Quality of Australian canola 2016-2017

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Acknowledgements

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NSW Department of Primary Industries would like to thank all the staff of Laboratory Services Oil Testing Service at Wagga Wagga for their assistance in the analysis of these samples and compilation of the book, their hard work is greatly appreciated.

Introduction

Sample analysis

Canola samples representing the 2016 harvest were received from GrainCorp Operations Limited (New South Wales and Victoria), Viterra Pty Ltd (South Australia) and CBH Group (Western Australia). These samples are representative of the seed collected at each of the receival points and have been taken to cumulatively represent the Australian harvest. Samples were received per site from New South Wales, South Australia and Victoria, site samples were not received from Western Australia; instead a sample was received from each of the four port zones. The NSW Department of Primary Industries Laboratory Services Oil Testing Service has no control over the collection of the samples and all data given is based on the analysis of the samples provided.

All averages reported are weighted based on the tonnage represented.

Each sample was analysed for oil, protein and glucosinolate content; fatty acid profiles and volumetric grain weights according to the standard AOF methods outlined in the methods section at the back of this book. The NSW Department of Primary Industries Laboratory Services Oil Testing Service performed all analyses on the samples. Oil contents are reported at 6% moisture in whole seed, protein content is reported in oil-free meal at 10% moisture. This year, for the first time, glucosinolate content is reported in oil-free meal at 10% moisture to allow comparison to the AOF trade standard. Glucosinolate content is also reported at 6% moisture in whole seed in line with previous volumes of the publication to reduce confusion caused by this change.

NSW Department of Primary Industries Laboratory Services Oil Testing Service at Wagga Wagga prepared composite samples for the determination of chlorophyll content. Composite samples were prepared to represent northern New South Wales, southern New South Wales and Victorian GrainCorp regions and South Australia's Adelaide, Central, Eastern and Western Viterra regions. Western Australia's four port zone samples were analysed as received from CBH. Composite samples were created on a per weight basis to proportionally represent each site.

Weather and production review

The season

The 2016 growing season was highlighted by well above average to record rainfall in eastern Australia and mostly average rainfall in Western Australia (Figure 1). Despite waterlogging in some areas of north east and south west Victoria and severe waterlogging and flooding across areas of NSW, the national crop achieved its highest or near highest average yield on record and oil contents were at record highs. Figure 1 shows the rainfall deciles across Australia for the winter crop growing season 1 April – 31 October 2016.

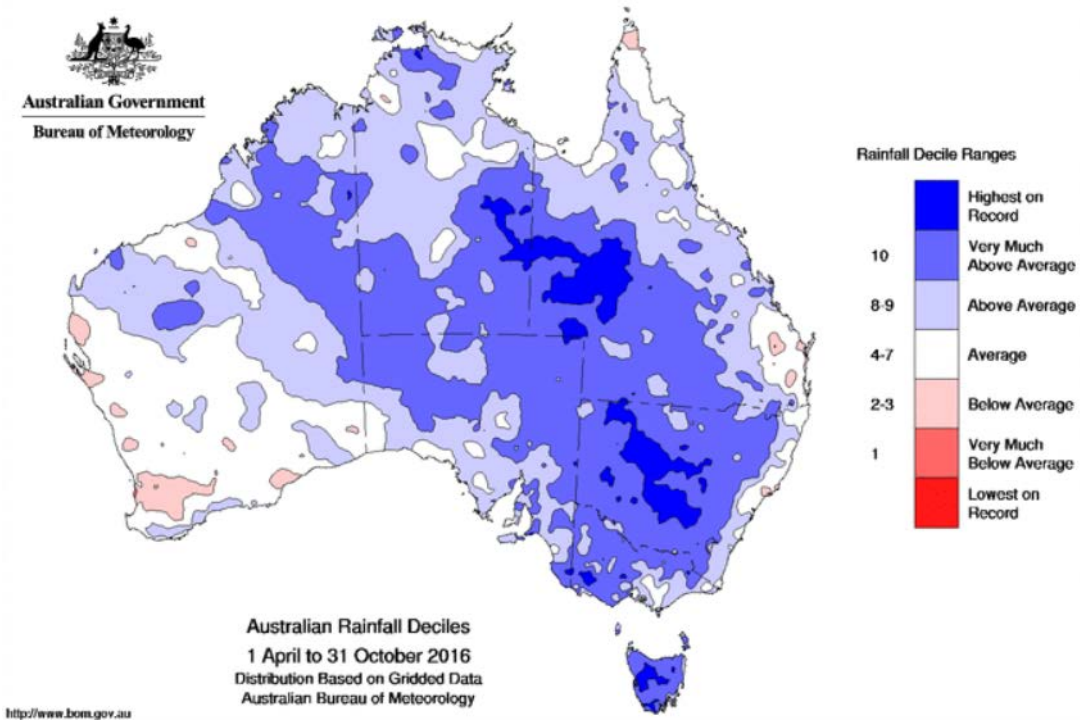

Figure 1: Australian rainfall deciles 1 April – 31 October 2016

Source: Bureau of Meteorology

New South Wales

After a patchy start to the sowing period in April, good rainfall in early May ensured establishment for the bulk of the NSW canola crop. About 70% of the crop was sown by the end of April, but an increasing proportion was dry-sown ahead of the main sowing for wheat. Subsoil moisture was 50-75% full in the main canola production region of the south at sowing time, but subsoils were drier in the centre, north and western growing areas.

Record rainfall was recorded in many regions for the May to September period. June was a very wet month, which hampered weed control programs and nitrogen topdressing. Rainfall for September was also at record levels (150−225 mm), exacerbating the waterlogging that was present during June, but also resulting in widespread and damaging flooding, especially in the river valleys of the centre of the state. About 10% of the NSW canola crop was lost to flooding and severe waterlogging.

The very wet, cloudy winter reduced solar radiation to near record lows.

The wet winter and early spring was conducive to Sclerotinia infection, which caused yield loss in areas that were too wet for preventative fungicides to be applied. Blackleg cankers were again observed on the upper canopy (branches, stems and pods) of crops, especially those that flowered early.

Windrowing and harvest was challenging as wet soils could not hold machinery and bogging occurred in some paddocks and parts of others. Oil contents, on average, were at record highs, and commonly between 44 and 48%, but ranging 38–50%. A mild spring contributed to average to above average yields and oil contents. The very high oil contents and wet seasonal conditions resulted in seed test weights being lower than previous years, resulting in some loads being rejected at delivery.

Final estimated production for NSW was 842,000 t from an estimated 510,000 ha for an average yield of 1.65 t/ha.

Victoria

Most of the cropping regions of Victoria started the season with very low to low subsoil moisture, ranging from near zero in the South West (Former Western Districts) to 30% full in the northern Mallee.

Up to 50% of the total area was dry-sown in late April, based on the weather outlook for a promising season. The autumn break arrived in early to mid-May for most districts and for the rest of the season rainfall, temperatures and solar radiation levels were similar to NSW – above average rainfall, cool temperatures and low solar radiation from May through to September. Waterlogging began to affect crops in the North East in July and by September other areas such as the South West were also experiencing severe waterlogging. It was estimated that 5−7% of the total crop was lost to waterlogging and inundation.

Similar to NSW September and October were cool allowing the majority of the crop to achieve high yield and high oil contents.

Final estimated production for Victoria was 700,000 t from an estimated 355,000 ha for an average yield of 1.97 t/ha.

South Australia

The area sown to canola was slightly higher than in 2015. Subsoil moisture in April ranged from near zero in the South East, up to about 40% full in the Mid-North and the York and Eyre Peninsula. Dry sowing has increased in SA and similar to other states growers are aiming for early establishment of canola and timelier sowing of winter cereals. Rainfall in May, June and July was above average with most crops having a full soil moisture profile by the end of July.

Seasonal conditions (rainfall, temperature and solar radiation) were similar to NSW and Victoria for the rest of the season.

Some of the highest ever levels of blackleg leaf symptoms were observed in SA and Victoria, but this did not translate into serious crown canker infection with lower levels recorded than in previous years.

Sclerotinia was prevalent in earlier flowering crops, but yield loss was minimal.

A severe wind storm in late September caused most crops to table but did not appear to affect yield potential.

Final estimated production for South Australia was 400,000 t from an estimated 220,000 ha for an average yield of 1.82 t/ha.

Western Australia

The area sown to canola increased by 3% to 1.24 million hectares in 2016.

Following good early rain in late March and follow-up in most districts in mid-April, an estimated 80% of the crop was sown by the end of April. March to May rainfall was much lighter in the northern zone between Geraldton and Mullewa.

Rainfall was generally average through May to July and average to above average through August. Crop growth was well ahead of normal by mid-winter, in many areas 2-4 weeks ahead, and combined with good soil moisture set the crop up for a high yield potential, but with heightened frost risk.

The lowest average minimum temperatures on record were recorded for September across most growing regions, which served to increase yield potential. However two major frost events on 17-18 and 23-24 September in the Lakes region of the Albany Port Zone, reduced yield potential in affected crops in that zone by about 25%.

The generally mild finish to the season helped crops to achieve record yields with exceptional oil contents, mostly in the range 47−50%.

Final estimated production for Western Australia was 2.20 million tonnes from an estimated 1.24 million ha for an average yield of 1.77 t/ha.

