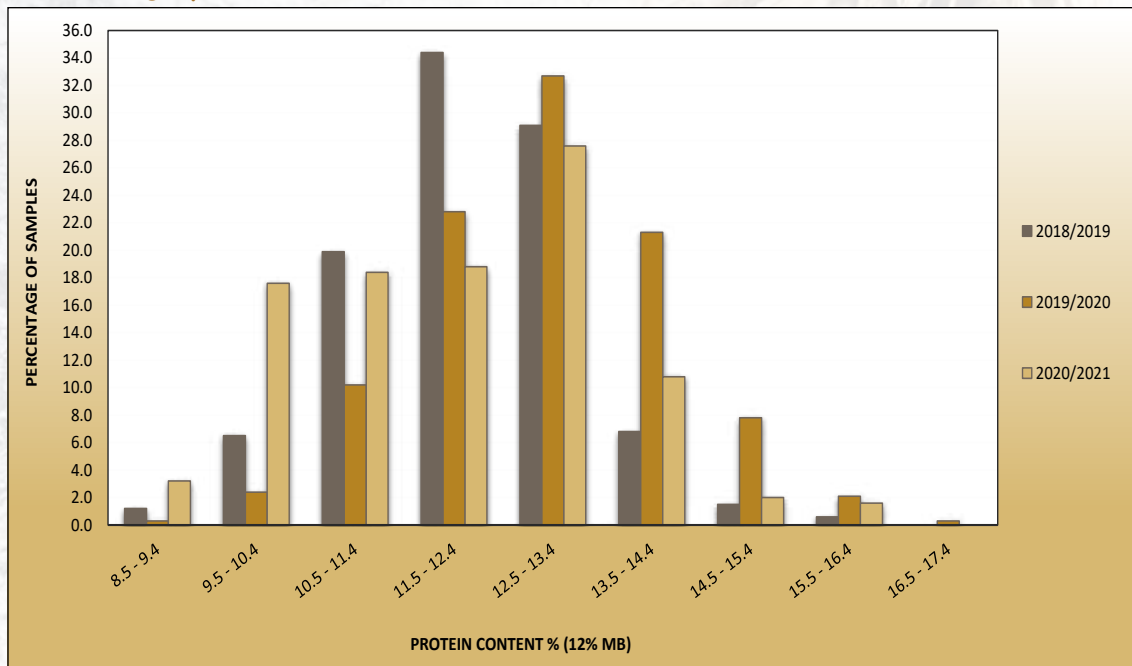


Crop quality of the 2020/21 season

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

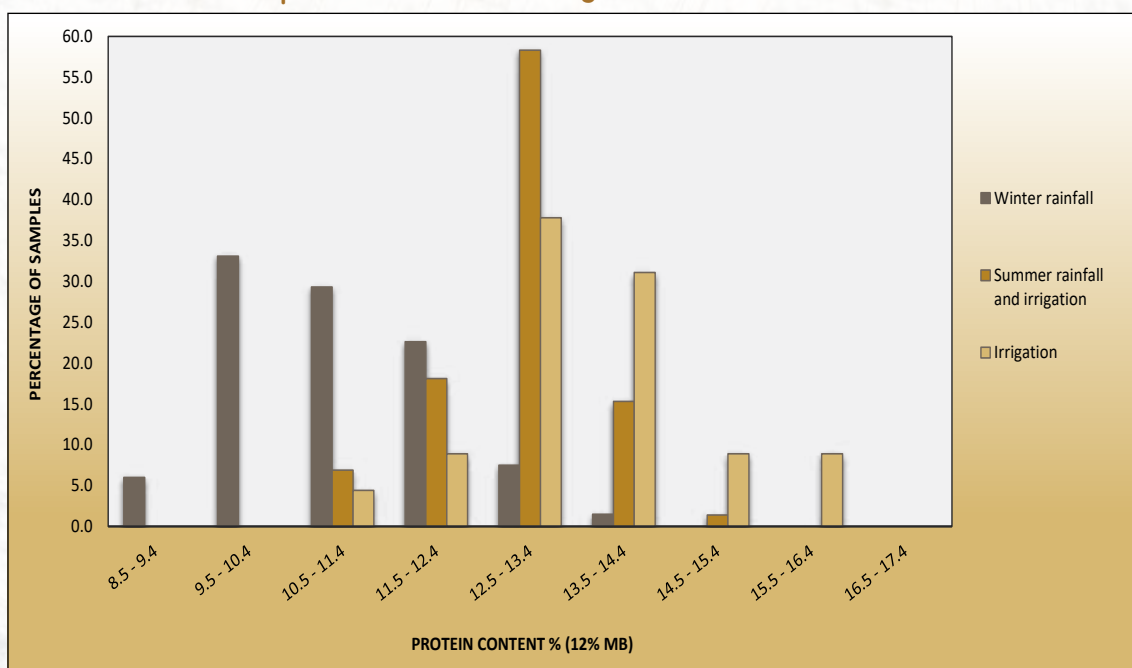
The national whole wheat protein average decreased from 12.9% in the previous season to 12.0%. The ten-year national average is 12.1%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 23 and 24 for the protein content distribution over the last three seasons and between the three major production areas.

