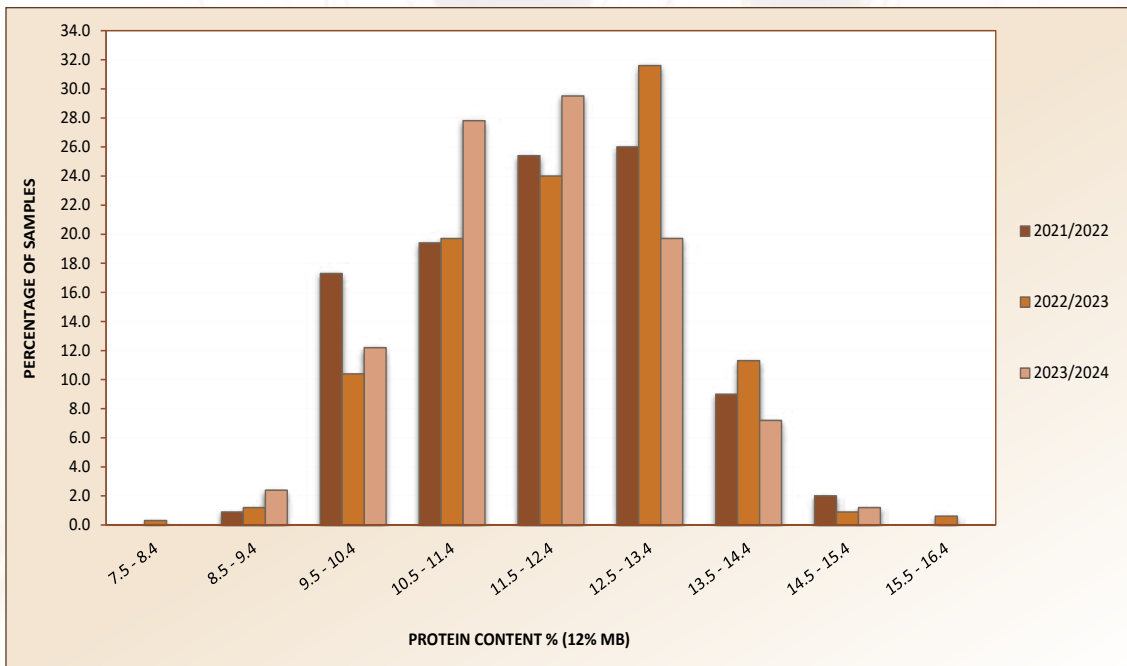


# Crop quality of the 2023/24 season

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

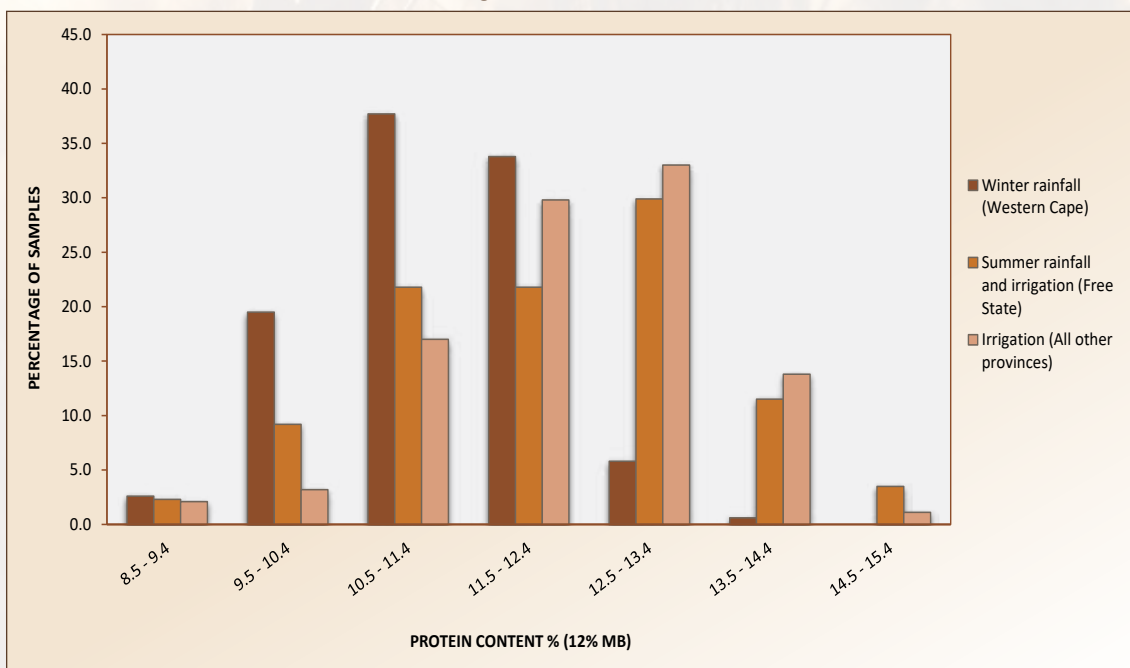
The national whole wheat protein average decreased from 12.1% in the previous season to 11.8%. The ten-year national average is 12.2%. Protein content is generally a function of the growing environment (soil and climatic conditions) as well as fertiliser application. Please see Graphs 21 and 22 for the protein content distribution over the last three seasons and between the three major production areas during 2023/24.