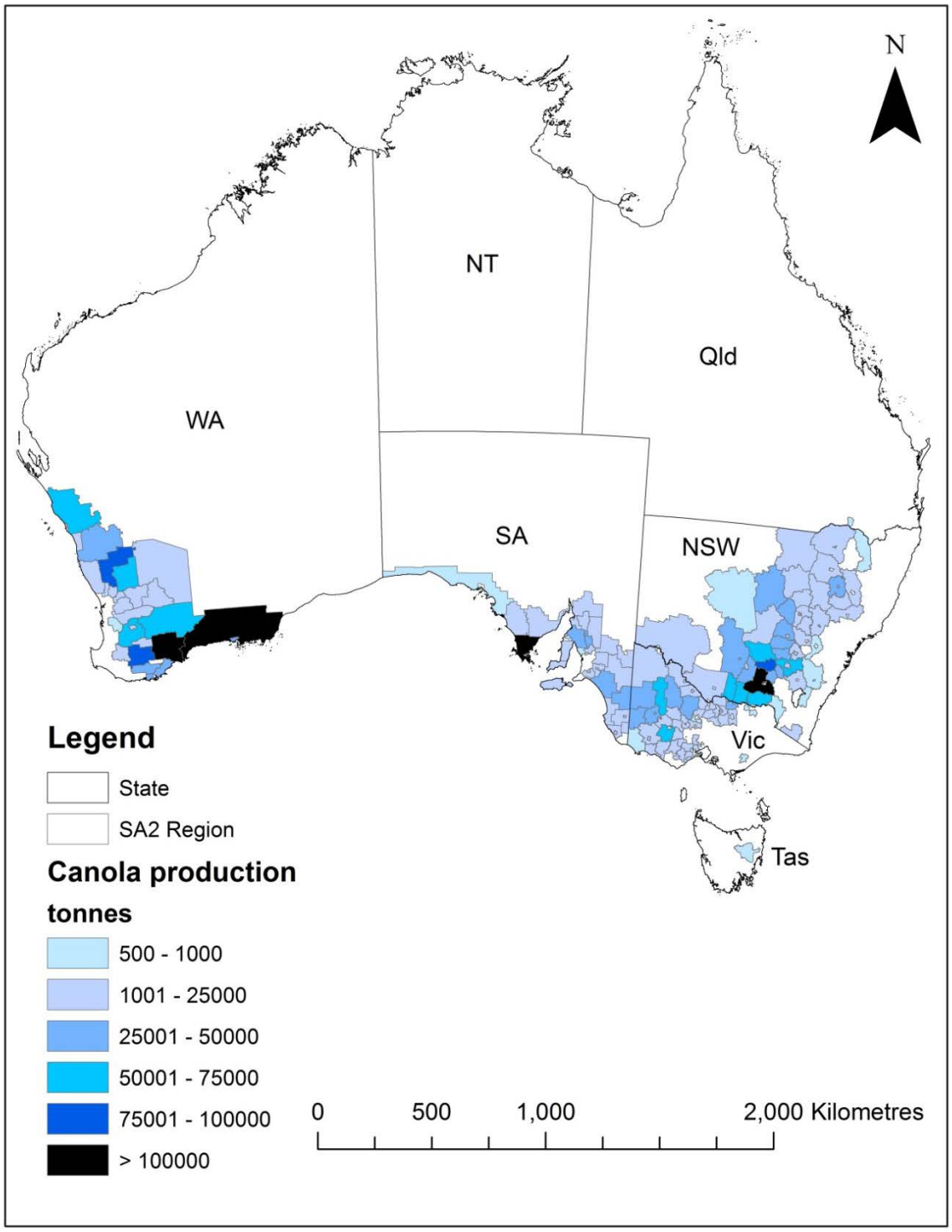

Figure 2: Average canola production from 2010 to 2014

Source: Map produced by CSIRO using ABS statistics

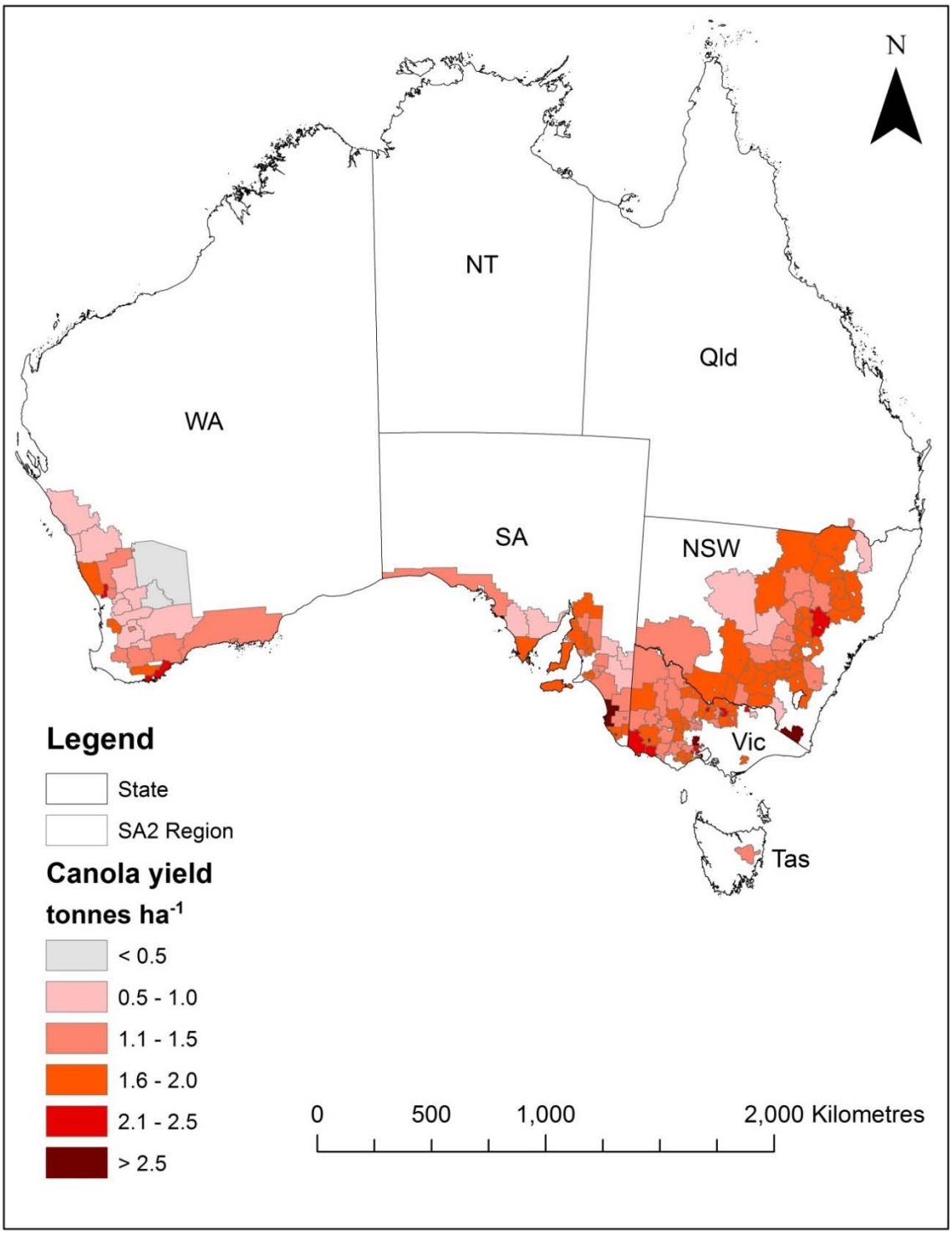

Figure 3: Average canola production yields from 2010 to 2014

Source: Map produced by CSIRO using ABS statistics

Yield

Australia produced in excess of 4 million tonnes for only the second time in 2016, equalling the record of 4,142,000 tonnes set in 2012. Western Australia recorded its highest ever production at 2.2 million tonnes, 404,000 tonnes more than the previous maximum in 2013. The other three states' production figures were in the top four ever recorded.

The 4 million tonnes was produced off the smallest area since 2012. The national yield of 1.78 t/ha was the highest recorded since national production first exceeded half a million tonnes in 1995. Yield ranged from 1.65 t/ha in New South Wales to 1.97 t/ha in Victoria (second highest ever recorded). South Australia recorded its highest ever yield at 1.82 t/ha and the 1.77 t/ha yield in Western Australia was the second highest ever recorded for the state.

Area sown and production in each state is shown in Table 1. Final production was estimated at 4.142 million tonnes.

Table 1: Estimated Australian canola production by state in 2016

State	Production (tonnes)	Area Harvested (hectares)	Average Yield (tonnes/hectare)
New South Wales	842,000	510,000	1.65
Victoria	700,000	355,000	1.97
South Australia	400,000	220,000	1.82
Western Australia	2,200,000	1,240,000	1.77
Australia	4,142,000	2,325,000	1.78

Source: ABARES Australian Crop Report February 2017

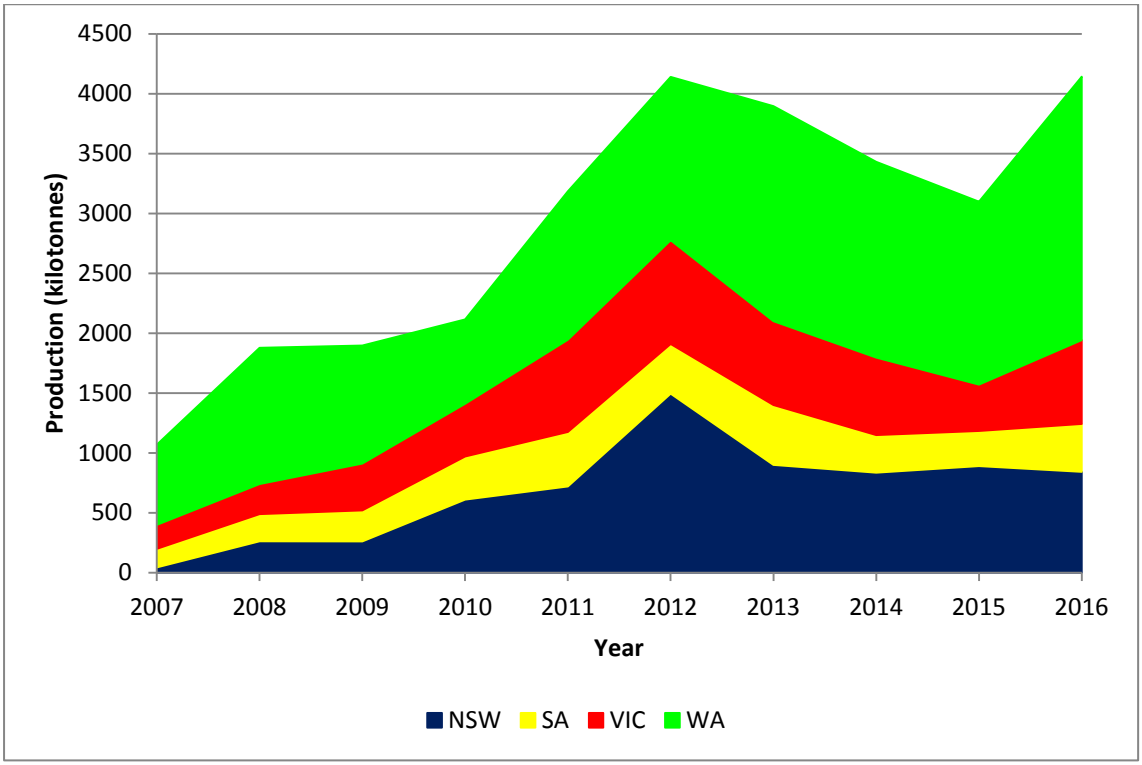

Figure 4: Canola Production in Australia 2007 – 2016

Australian quality parameter summary

A weighted average of each region and state was calculated based on the tonnages each Site and Grade represents.

The Australian national weighted average was calculated using the production figures for each state. The composite samples representing the port zones in Western Australia were insufficient to perform test weight analysis so the Australian weighted average only represents the 2016 harvest in New South Wales, South Australia and Victoria.

Due to tonnages being confidential information, individual site tonnages cannot be reported.

Table 2: Average quality of Australian canola 2016

Quality Parameter	**Australian weighted average**
Oil content, % in whole seed @ 6 % moisture	47.2
Protein content, % in oil-free meal @ 10 % moisture	37.5
Glucosinolates, µmoles/g in oil-free meal @ 10 % moisture	10
Glucosinolates, µmoles/g in whole seed @ 6 % moisture	5
Test weight, kg/hL[1]	65.30
Oleic acid (C18:1), %[2]	60.5
Linoleic acid (C18:2), %[2]	19.9
Linolenic acid (C18:3), %[2]	10.9
Erucic acid (C22:1), %[2]	< 0.1
Polyunsaturated fatty acids, %[2]	30.8
Monounsaturated fatty acids, %[2]	62.1
Saturated fatty acids, %[2]	7.1
Iodine Value	116.2
Chlorophyll content, mg/kg in whole seed as received	11

[1] Australian weighted average only representative of the New South Wales, South Australian and Victorian harvest

[2] Fatty acids are reported as a % of total fatty acids in the oil portion of the seed.

Oil content

The average oil content for the Australian harvest in 2016 was 47.2%. This was the highest ever recorded, 1.5 percentage points higher than the previous maximum of 45.7% recorded in 2013 and 5.2 percentage points higher than the 2015 season (although if WA data was available in 2015 the oil content would have been higher). Oil content from every site was above the 42.0% base level set by the AOF trade standard, ranging from 43.3% at Premer in New South Wales to 48.8% at Westmere in Victoria. The port zones of Albany and Esperance in Western Australia were both higher than Westmere recording 49.1% and 49.8% respectively.