Graph 23: Protein content distribution over the last three seasons



The Summer rainfall and Irrigation areas of the Free State reported the highest whole wheat protein average, namely 13.5%. The production regions in the Winter rainfall area of the Western Cape averaged 10.9% and the Irrigation areas 12.9%.

Graph 24: Protein content distribution between the three production areas during the 2020/21 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 11.2% this season, 0.7% percent lower than the previous 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 of 78.9 kg/hl equaled that of the previous season and is also the joined lowest average reported over the last eleven seasons. The ten-year national average is 80.4 kg/hl. 25 samples (10%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat, of these 11 samples originated in the Western Cape (Winter rainfall area), 13 in the Free State and one in KwaZulu-Natal. Regional averages ranged from 77.8 kg/hl in the Free State and 78.1 kg/hl in the Western Cape to 80.9 kg/hl in the Irrigation areas.

The 1000 kernel mass, reported on a 13% moisture basis, increased from 35.6 g last season to 38.2 g this season. The 2018/19 season's average was 39.2 g. Averages over production areas varied from 36.7 g in the Summer rainfall and irrigation areas of the Free State to 37.4 g in the Irrigation areas and 39.2 g in the Winter rainfall areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.63%, compared to the 1.92% and 1.49% of the previous two seasons respectively. The Summer rainfall and irrigation areas reported the highest average percentage, namely 2.16% and the Irrigation areas the lowest of 1.07%. 31 (12%) of the 250 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. Most (55%) of these samples originated in the Western Cape.

The national weighted average falling number value was 372 seconds, higher than the 353 seconds of last season's average and slightly higher than the ten-year weighted average value of 369 seconds. 16 (6.4%) of the samples analysed for this survey reported falling number values below 250 seconds, 11 (4%) of these were below 220 seconds and were downgraded to COW as a result. These samples originated mainly from the Free State (N=8), with one sample each from Mpumalanga, North West and KwaZulu-Natal. Last season 8% of the samples analysed as part of the survey, was downgraded to COW due to a low falling number. The highest regional average falling number value of 401 seconds this season, was reported for the Western Cape and the lowest, namely 302 seconds for the Free State. All falling number values reported, are corrected for the altitude at which the test is performed.