Graph 21: Protein content distribution over the last three seasons



The Irrigation areas reported the highest whole wheat protein average, namely 12.4%. The production regions in the Winter rainfall area of the Western Cape averaged 11.2% and the Summer rainfall and irrigation areas of the Free State 12.2%. See the Regional quality weighted averages summarized in Table 5 on pages 26 and 27.

Graph 22: Protein content distribution between the three production areas during the 2023/24 season



Flour protein content is on average 0.5 to 1.2% lower than that of whole wheat and averaged 10.8% this season, slightly (0.2%) percent lower than the previous season. The difference in the protein content between the whole wheat and flour protein, 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 80.7 kg/hl is 0.9 kg/hl higher than the previous season and also 0.4 kg/hl higher than the ten-year national average of 80.3 kg/hl. Thirteen samples (4%) reported values below the 76 kg/hl minimum level for Super grade, Grade 1 and Grade 2 wheat. Eleven of these samples originated in the Free State and one each in Limpopo and the Western Cape. Regional averages ranged from 79.7 kg/hl in the Free State, 80.2 kg/hl in the Western Cape and 82.4 kg/hl in the Irrigation areas.

The average 1000 kernel mass, reported on a 13% moisture basis, increased from 37.0 g last season to 39.1 g this season. The 2021/22 season's average was 40.3 g. Averages over production areas varied from 36.2 g in the Summer rainfall and irrigation areas of the Free State to 38.6 g in the Irrigation areas and 41.1 g in the Winter rainfall areas. The weighted average percentage screenings obtained with a 1.8 mm slotted sieve was 1.45%, compared to the 1.69% and 1.20% of the previous two seasons respectively. The Summer rainfall and irrigation areas reported the highest average percentage, namely 1.72% and the Irrigation areas the lowest of 1.21%. 28 (8%) of the 335 samples exceeded the 3% maximum permissible screenings level for Super grade to Grade 3. 43% of these samples originated in the Free State, 32% in the Western Cape, with single samples in Limpopo, North West, Mpumalanga and Gauteng.

The national weighted average falling number value was 375 seconds, compared to last season's average of 361 seconds. The ten-year weighted average value is 368 seconds. Only four (1%) of the samples analysed for this survey reported falling number values below 250 seconds and only one of these was below 220 seconds and were downgraded to COW as a result. This sample originated in Gauteng. Last season 5% of the samples analysed as part of the survey, was downgraded to COW due to a low falling number. Falling number values this season ranged between 197 and 551 seconds. All falling number values reported, are corrected for the altitude at which the test is performed.

