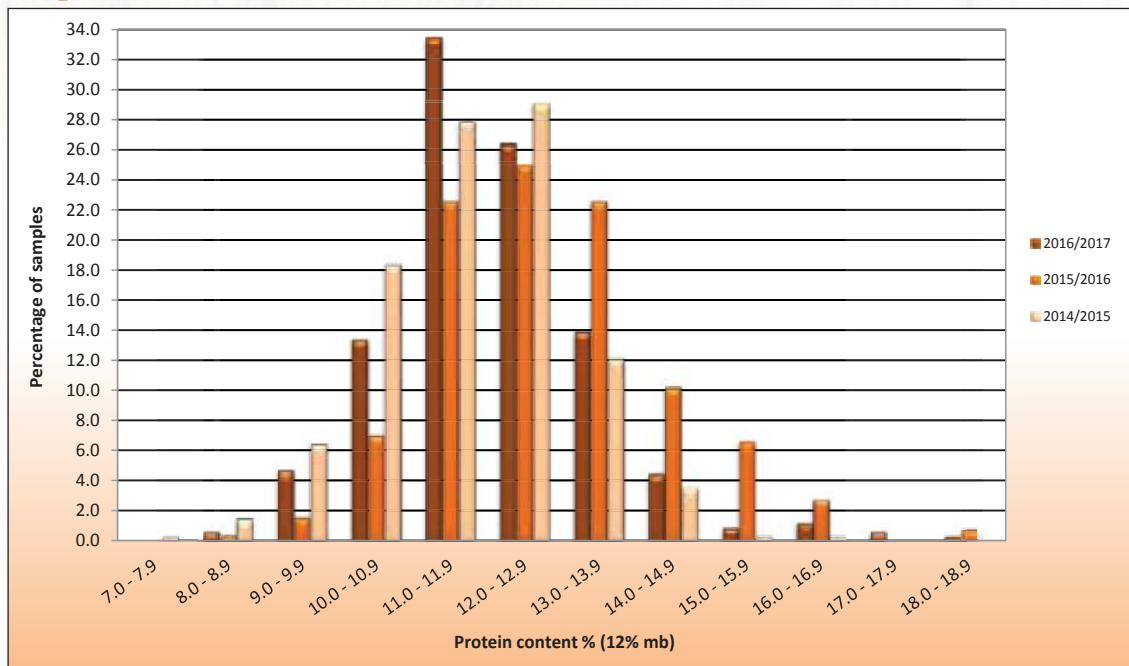


Crop quality of the 2016/2017 season

All national, seasonal and regional averages provided in this report are weighted averages.

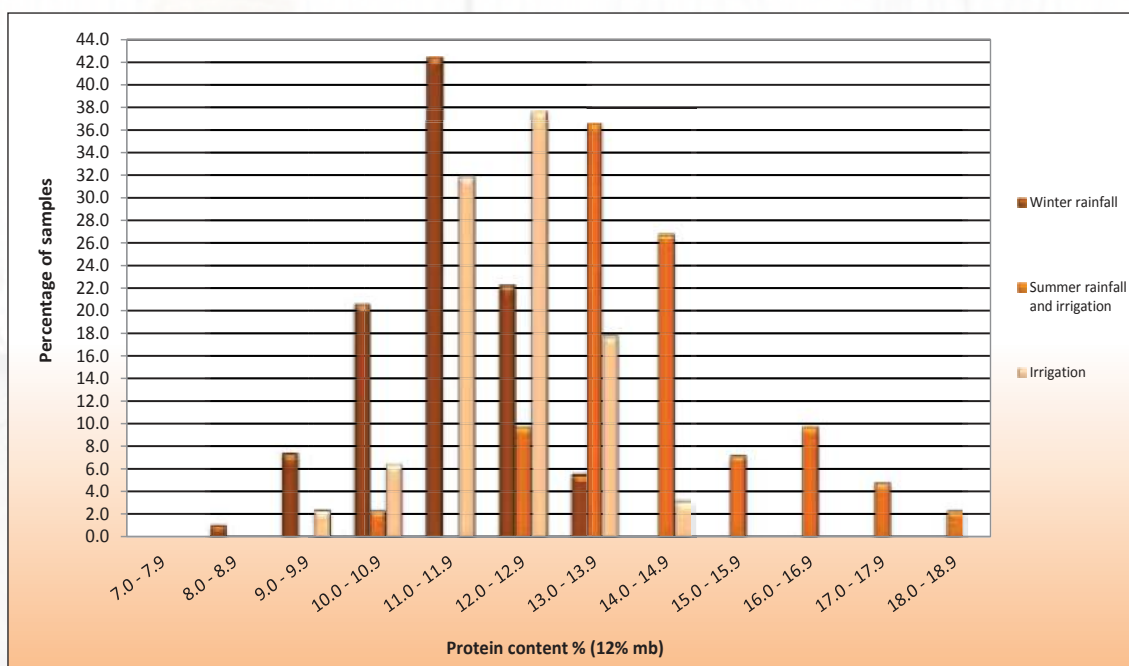
The national whole wheat protein average of 12.0% is the second highest since the 2010/2011 season. Protein content is generally a function of the environment (soil and climatic conditions) where the wheat was grown as well as fertilizer treatment. The percentage of samples with protein contents exceeding 13.0%, decreased significantly from the 43.2% of the previous season (which can be attributed to the extreme drought conditions experienced) to 21.4%, which compares better to the 16.4% and 18.3% respectively of the 2014/2015 and 2013/2014 seasons.