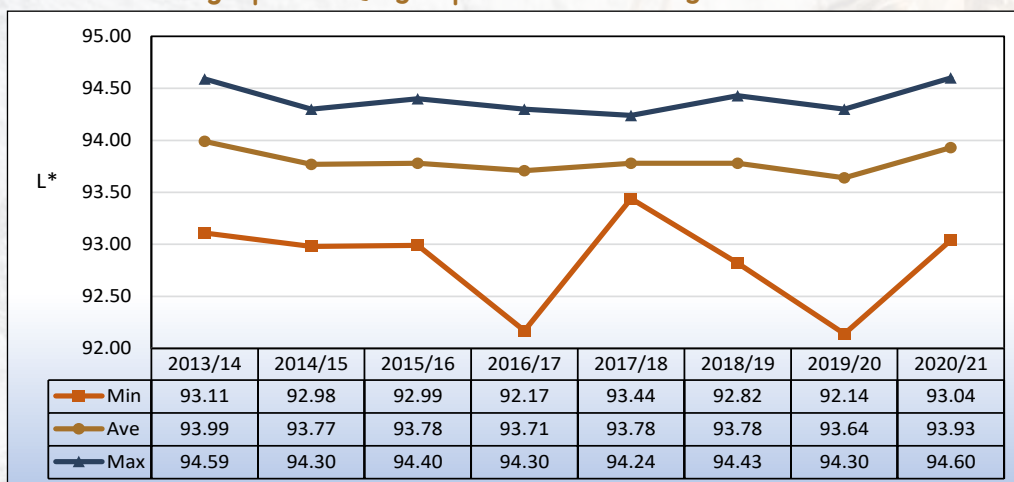
The weighted mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.2 minutes compared to the 3.0 minutes of the previous season and the 2.9 minutes of the ten-year average. The weighted mixogram peak time of the flour from the Bühler mill was 2.9 minutes, compared to the 2.6 minutes of the previous five seasons. Mixing time is a measure of optimum dough development and thus also of protein quality.

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 optimise 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 composite samples was 74.1% compared to the 74.8% of the previous season.

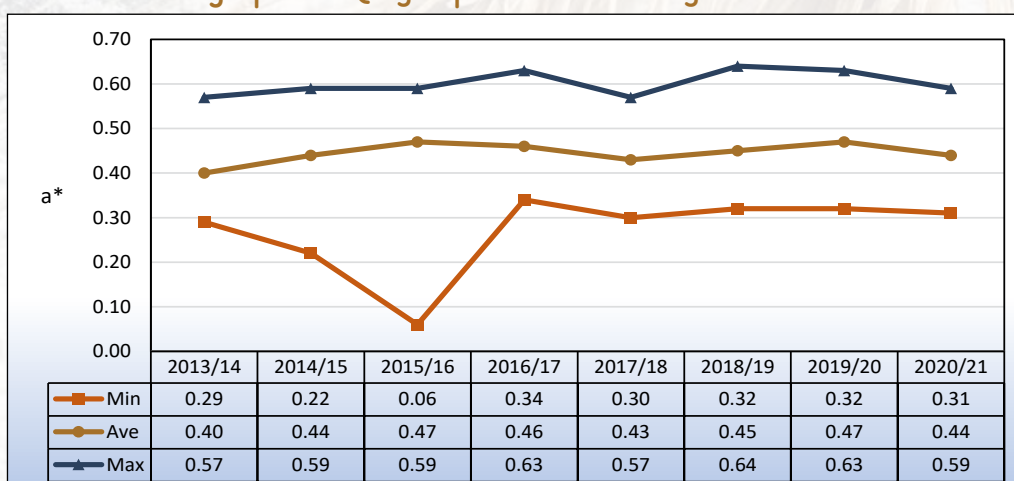
Colour is an important parameter of milled wheat since the colour of wheat flour affects the colour of the finished product, like the crumb colour of a loaf of bread. In general, a bright white colour flour is more desirable for most products. For the past nine seasons, a dry colour determination by means of a Konica Minolta CM-5 spectrophotometer has been done on the composite flour samples. The CIE L*a*b* (CIELAB) colour model uses lightness (L*) and two colour values (a* and b*), these colour coordinates define where a specific sample's colour lies in a Cartesian graph. L* represents lightness (100 being white and 0 being black), a* represents green to red variation and b* represents variation from blue to yellow. Please see Graphs 25 (L*), 26 (a*) and 27 (b*) for a comparison of the ranges in the CIE L*a*b* values obtained. The minimum and maximum values are based on a single composite sample's result in a specific season.

The average ash content was 0.60 % on a dry basis (moisture free basis), compared to the 0.64% of the previous season's average. 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%, white bread flour's ash content should be between 0.60 to 1.00% and that of all-purpose wheat flour between 0.55 and 0.75%.

