***32.0 - 47.3***	***172***	***41.0***	***30.4 - 44.9***	***156***	***40.5***	***27.3 - 48.4***	***176***

**One sample with an outlier value was not taken into account for calculation purposes.*
***Three samples with outlier values were not taken into account for calculation purposes.*

Graph 19: Comparison of the test weight per province over five seasons



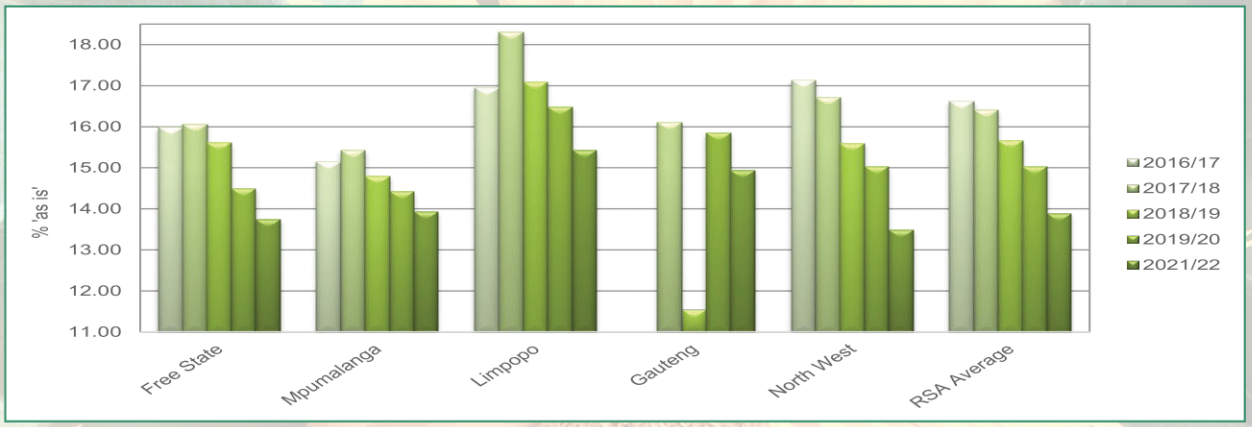
The nutritional component analyses, namely crude protein, -fat, -fibre and ash are reported as % (g/100 g) on an 'as received' or 'as is' basis.

The weighted average crude protein content this season was 13.90%, the lowest of the ten seasons for which crop survey results are available. The previous two seasons' averages were the second and third lowest respectively (15.02% and 15.66%). Limpopo had the highest weighted average crude protein content of 15.42%, followed by the sample from Gauteng with 14.94% and Mpumalanga with an average of 14.15%. The Free State averaged 13.74% and North West 13.48%. The weighted average crude fat percentage was 38.1% compared to the 39.5% of the previous season. The sample from Gauteng had the highest crude fat content of 39.9%, followed by Mpumalanga with 39.0% and North with West 38.4%. Limpopo and the Free State averaged 37.7% and 37.6% respectively.

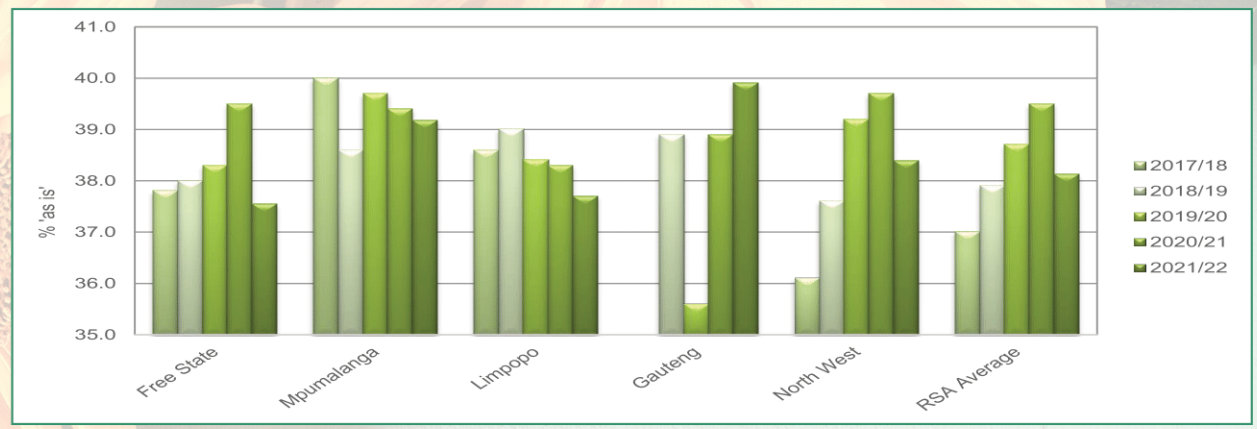
The weighted average percentage crude fibre was 23.1%, the highest weighted average value since the 2012/13 season. Average values varied from a low of 22.1% in Mpumalanga to a high of 23.6% in the Free State. The weighted average ash content was 2.61%. The provincial averages ranged from 2.49% in Gauteng to 2.64% in both North West and the Free State.