Graph 19: Protein content distribution over the last three seasons



The Winter rainfall areas reported the second highest whole wheat protein average (after last season) since the 2011/2012 season, namely 11.4%. The Irrigation areas averaged 12.3% and the production regions in the Free State province 14.3% (1.1% higher than last season).

Graph 20: Protein content distribution between the three production areas



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 11.2% this season. The protein loss can be attributed to the removal of the bran and aleuron layer as well as the germ during milling. The protein content is reported on a 12% moisture basis.

The average hectoliter mass increased by 0.4 kg/hl to 81.5 kg/hl compared to the previous season and was 0.9 kg/hl higher than the seven year weighted average of 80.6 kg/hl for determinations done by means of the Kern 222 instrument. Of the 13 samples that reported values below the 77 kg/hl minimum level for grade B1 wheat, three originated in the Western Cape (Winter rainfall area), one each in the irrigation areas of the Northern Cape and North West and the remainder (eight) of the samples in the Free State. The regional averages ranged from 79.4 kg/hl in the Free State to 82.6 kg/hl in the Irrigation areas.

The 1000 kernel mass, reported on a 13% moisture basis increased from 36.8 g last season to 38.6 g this season and compared well with the 38.8 g of the 2014/2015 season. Averages over production areas varied from 35.4 g in the Free State to 39.6 g in the Winter rainfall area. The weighted average percentage screenings (1.8 mm sieve) of 1.86% was higher than the 1.71% of the previous season and the highest since the 2003/2004 season. The Winter rainfall areas reported the highest average percentage, namely 2.16% and the Free State area the lowest of 1.26%. Eleven of the 337 samples exceeded the 4% maximum permissible screenings level for grade B4.

The weighted average falling number was 356 seconds, lower than last season's 393 seconds and also lower than the ten year weighted average value of 368 seconds. Four of the samples analysed for this survey reported falling number values below 250 seconds and of these two were below 220 seconds. All of these samples originated in the Free State area. The highest average falling number value of 371 seconds, was reported for the Irrigation areas. All falling number values reported, are corrected for the altitude at which the test is performed. During the previous two seasons none and four samples respectively reported falling numbers below 250 seconds.

The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 2.7 minutes, equal to last season and shorter than the previous eight seasons and as a result also the ten year average of 2.9 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 2.6 minutes, also equal to the previous season. Mixing time, in general, decreases as protein content increases to about 12.0%, thereafter remaining approximately constant with flour protein increases.

Extraction rate is an indication of the flour yield that can be obtained from a given amount of wheat. The extraction rate achievable on industrial scale mills is a number of percentage points higher than on laboratory scale mills due to an increase in roller surface area. Industrial type mills are also set to obtain optimum extraction rates within certain quality parameters, whereas the milling procedure and laboratory scale mill at SAGL is not set to optimize extraction but rather indicate differences in milling quality. Composite samples per class and grade per production region are cleaned, tempered/conditioned and then milled to facilitate flour and dough quality assessment. The weighted average Bühler MLU 202 laboratory mill extraction for the 70 composite samples was 72.5%, lower than the 73.4% of the previous two seasons.