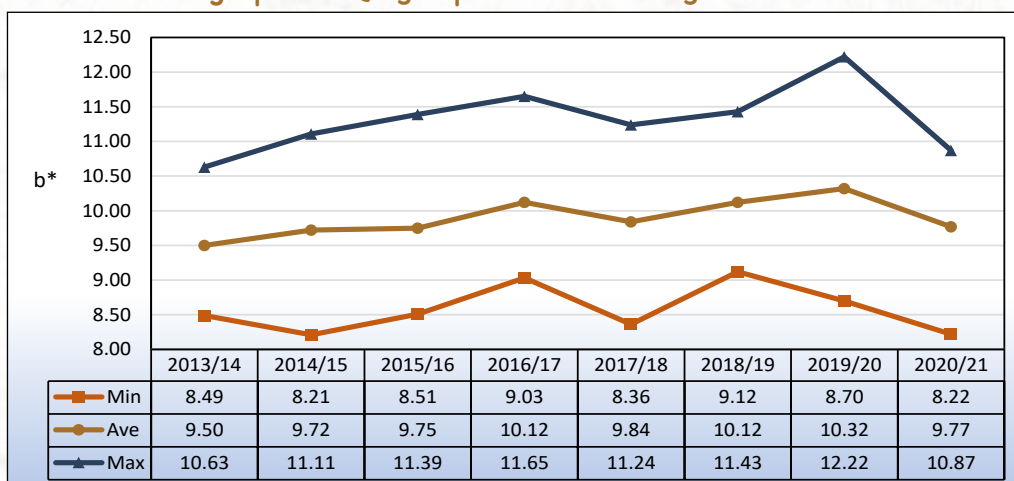
Graph 25: Range of L^* values over eight seasons



Graph 26: Range of a^* values over eight seasons



Graph 27: Range of b^* value over eight seasons



The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2211 cP (centipoise), the minimum viscosity 1671 cP and the final viscosity 2491 cP. These values compared well with the 2018/19 season's values of 2218 cP, 1675 cP and 2516 cP respectively. The effect of sprout damage on the starch and gelatinisation properties of wheat were well illustrated in the previous season with values of 1852 cP, 1407 cP and 2049 cP respectively. The analysis conditions were kept constant during all the analyses. Results are reported on a 14% moisture basis.

The wet gluten (14% mb) averaged 29.9% and the dry gluten, also on a 14% moisture basis, 10.1%. The previous season, these values averaged 31.1% and 10.6% respectively. The lower gluten values this season are expected given the lower average protein content compared to the 2019/20 season. The average gluten index value was 95 (equal to last season) and ranged between 90 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 farinograph analysis resulted in an average water absorption of 59.3% (60.2% the previous season) and an average development time of 5.6 minutes (5.4 minutes the previous season). The stability value of 8.5 minutes was almost half a minute longer than the previous average. The mixing tolerance index was 36, compared to the previous season's average of 41 BU.

The average alveogram strength was 38.3 cm² and the average P/L value 0.63 (42.6 cm² and 0.60 the previous season). The distensibility of the dough decreased on average compared to the previous season. The stability value of 75 mm was slightly lower than the 79 mm of the previous season.

The average extensogram strength decreased from 112 cm² in the previous season to 99 cm². The maximum height in Brabender Units was also lower than last season (362 BU in 2020/21 versus 383 BU in 2019/20) as was the average extensibility value of 200 mm this season compared to 211 mm the previous season.

The 100 g loaves baked using the straight-dough optimised 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.

Mycotoxin analyses were performed on 30 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 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 are possible in one run.

13 samples tested positive for deoxynivalenol (DON) residues, with two of these samples exceeding the national maximum allowable level of 2 000 µg/kg for cereal grain intended for further processing. The average value of the 13 positive results was 891 µg/kg (ppb) and the highest value obtained 3 088 µg/kg. Last season, six samples tested positive for DON residues with an average value of 300 µg/kg (ppb), the highest value obtained was 1 017 µg/kg. Please see the mycotoxin results in Table 6 on pages 65 and 66.