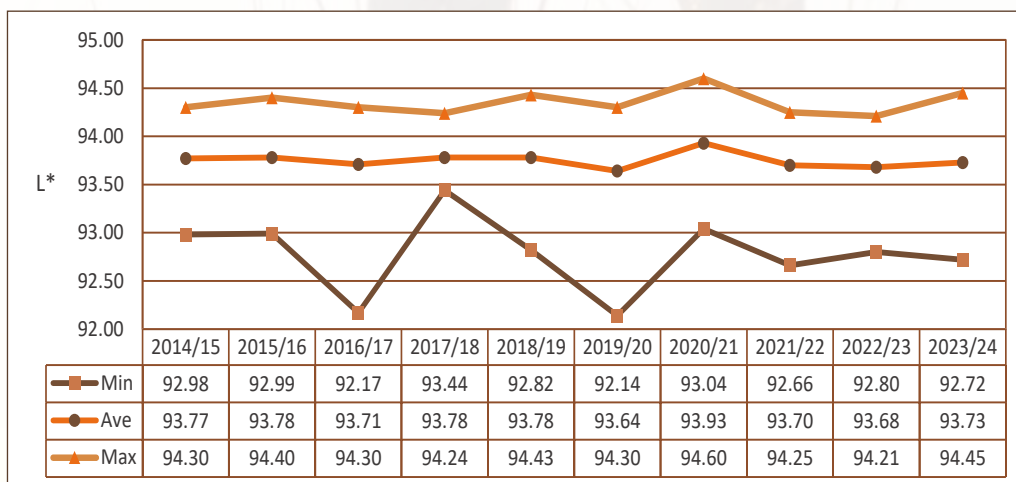
The mixogram peak time on flour milled on the Quadromat Junior mill averaged 3.1 minutes compared to the 3.3 minutes of the 2022/23 season. The ten-year average is 3.0 minutes. The weighted mixogram peak time of the flour from the Bühler mill was 3.0 minutes and on par with the 3.1 minutes of the previous season. 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 72.8% compared to the 73.8% of the previous season.

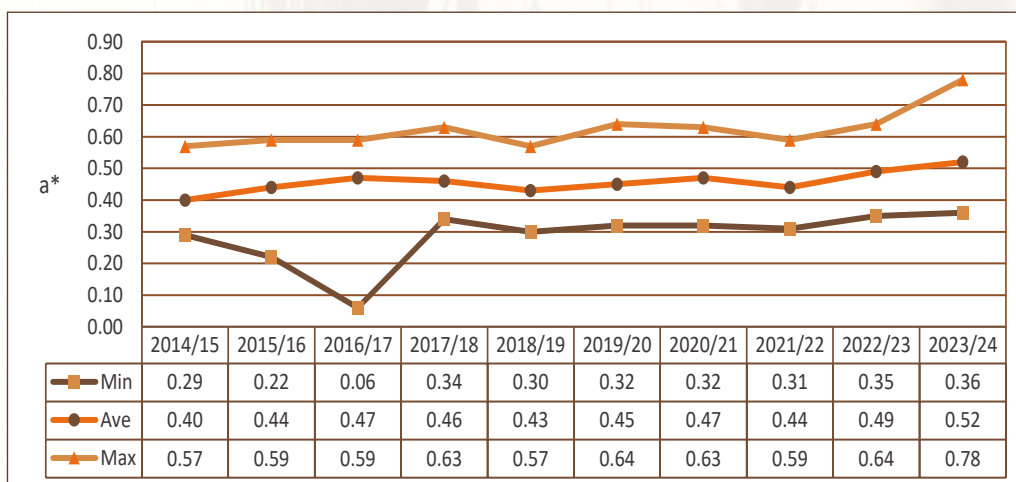
Colour is an important parameter of milled wheat since the colour of wheat flour affects the colour of the finished product, like the crumb colour of a loaf of bread. In general, a bright white colour flour is more desirable for most products. The CIE L\*a\*b\* (CIELAB) colour model uses lightness (L\*) 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 23 (L\*), 24 (a\*) and 25 (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 0.59 % on a dry basis (moisture free basis), equal to 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%.