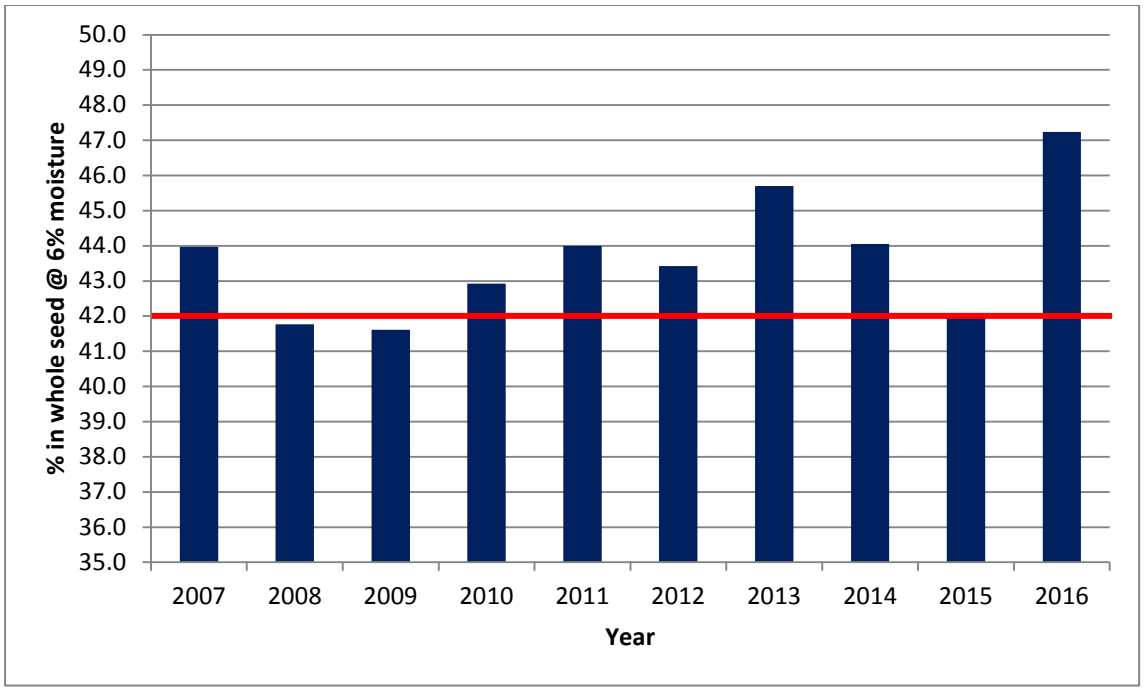

Figure 5: Average Australian oil content 2007 - 2016

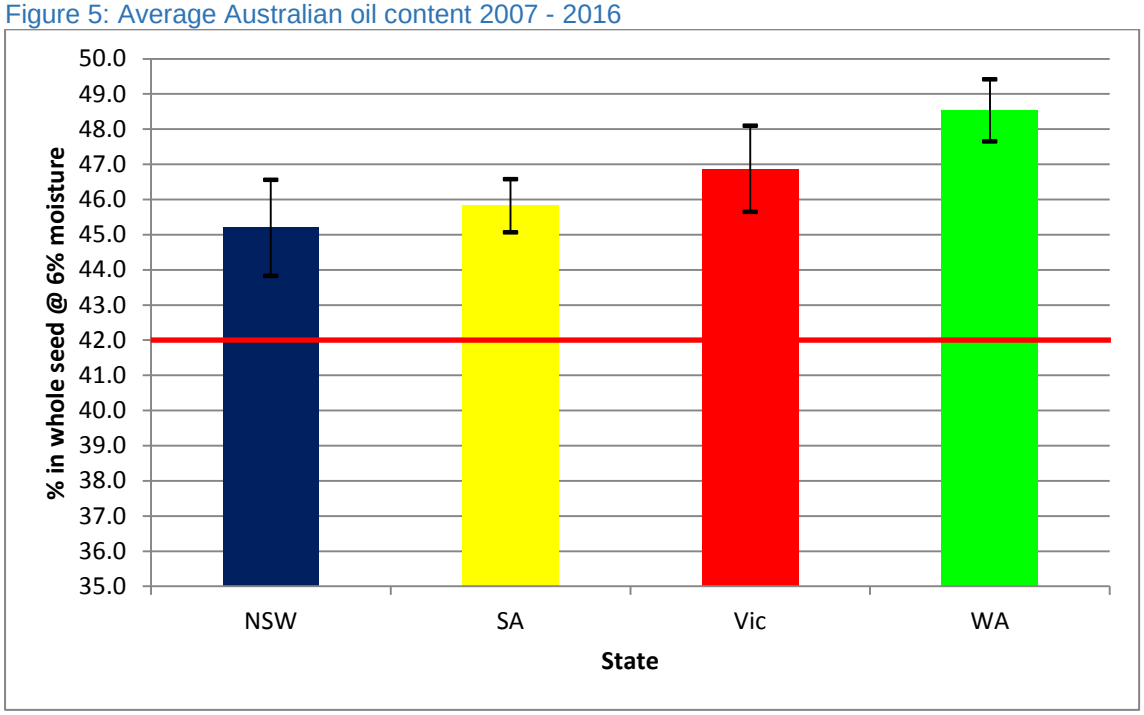

Figure 6: Average oil content by state 2016

Bars indicate the standard deviation for each state
Red lines show the AOF base level oil content of 42%
2015 average was determined with NSW, SA & Vic results only

Protein content

The average protein content for the 2016 Australian canola harvest was 37.5% in oil-free meal. As expected with record high oil content, protein content dropped 2.3 percentage points from the 2015 season and was the lowest since 2013. Protein content ranged from 34.5% at Boorowa in New South Wales to 40.8% at Gilgandra in New South Wales.

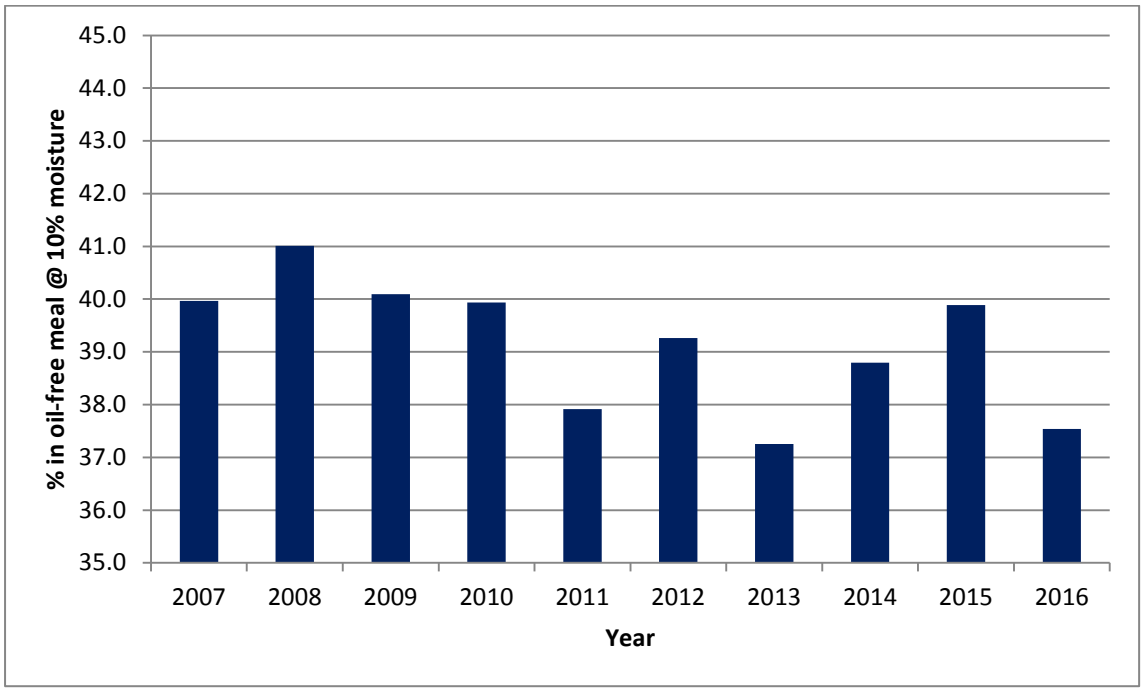

Figure 7: Average Australian protein content 2007 - 2016

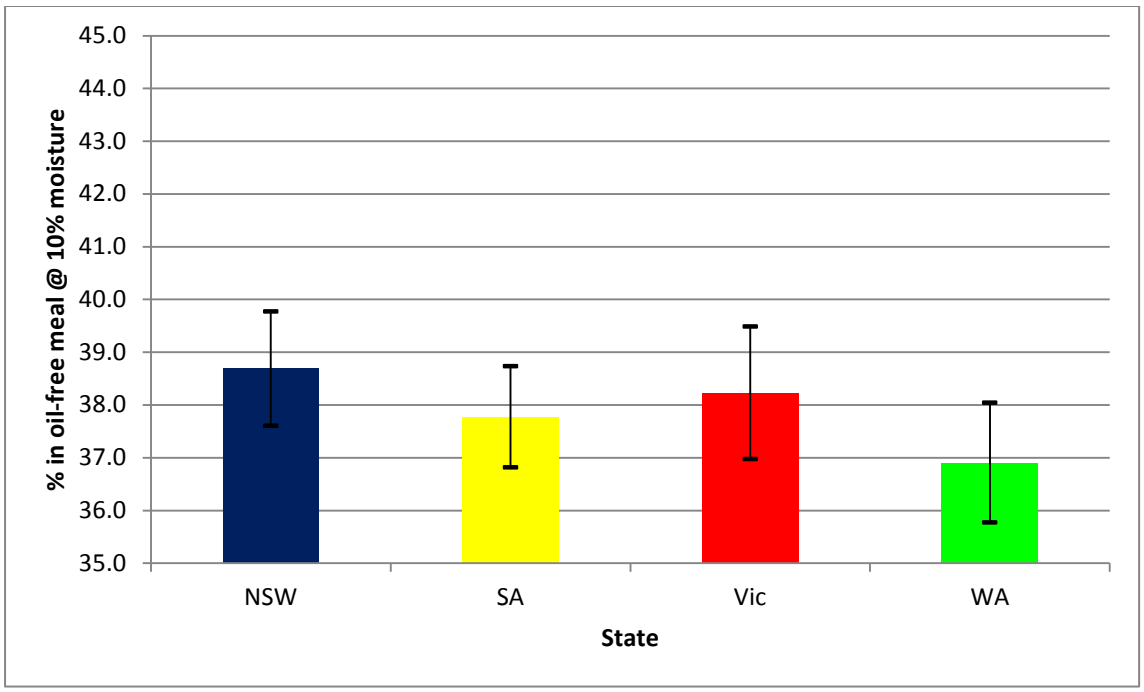

Figure 8: Average protein content by state 2016

Bars indicate the standard deviation for each state
2015 average was determined with NSW, SA & Vic results only

Glucosinolate content - meal

The AOF trade standard sets the limit for glucosinolate content at 30 µmoles/g in oil-free meal. In the past this publication has reported glucosinolate content in whole seed in line with other publications and programs. This year glucosinolate content has been reported in oil-free meal at 10% moisture to allow comparison to the AOF trade standard. Glucosinolate content has also been reported at 6% moisture in whole seed in line with previous volumes of the publication to help reduce confusion as we transition to the new method of reporting.

The average glucosinolate content for the Australian harvest in 2016 was 10 µmoles/g in oil-free meal at 10% moisture. Glucosinolate content ranged from 6 µmoles/g at three sites – Bribbaree and Wyalong in New South Wales and Dooen in Victoria (part of Viterra's South Australian operation) to 21 µmoles/g at Boorowa in New South Wales.