Graphs 20 to 23 on page 21 provide comparisons between provinces and over seasons for the nutritional components discussed above.

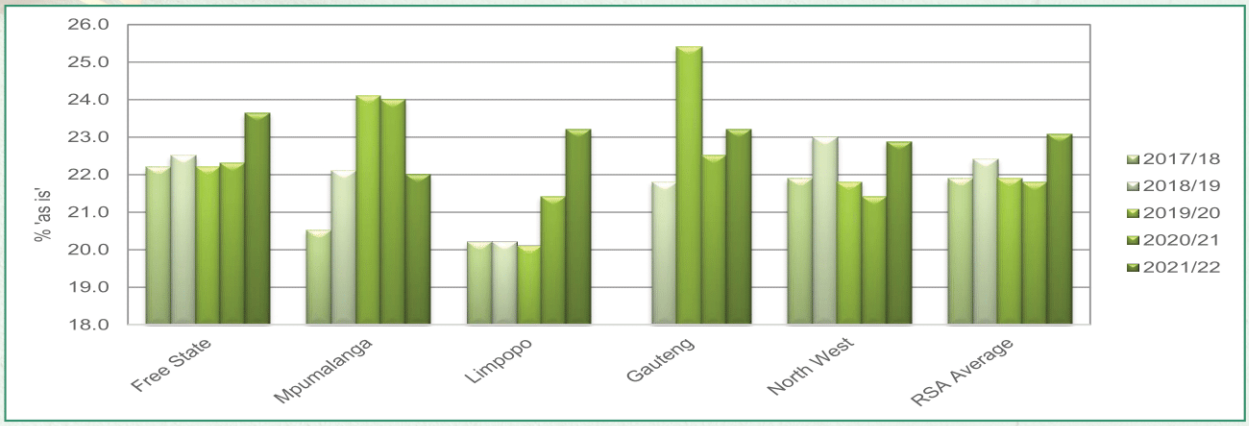
Graph 20: Average crude protein content per province over five seasons



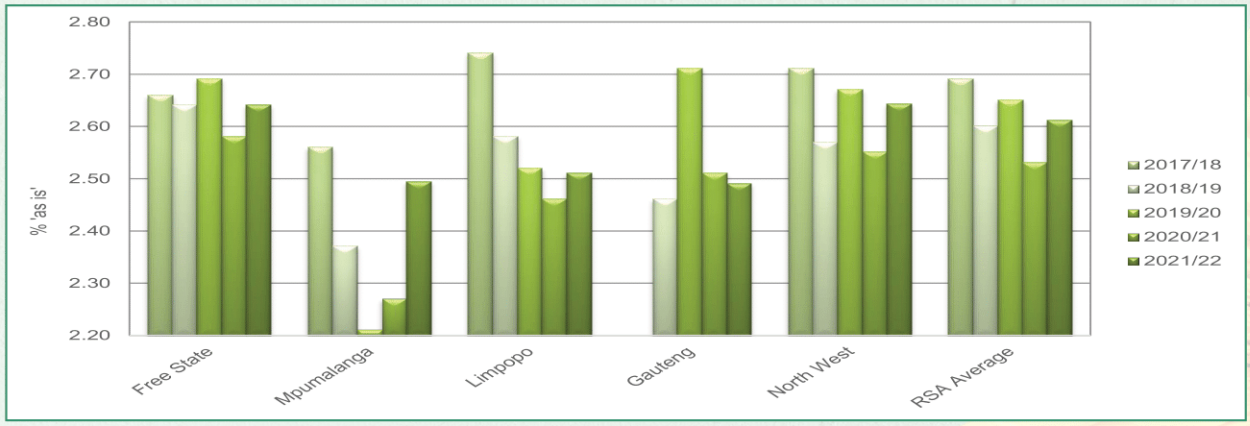
Graph 21: Average crude fat content per province over five seasons



Graph 22: Average crude fibre content per province over five seasons



Graph 23: Average ash content per province over five seasons



Please see a comparison of the moisture, crude protein and crude fat results between the crop survey and ARC Grain Crops sunflower cultivar trials' samples in Table 4.

Table 4: Comparison between the moisture, crude protein and crude fat results of the sunflower crop quality and ARC cultivar trial samples of the 2021/22 season

Analysis	Moisture, % (5hr, 105°C)	Crude Protein, % (as is)	Crude Fat, % (as is)
Sunflower Crop Quality Survey results			
Average	5.2	13.90	38.1
Minimum	3.0	10.79	30.6
Maximum	7.8	19.73	45.2
Standard deviation	0.77	1.33	2.24
No. of samples	***176***	***176***	***176***
ARC Grains Crops Cultivar trial sample results			
Average	5.2	15.36	43.9
Minimum	3.2	11.26	35.8
Maximum	6.8	21.89	55.8
Standard deviation	0.69	2.64	3.57
No. of samples	***160***	***160***	***160***
% Difference between crop and cultivar samples	***0.0***	***-1.46***	***-5.8***

See Table 5 on page 23 for a summary of the RSA Sunflower Crop Quality averages of the 2021/22 season compared to those of the 2020/21 season.

Please also see pages 24 to 30 for the average sunflower quality per region.