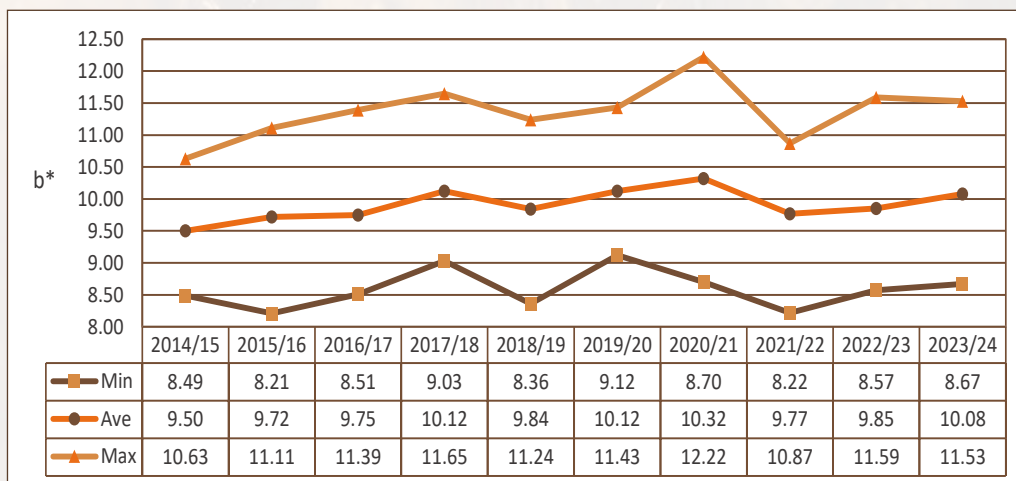
Graph 23: Range of L\* values over ten seasons



Graph 24: Range of a\* values over ten seasons



Graph 25: Range of b\* values over ten seasons





The Rapid Visco Analyser (RVA) average peak viscosity of the samples analysed was 2291 cP (centipoise) (1548 – 2703 cP), the minimum viscosity 1773 cP (1266 – 2154 cP) and the final viscosity 2576 cP (1654 – 3071 cP). The range of the values are provided in brackets. The previous season the average peak viscosity was 2297 cP (1179 – 2912 cP), the minimum viscosity 1799 cP (877 – 2218 cP) and the final viscosity 2593 cP (1294 – 3400 cP). The RVA test parameters were kept constant during all the analyses. Results are reported on a 14% moisture basis.

Both the wet and dry gluten content averaged slightly lower than in the 2022/23 season. The wet gluten content (14% mb) averaged 29.1% and the dry gluten, also on a 14% moisture basis, 9.6%. The previous values, averaged 29.5% and 9.8% respectively. The average gluten index value was 96 (equal to last season) and ranged between 92 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 60.0% (59.4% the previous season) and an average development time of 5.4 minutes that equaled the previous season. The stability value of 11.2 minutes was 1.4 minutes shorter than the previous average (12.6 minutes). The mixing tolerance index compared well, 35 BU this season, 31 BU previously.

The average alveogram strength was 39.3 cm<sup>2</sup> and the average P/L value 0.71 (41.4 cm<sup>2</sup> and 0.66 the previous season). The distensibility of the dough (122 mm) decreased lightly on average compared to the previous season (130 mm). The average stability value of 80 mm equals the previous season's value.

The average extensogram strength of 110 cm<sup>2</sup> compared very well with the 109 cm<sup>2</sup> in the previous season. The maximum height in Brabender Units was slightly lower than last season, 403 BU in 2023/24 versus 411 BU in 2022/23. The average extensibility value this season (198 mm) was slightly longer than the previous season's 192 mm.

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.

Please see the results provided per individual production region on pages 35 to 58.

Mycotoxin analyses were performed on 40 wheat samples, randomly selected to represent different regions. 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 B<sub>1</sub>, B<sub>2</sub>, G<sub>1</sub>, G<sub>2</sub>, Fumonisin B<sub>1</sub>, B<sub>2</sub>, B<sub>3</sub>, Deoxynivalenol, 15-ADON, HT-2 Toxin, T-2 Toxin, Zearalenone and Ochratoxin A are possible in one run.

11 samples (28%) tested positive for deoxynivalenol (DON) residues, none of these samples exceeded the national maximum allowable level of 2 000 µg/kg for cereal grain intended for further processing. The average value of the 11 positive results was 239 µg/kg (ppb) and the highest value measured 478 µg/kg. Last season, 17 samples (43%) tested positive for DON residues with an average value of 1 780 µg/kg (ppb), the highest value obtained was 6 463 µg/kg. No residues were found for any of the other mycotoxins tested.

Please see the mycotoxin results in Table 6 on pages 60 and 61.