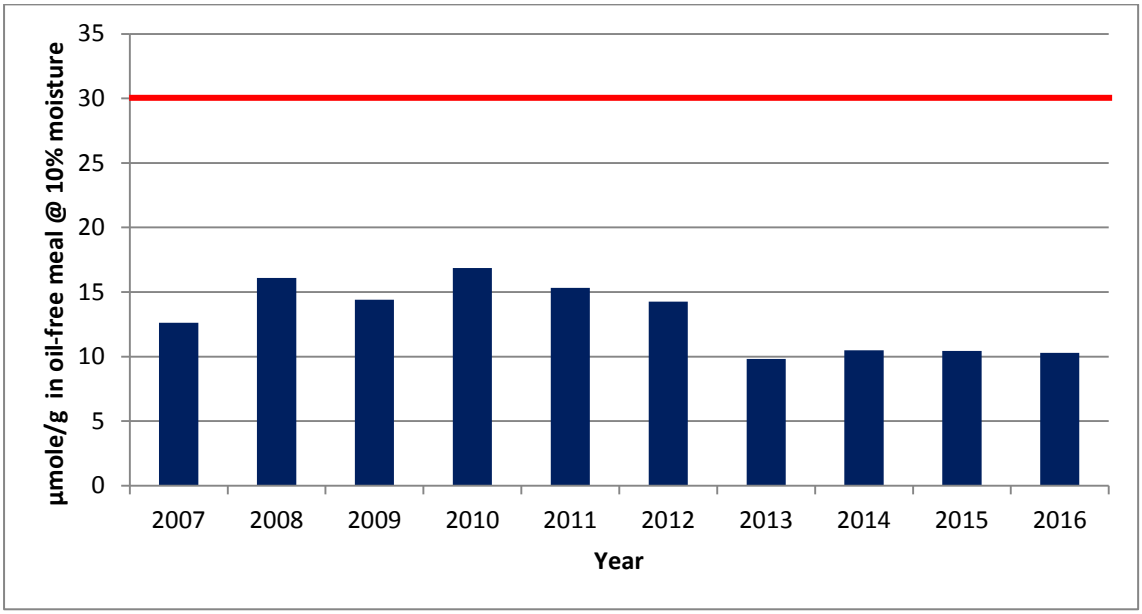

Figure 9: Average Australian glucosinolate content in meal 2007 – 2016

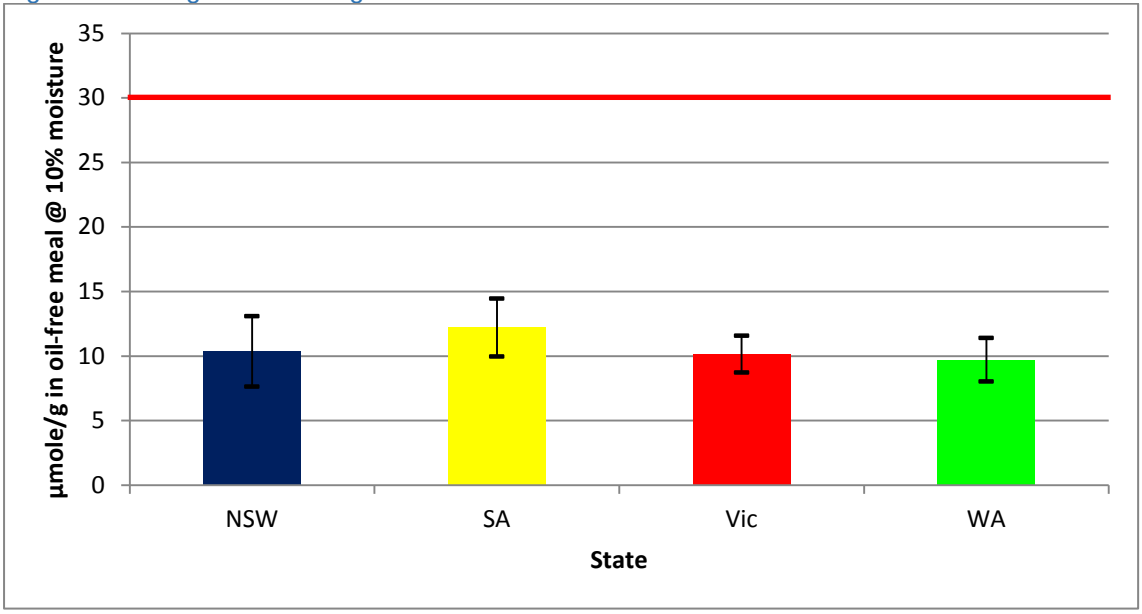

Figure 10: Average glucosinolate content in meal by state 2016

Bars indicate the standard deviation for each state
Red lines show the AOF limit of 30 µmoles/g in oil-free meal
2014 & 2015 averages were determined with NSW, SA & Vic results only

Glucosinolate content – whole seed

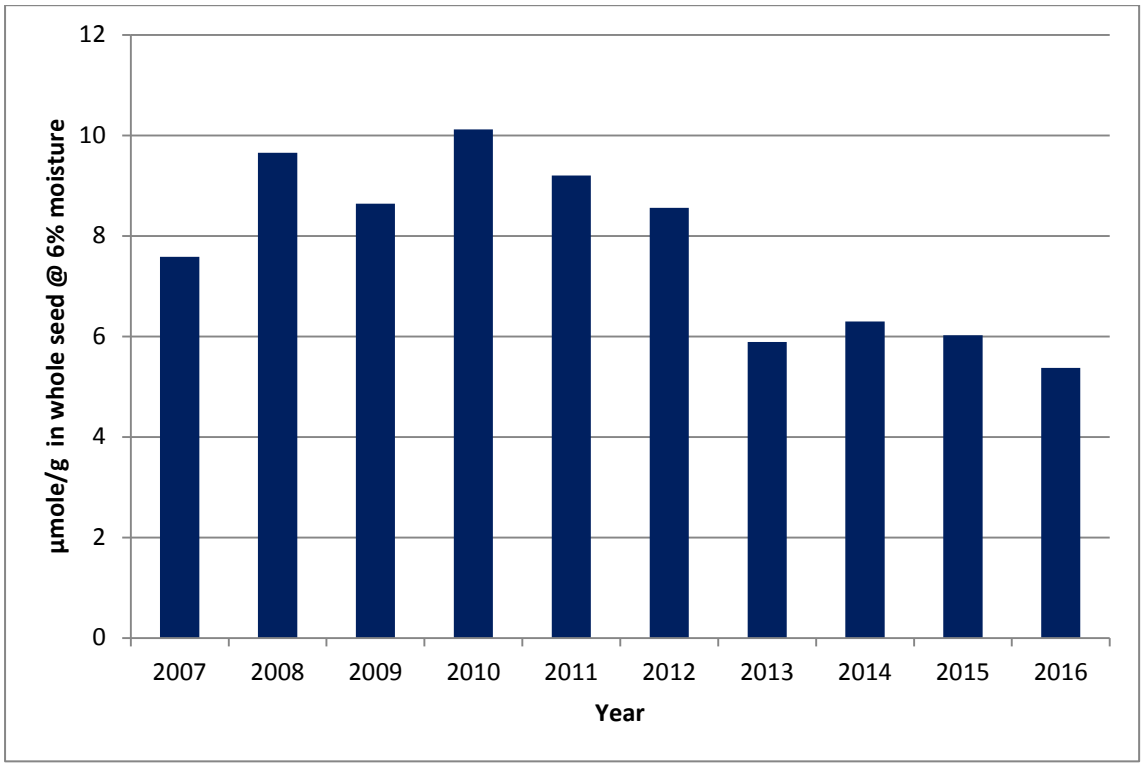

Figure 11: Average Australian glucosinolate content in whole seed 2007 – 2016

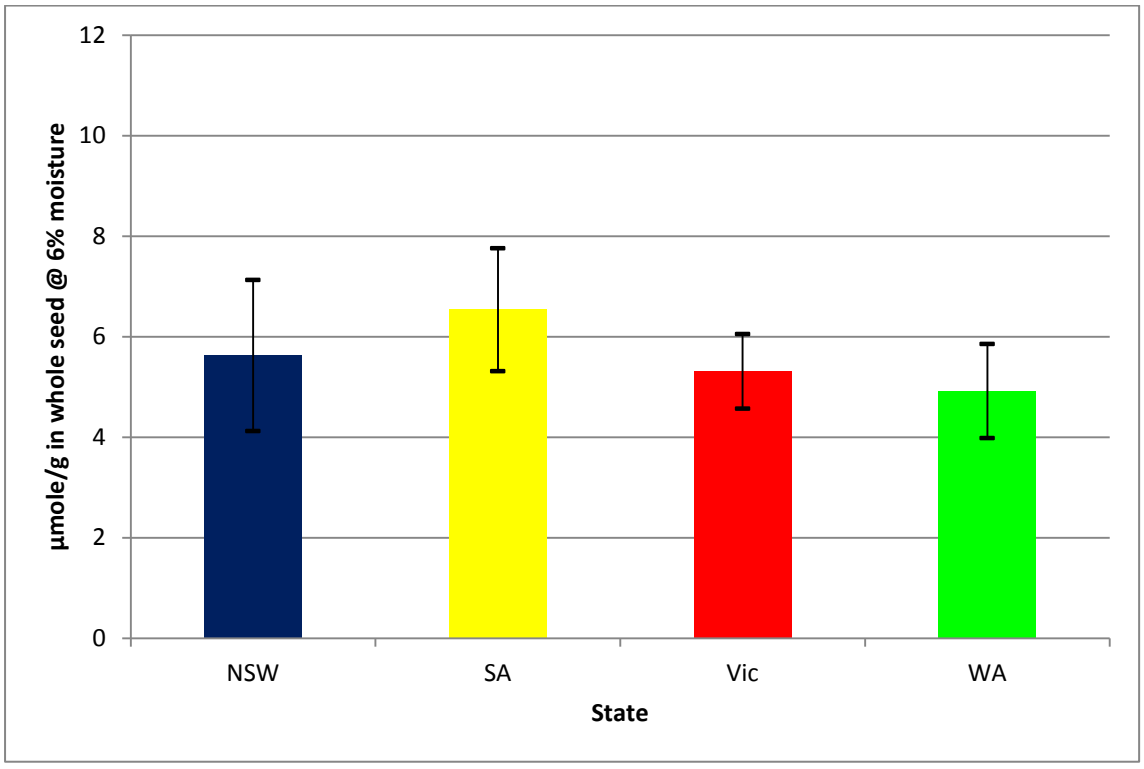

Figure 12: Average glucosinolate content in whole seed by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Fatty acid composition

Oleic acid

The average oleic acid (C18:1) percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 60.5%. This was a decrease of 3.8 percentage points from the 2015 season and the lowest since 2008. Oleic acid ranged from 57.7% at Barnes Crossing in Victoria to 65.7 at Ardlethan in New South Wales.

