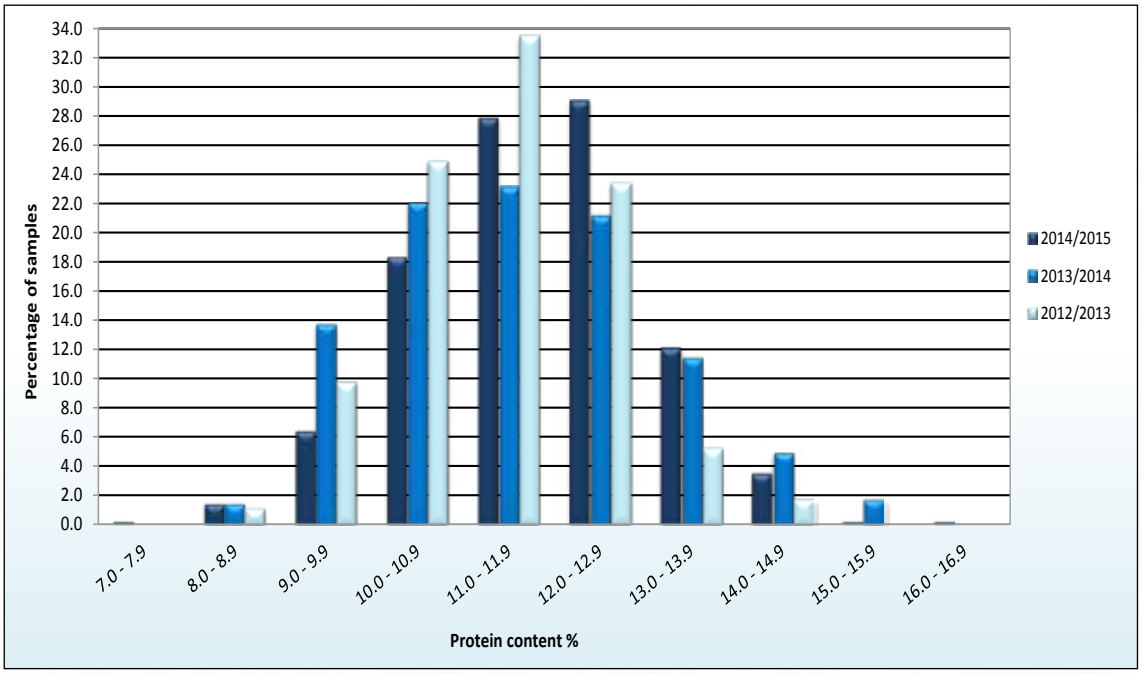
Crop quality of the 2014/2015 season

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

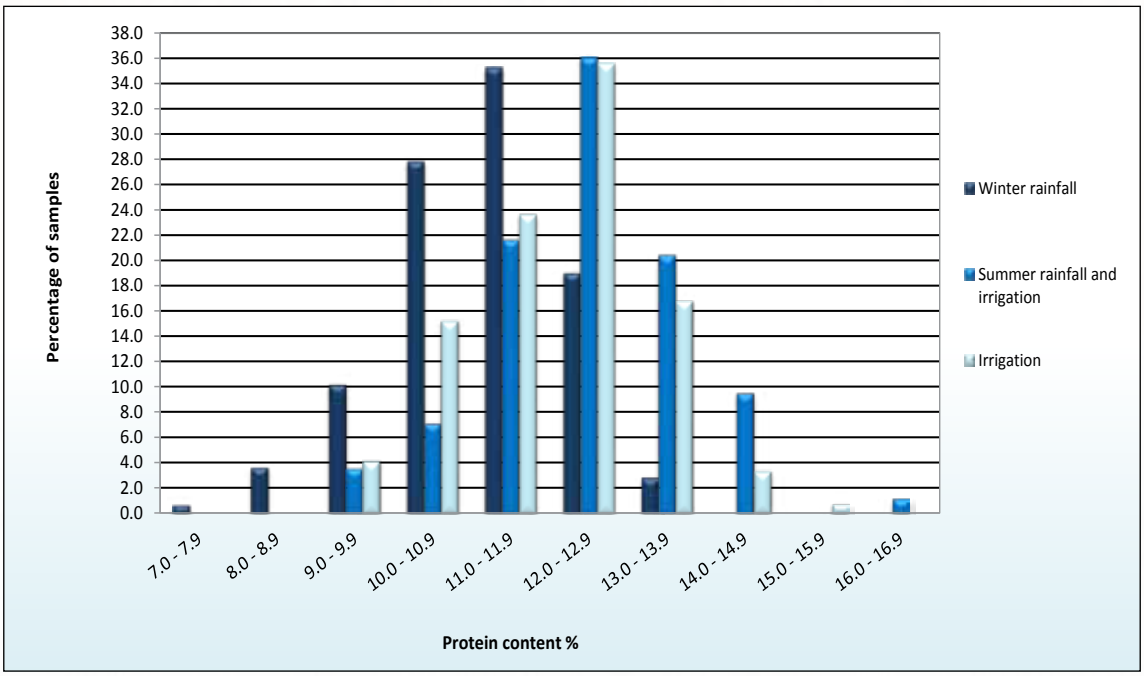
The national whole wheat protein average has varied with less than half a percent over the last three seasons, from 11.4% in the 2012/2013 season to 11.8% in the 2014/2015 season. The percentages of samples having protein contents in the intervals 11.0 - 11.9% and 12.0 - 12.9% increased with almost 5 and 8% respectively compared to the previous season.