The average Kent Jones colour this season was -3.8 KJ units, lower than the -3.5 KJ units of the previous season. As from the 2012/2013 survey, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer is also included. Please see the comparison of the CIE L*a*b* values obtained below. The average and range (in brackets) are provided to assist with interpretation of these parameters:

2016/2017 season: L* 93.71 (92.17 – 94.30), a* 0.46 (0.34 – 0.63) and b* 10.12 (9.03 – 11.65)

2015/2016 season: L* 93.78 (92.99 – 94.40), a* 0.47 (0.06 – 0.59) and b* 9.75 (8.51 – 11.39)

2014/2015 season: L* 93.77 (92.98 – 94.30), a* 0.44 (0.22 – 0.59) and b* 9.72 (8.21 – 11.11)

2013/2014 season: L* 93.99 (93.11 – 94.59), a* 0.40 (0.29 – 0.57) and b* 9.50 (8.49 – 10.63)

2012/2013 season: L* 93.85 (93.14 – 94.39), a* 0.41 (0.26 – 0.54) and b* 9.92 (8.65 – 11.35).

L* represents lightness (100 being white and 0 being black), a* represents green to red variation and b* represents variation from blue to yellow.

The average ash content was determined to be 0.59 % on a dry basis (moisture free basis), compared to the 0.65% of the previous season. According to the Wheat product regulations (Government Notice No. R. 405 of 5 May 2017), cake flour's ash content should not exceed 0.65% and that of white bread flour should be between 0.60 to 1.00%.

The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2257 cP (centipoise), the minimum viscosity 1742 cP and the final viscosity 2570 cP. Last season the values were 2318 cP, 1709 cP and 2597 cP respectively. The analysis conditions were kept constant during all of the analyses.

The wet gluten (14% mb) averaged 30.7% and the dry gluten, also on a 14% moisture basis, 10.5%. These values are lower than the 31.9% and 11.0% respectively of the previous season, which is expected since the average protein content is also lower than that of the previous season. The average gluten index value was 94, ranging between 63 and 99. The gluten index provides an indication of the gluten strength (higher being better) and is not influenced by the protein content. A value between 70 and 100 is generally accepted as good quality for pan bread baking purposes. The average gluten index value last season was 95.

The farinograph analysis resulted in an average water absorption of 60.1% (60.8% the previous season) and an average development time of 5.2 minutes (5.8 minutes the previous season). The stability value of 8.3 minutes compared well with the 8.0 minutes reported previously. There was also no significant difference between the mixing tolerance indexes of these two seasons, namely 37 BU and 38 BU respectively.

The average alveogram strength was 37.0 cm² and the average P/L value 0.57 (38.3 cm² and 0.75 the previous season). The distensibility of the dough as determined by the Alveograph increased compared to the previous season. A combination of this and also a slightly lower stability value resulted in the observed lower P/L value.

The average extensogram strength was 99 cm² (105 cm² previous season). The maximum height in Brabender Units did not increase significantly compared to the previous season (364 BU in 2016/2017 and 373 BU in 2015/2016). The extensibility values were similar, 193 mm now and 198 mm previously.

While doing the comparisons between seasons, it was interesting to notice that the average values of the 2016/2017 and 2014/2015 seasons' farinograph, alveograph and extensogram results were almost identical.

The 100 g loaves baked using the straight-dough optimized bread making method, received an evaluation rated as "Excellent". The basis for this evaluation refers to the relationship between the protein content and the bread volume.

This season, for the first time, amino acid profiles of local wheat were determined as part of this survey. Total Amino acid analyses that included 18 amino acids namely Aspartic acid, Glutamic acid, Serine, Glycine, Histidine, Arginine, Threonine, Alanine, Proline, Tyrosine, Valine, Isoleucine, Leucine, Phenylalanine, Lysine, Tryptophan, Cystine and Methionine were performed on forty samples, randomly selected to represent different regions as well as grades. Please see Table 7 on pages 63 to 64 for the results and page 72 for information on the methods followed.

Mycotoxin analysis was performed on forty wheat samples, randomly selected to represent different regions as well as grades. The samples were tested by means of a SANAS ISO/IEC 17025 accredited multi-mycotoxin screening method using UPLC-MS/MS. With this technique simultaneous quantification and confirmation of Aflatoxin B₁; B₂; G₁; G₂, Fumonisin B₁; B₂; B₃, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A is possible in one run.

Four samples tested positive for deoxynivalenol (DON) residues. The average value of the four positive results was 289 µg/kg (ppb) and the highest value obtained 501 µg/kg, which is still well below national and international maximum residue levels. Please see the mycotoxin results on pages 59 to 60. Last season, four samples also tested positive for DON residues with an average value of 397 µg/kg (ppb), the highest value obtained was 593 µg/kg.