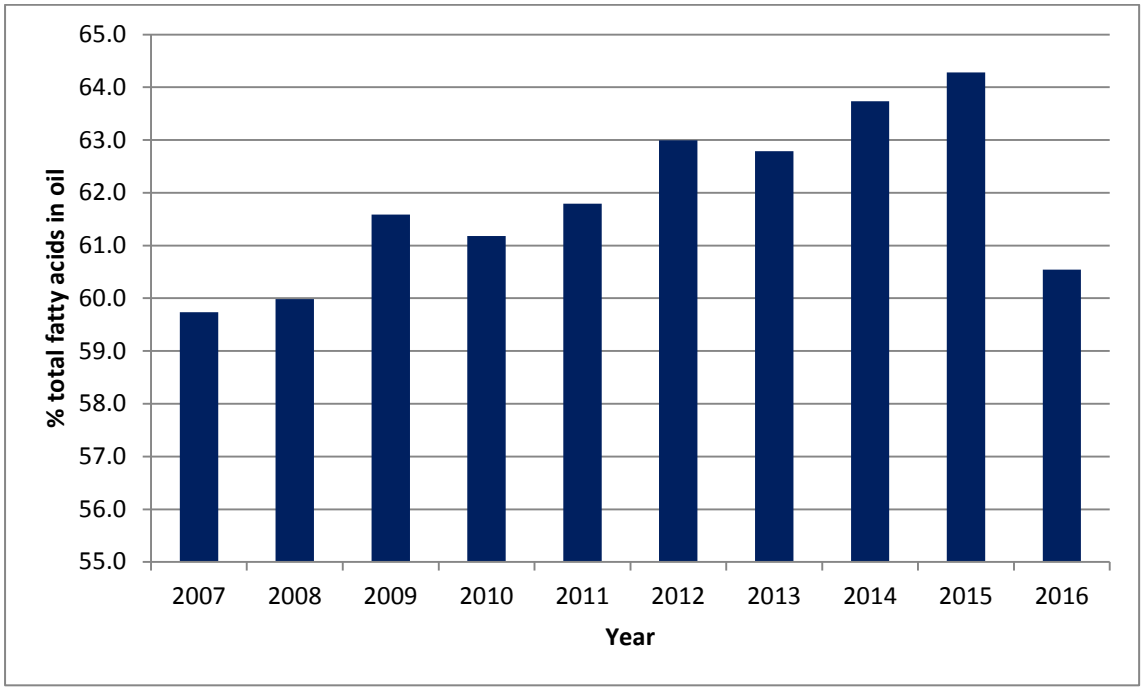

Figure 13: Average Australian percentage of oleic acid in canola oil 2007 – 2016

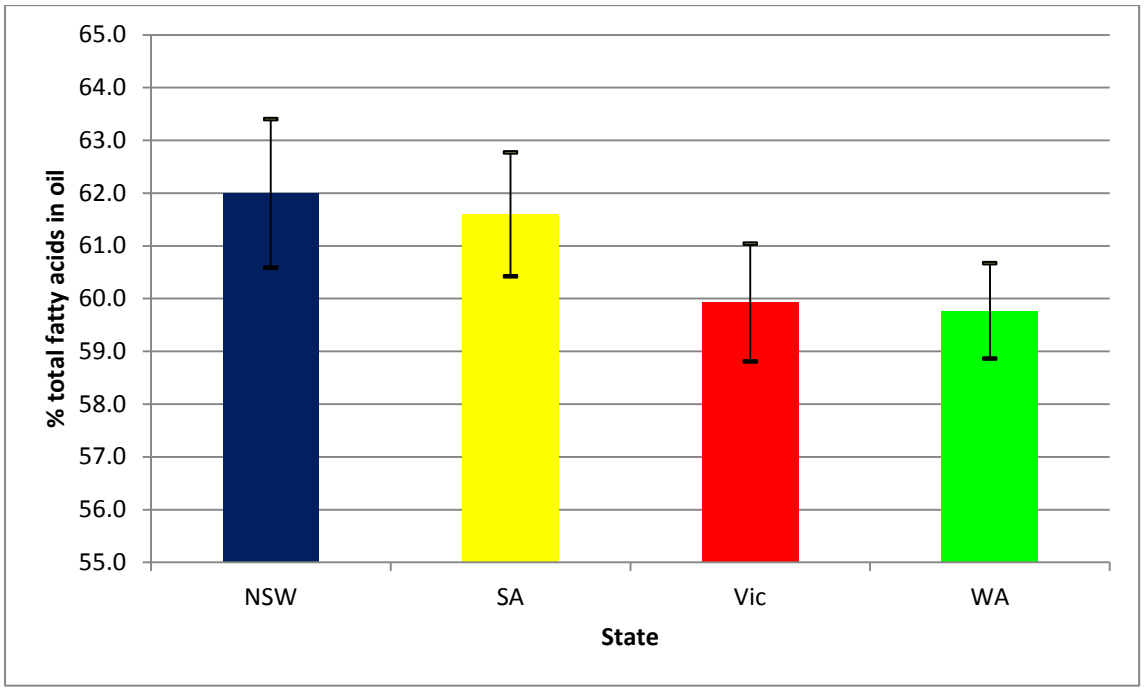

Figure 14: Average percentage of oleic acid in canola oil by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Linoleic acid

The average linoleic acid (C18:2) percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 19.9%. This was an increase of 2 percentage points from the 2015 season and the highest since 2008. Linoleic acid ranged from 15.6% at Ardlethan in New South Wales to 22.6% at Barnes Crossing in Victoria.

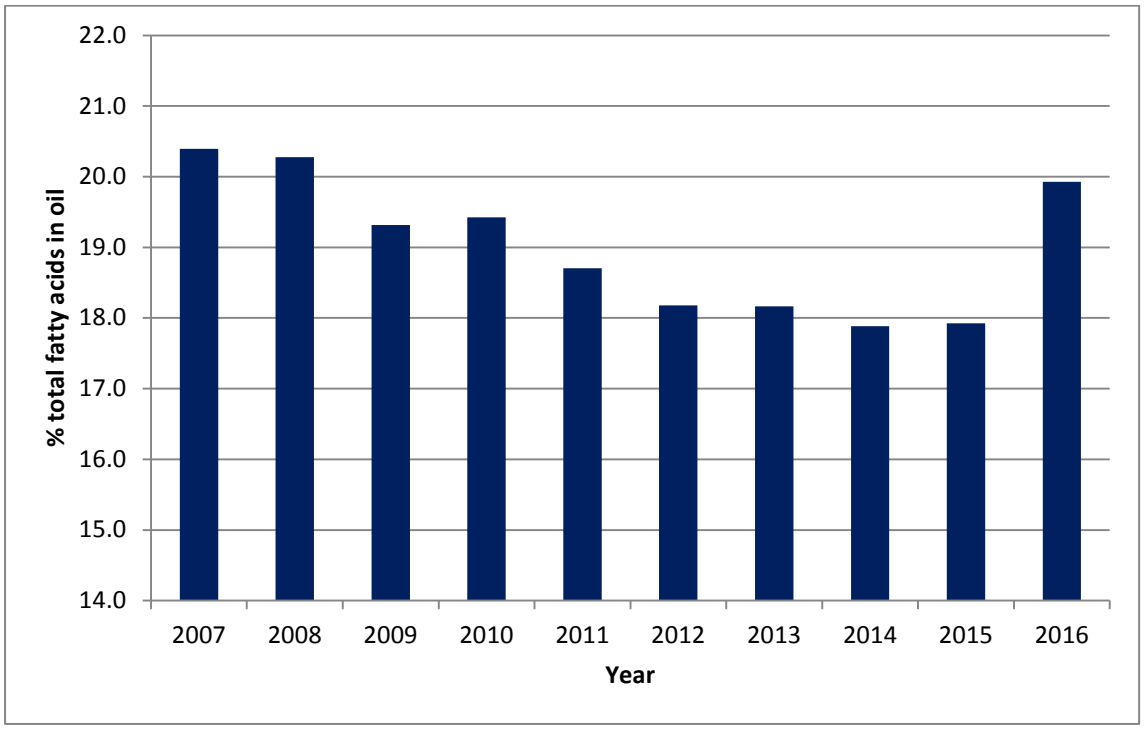

Figure 15: Average Australian percentage of linoleic acid in canola oil 2007 – 2016

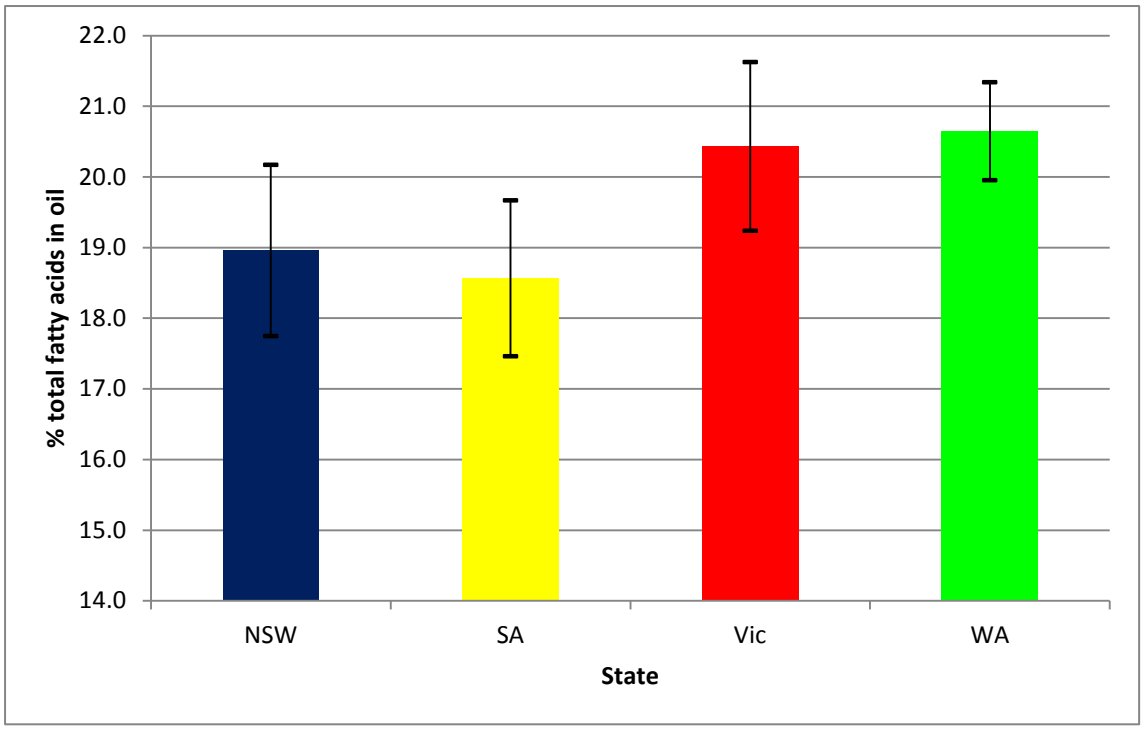

Figure 16: Average percentage of linoleic acid in canola oil by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Linolenic acid

The average linolenic acid (C18:3) percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 10.9%. This was an increase of 2.3 percentage points from the 2015 season and the highest since 2007. Linoleic acid ranged from 8.2% at Boorowa in New South Wales to 11.8% at three sites – Grong Grong in New South Wales, Lillimur in Victoria and Naracoorte in South Australia (part of GrainCorp's Victorian operation).