Graph 11: Protein content distribution over the last three seasons



Although the Winter rainfall areas again reported the lowest average whole wheat protein namely 11.1%, this value is 0.3% and 0.4% respectively higher than the previous two seasons. The production regions in the Free State province, reported the highest average protein content (12.4%) followed by the 12.1% of the Irrigation areas.

Graph 12: Protein content distribution between the three production areas



The protein content is reported on a 14% moisture basis. The flour protein content is on average 0.5 to 1.2% lower than that of whole wheat. The protein loss can be attributed to the removal of the bran and aleuron layer as well as the germ during milling.

The average hectolitre increased by 0.7 kg/hl to 80.2 kg/hl compared to the previous season and was just below the six year weighted average of 80.3 kg/hl. Of the 26 samples that reported values below the minimum level for grade B1 wheat, 10 originated in the Western Cape (Winter rainfall area), 15 in the Free State and only one in Mpumalanga. The regional averages ranged from 79.2 kg/hl in the Free State regions to 81.2 in the Irrigation areas.

The thousand kernel mass, reported on a 13% moisture basis, decreased from 39.3 g in the 2013/2014 season to 38.8 g this season. The weighted average screenings (1.8 mm sieve) of 1.55% compared well with the previous two seasons.

The weighted average falling number was 368 seconds. Samples from the Free State's production regions gave the lowest average falling number of 352 seconds and those of the Western Cape the highest, namely 379 seconds. All Falling number values reported are corrected for the altitude at which the test were performed. Compared to the 29 samples in the previous season, only four samples reported falling numbers below 250 seconds this season.

The weighted mixogram peak time on flour from the Quadromat mill averaged 3.0 minutes, equal to the previous season and comparing very well with the ten year average (2.9 minutes). The weighted mixogram peak time of the flour from the Bühler mill was 2.7 minutes, similar to the 2.8 minutes mixing time last season.

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. 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 73.4%, slightly higher than the previous two seasons.

The average Kent Jones colour this season was -3.3 KJ units, lower than the previous two seasons. 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:
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.

This is the first survey that the ash content is determined on the composite samples. The average ash content was determined to be 0.59 % on a dry basis (moisture free basis). Flour milled on the laboratory mill has a lower ash content on average than industrial type mills. According to the Wheat product regulations (Government Notice No. R. 186 of 22 February 2008), cake flour's ash content should not exceed 0.60% and white bread flour's should be between 0.60 to 1.00%.

This is the second survey that include Rapid Visco Analyser (RVA) analyses on the composite samples. The average peak viscosity of the samples analysed was 2246 cP (centipoise), the minimum viscosity 1719 cP and the final viscosity 2550 cP. Last season the values were 2170 cP, 1750 cP and 2432 cP respectively. The analysis conditions were kept constant during all of the analyses.

The wet gluten (14% mb) averaged 28.9% and the dry gluten also on a 14% moisture basis, 9.8%. These values are slightly lower than the previous season, but still indicative of a good quality gluten for pan bread baking

if the flour protein content of 10.7% is considered. The average gluten index value was 88, ranging between 78 and 97. 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 bread baking purposes. The average gluten index value last season was 86.

The farinogram had an average water absorption of 59.5% (60.1% the previous season) and an average development time of 5.3 minutes (5.2 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 season, namely 35 and 38 respectively.

The average alveogram strength was 38.1 cm^2 and the average P/L value 0.59 (37.6 cm^2 and 0.74 the previous season). The distensibility of the dough reported on the Alveograph was higher for the 2014/2015 season. A combination of this and also a slightly lower stability value resulted in the observed decrease in P/L value.

The average extensogram strength was 98 cm^2 (92 cm^2 previous season). The maximum height in Brabender Units did not increase significantly compared to the previous season (360 BU in 2014/2015 and 341 BU in 2013/2014). The extensibility values were equal, 196 mm now and 194 mm previously.

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.

Forty samples, randomly selected to represent different regions as well as classes and grades, 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 G_1; B_1; G_2; B_2, Fumonisin B_1; B_2; B_3, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A are possible in one run.

Five samples tested positive for deoxynivalenol (DON) residues. The average value of the 5 positive results were 229 µg/kg (ppb) and the highest value obtained 361 µg/kg, which is still well below international maximum residue levels. Please see page 58 - 59.