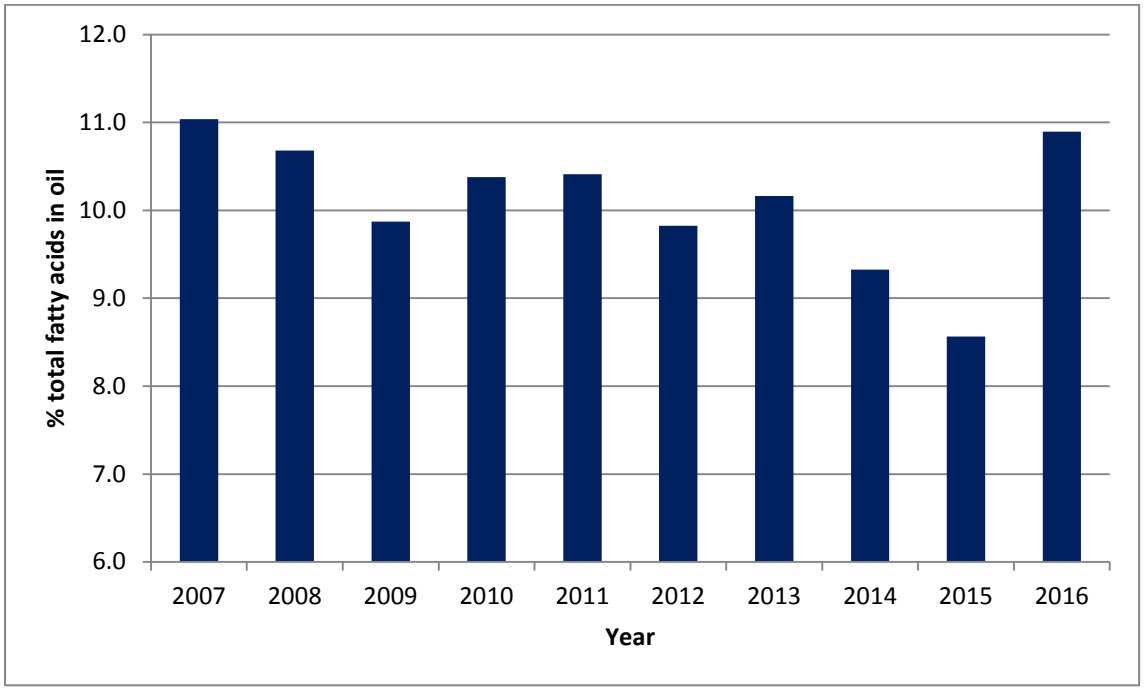

Figure 17: Average Australian percentage of linolenic acid in canola oil 2007 – 2016

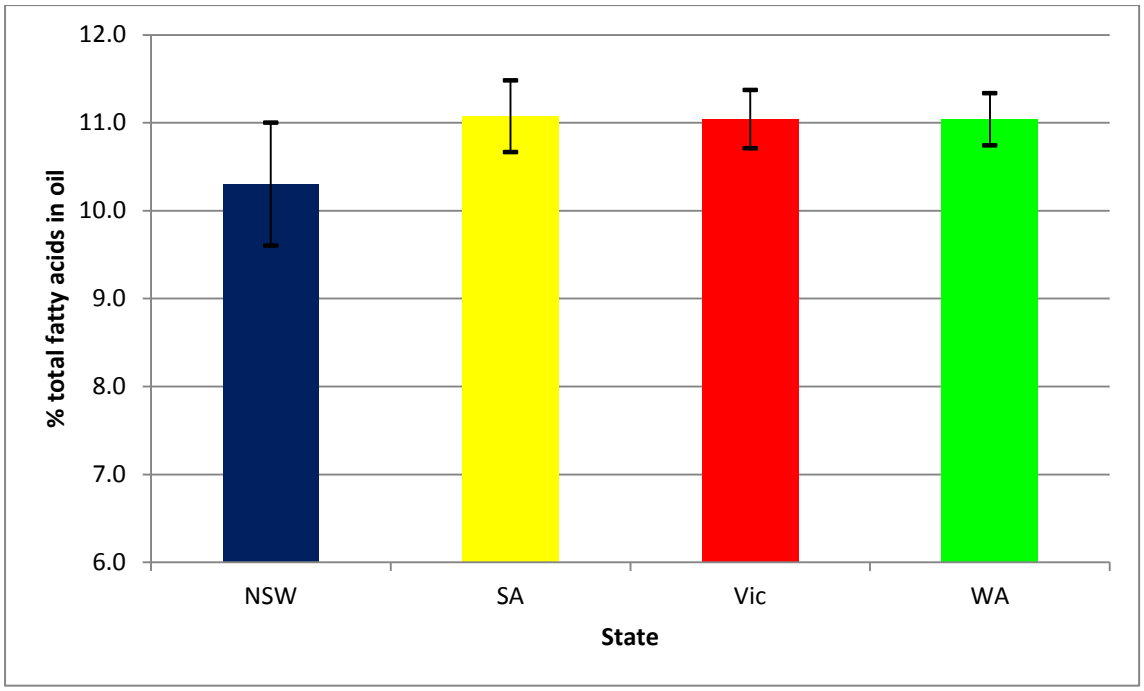

Figure 18: Average percentage of linolenic acid in canola oil by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Saturated fatty acids

The average saturated fatty acids percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 7.1%. This was a decrease of 0.5 percentage points from the 2015 season and the lowest since 2005. Saturated fatty acids ranged from 6.8% at Ardlethan and Trundle in New South Wales to 7.5% at Premer in New South Wales and Oaklands in New South Wales (part of GrainCorp's Victorian operation).

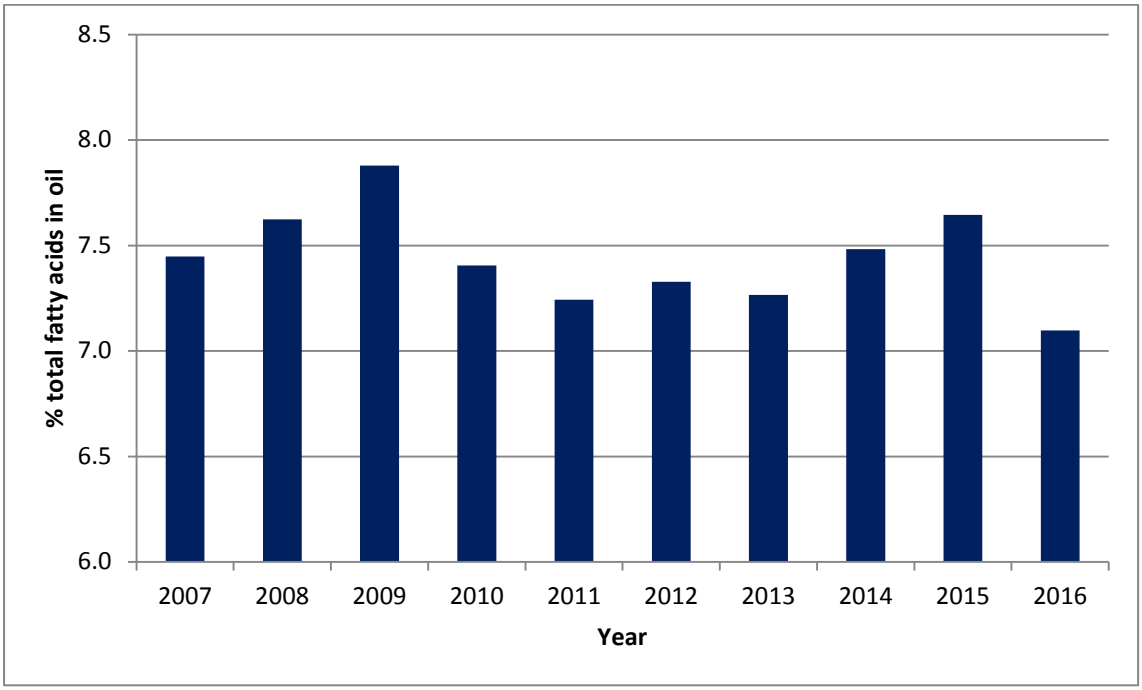

Figure 19: Average Australian percentage of saturated fatty acids in canola oil 2007 – 2016

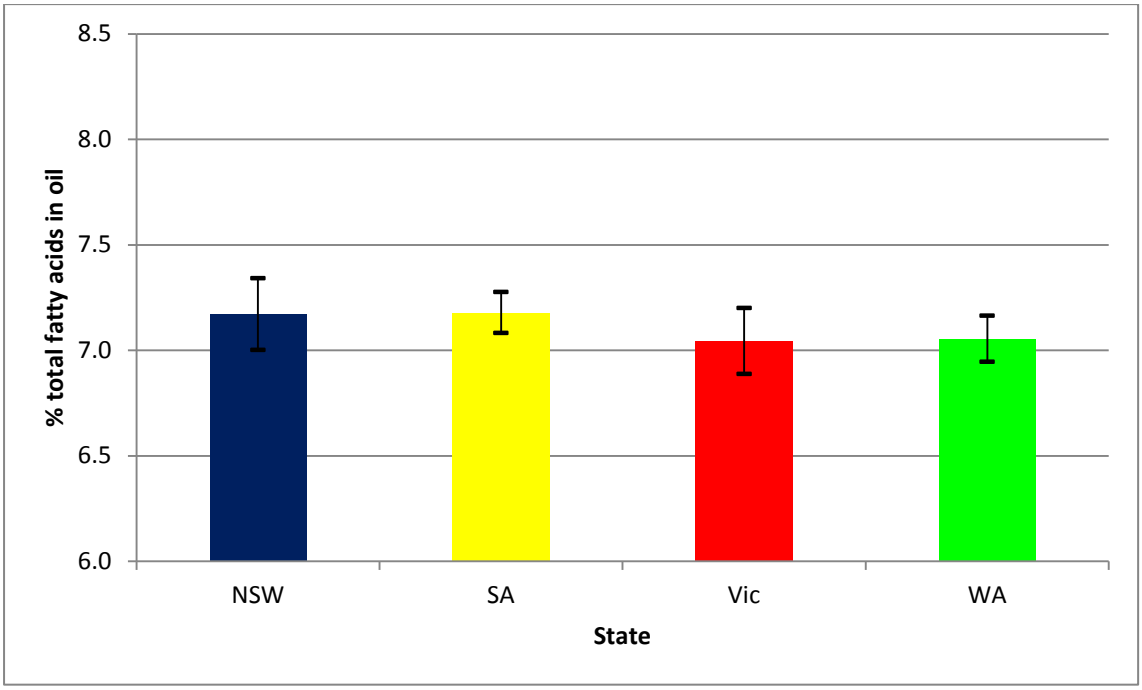

Figure 20: Average percentage of saturated fatty acids in canola oil by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Monounsaturated fatty acids

The average monounsaturated fatty acids percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 62.1%. This was a decrease of 3.8 percentage points from the 2015 season. Monounsaturated fatty acids ranged from 59.3% at Barnes Crossing in Victoria to 67.3% Ardlethan in New South Wales.

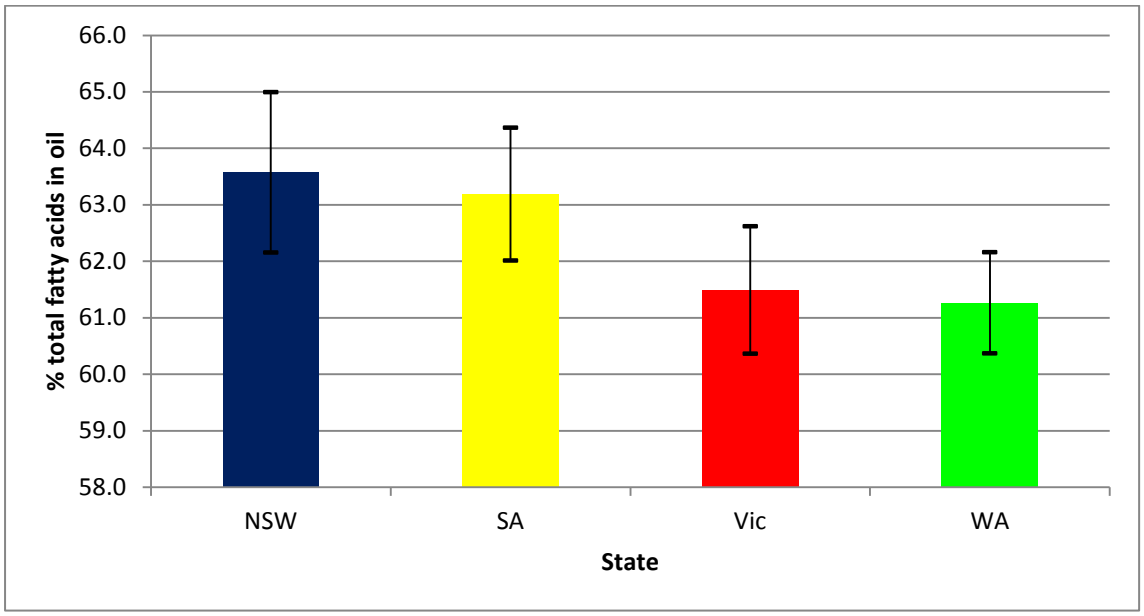

Figure 21: Average percentage of monounsaturated fatty acids in canola oil by state 2016

Bars indicate the standard deviation for each state

Polyunsaturated fatty acids

The average polyunsaturated fatty acids percentage of total fatty acids in the oil portion of seed from the 2016 harvest was 30.8%. This was a massive increase of 4.3 percentage points from the 2015 season. Polyunsaturated fatty acids ranged from 25.9% at Ardlethan in New South Wales to 33.5% Barnes Crossing in Victoria.

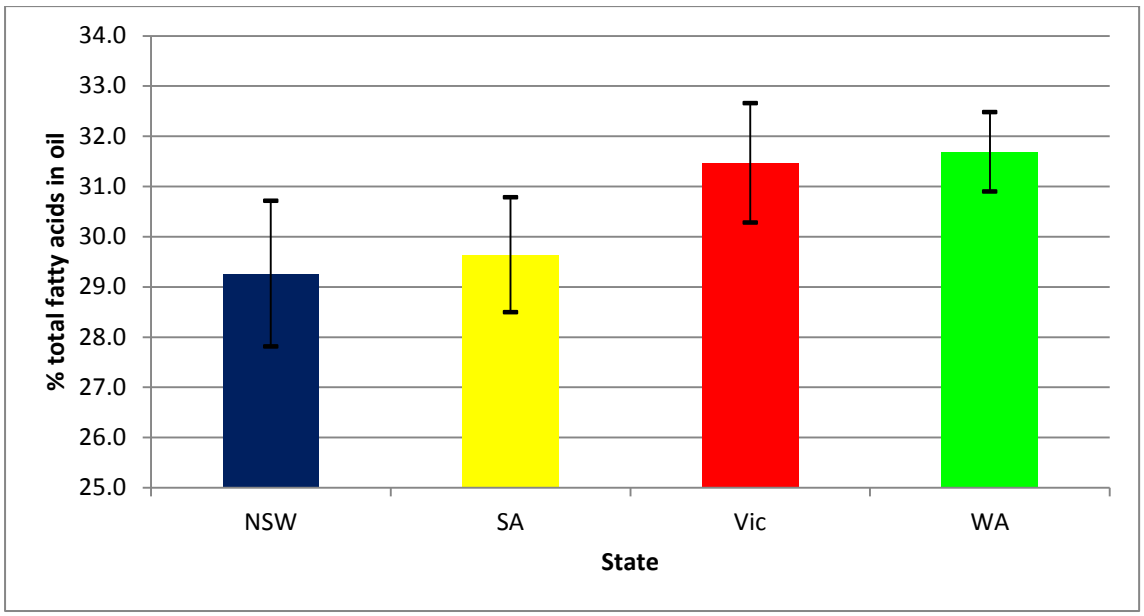

Figure 22: Average percentage of polyunsaturated fatty acids in canola oil by state 2016

Bars indicate the standard deviation for each state

Iodine value

The average iodine value in the oil portion of seed for the 2016 harvest was 116.2. This was 6.4 higher than the 2015 harvest and the highest since 2007. Iodine value ranged from 110.6 at Condobolin in New South Wales to 118.9 at Tocumwal in New South Wales (part of GrainCorp's Victorian operation).

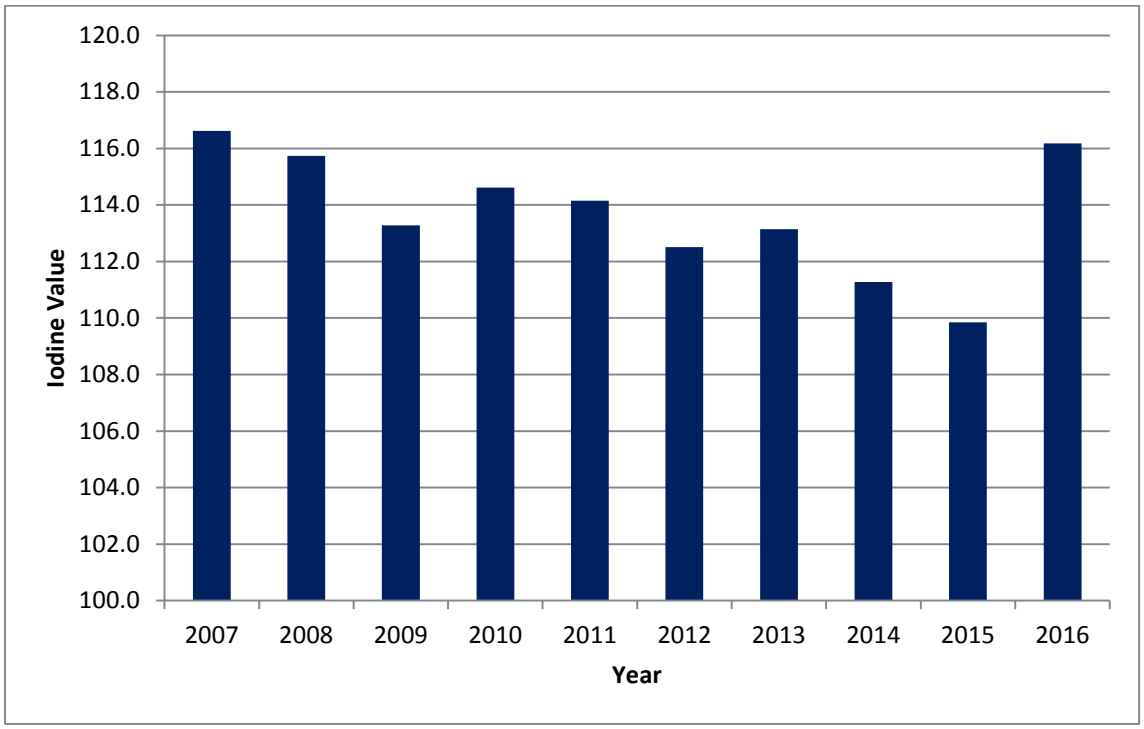

Figure 23: Average Australian iodine value in canola oil 2007 – 2016

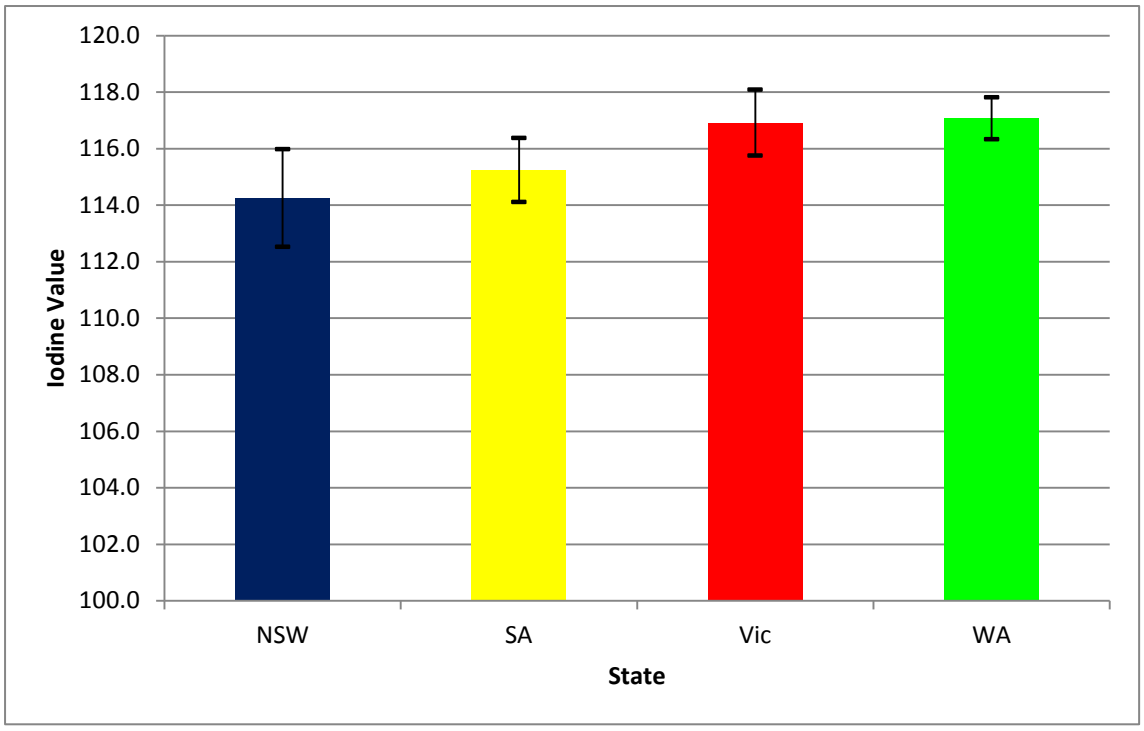

Figure 24: Average iodine value in canola oil by state 2016

Bars indicate the standard deviation for each state
2014 & 2015 averages were determined with NSW, SA & Vic results only

Quality Data by State

In each state the receival sites are grouped into Zones and Regions by the bulk handlers. Results are reported according to these Zones and Regions.

Figure 25: GrainCorp map of Northern NSW regions

Source: http://www.graincorp.com.au

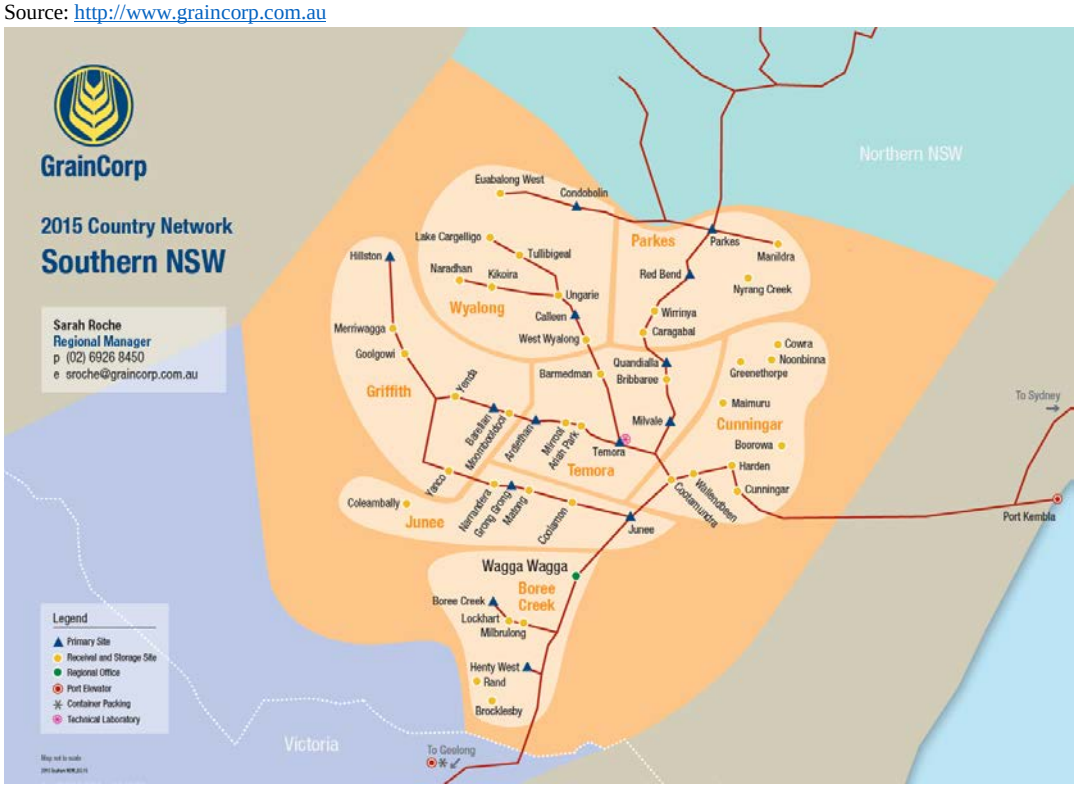

Figure 26: GrainCorp map of Southern NSW regions

Source: http://www.graincorp.com.au

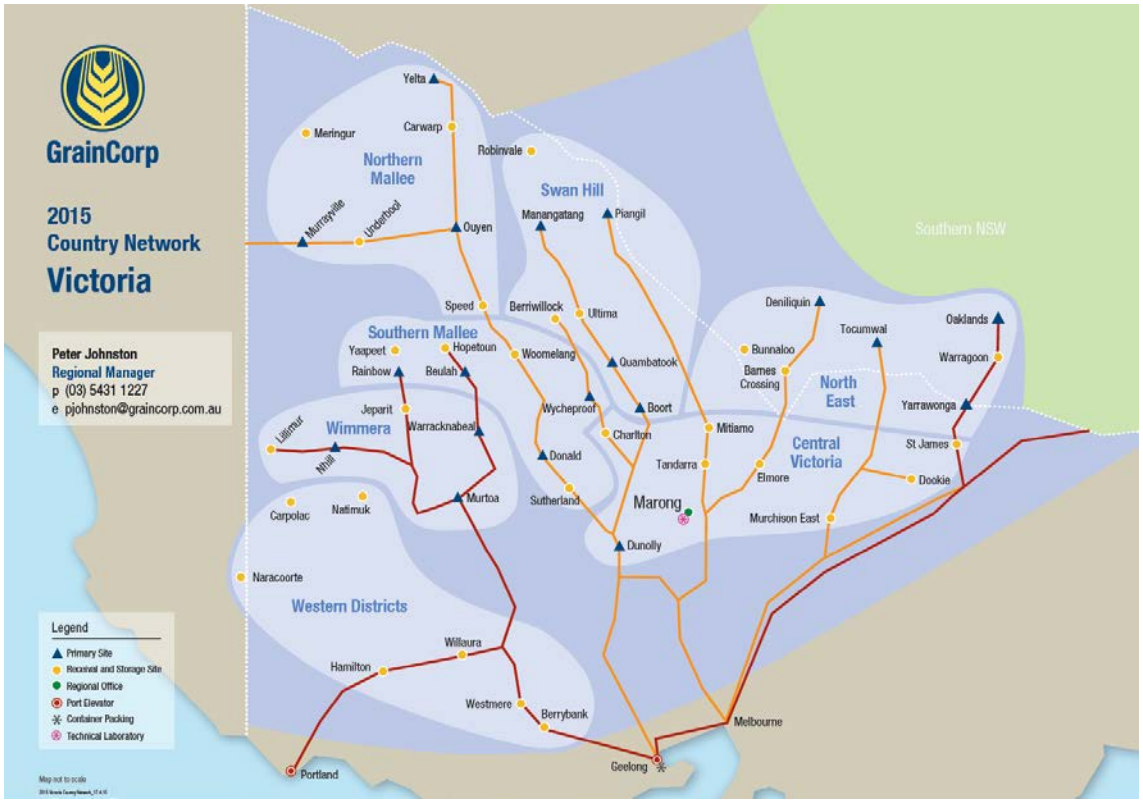

Figure 27: GrainCorp map of Victorian regions

Source: http://www.graincorp.com.au

Figure 28: Viterra Storage & Handling Network map

Source: http://www.viterra.com.au/storage-handling/sites-and-locations

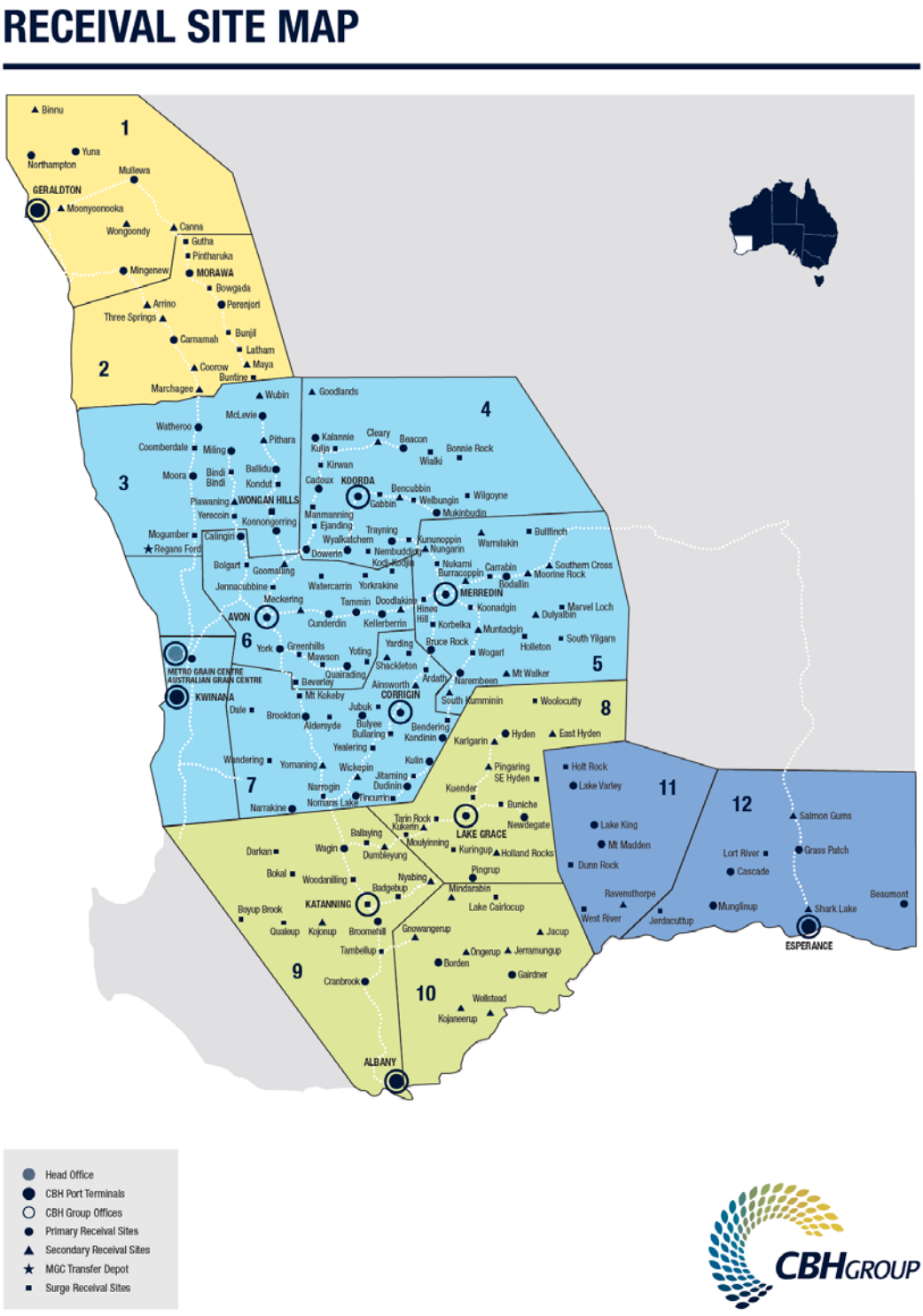

Figure 29: CBH Group receival site map

Source:
https://www.cbh.com.au/harvest%20information/site%20services%20and%20operating%20hours

Table 3: Quality Data – New South Wales

Region/ Zone/ Site	Grade	Oil	Protein	Glucosinolates		Test Weight
		%[1]	%[2]	µmoles/g[3]	µmoles/g[4]	kg/hL[5]
Northern NSW						
Dubbo North						
Gilgandra	CAN	44.9	40.8	10	6	64.25
Dubbo West						
Mungeribar	CAN	44.2	39.4	9	5	63.50
Nevertire	CAN	43.7	39.3	12	7	65.75
Trundle	CAN	48.2	37.4	10	5	63.50
Moree North						
Moree	CAN	43.8	37.8	12	7	64.50
Werris Creek						
Premer	CAN	43.3	39.0	11	6	64.00
Willow Tree	CAN	44.2	36.9	11	6	64.50
Northern NSW Weighted Average		**44.4**	**39.1**	**11**	**6**	**64.37**
Southern NSW						
Borree Creek						
Borree Creek	CAN	47.5	37.5	9	5	65.00
Henty West	CAN	46.9	38.4	10	5	63.83
Milbrulong	CAN	47.7	37.7	9	5	65.75
Rand	CAN	46.8	38.8	10	5	64.75
Cunningar						
Boorowa	CAN	45.7	34.5	21	11	63.00
Cootamundra	CAN	45.6	37.8	10	5	64.00
Cowra	CAN	46.7	37.8	11	6	64.25
Cunningar	CAN	46.0	37.9	10	5	63.83
Greenethorpe	CAN	46.1	37.8	11	6	64.25
Harden	CAN	45.6	37.7	15	8	63.00
Maimuru	CAN	45.6	39.9	13	7	64.50
Griffith						
Barellan	CAN	47.3	37.6	9	5	64.63
Junee						
Coolamon	CAN	48.6	37.5	8	4	65.00
Grong Grong	CAN	44.0	37.1	9	5	65.75
Junee Sub	CAN	47.6	38.0	11	6	64.00
Matong	CAN	44.4	37.3	8	4	65.25
Narrandera	CAN	47.5	38.4	9	5	65.25

[1] % in whole seed @ 6% moisture, [2] % in oil-free meal @ 10% moisture, [3] µmoles/g in oil-free meal @ 10% moisture, [4] µmoles/g in whole seed @ 6% moisture, [5] kilograms/ hectolitre

Table 3: Quality Data – New South Wales – continued

Region/ Zone/ Site	Grade	Oil	Protein	Glucosinolates		Test Weight
		%[1]	%[2]	µmoles/g[3]	µmoles/g[4]	kg/hL[5]
Parkes						
Caragabal	CAN	46.5	38.4	8	4	64.00
Manildra	CAN	46.1	38.0	12	6	64.00
Parkes Sub	CAN	45.6	37.6	8	4	64.25
Red Bend	CAN	46.6	38.4	9	5	63.75
Temora						
Ardlethan	CAN	46.9	36.5	7	3	63.75
Bribbaree	CAN	45.5	37.8	6	3	63.75
Milvale	CAN	45.0	38.8	11	6	64.13
Temora Sub	CAN	46.8	38.6	11	6	64.00
Wyalong						
Calleen	CAN	47.8	36.3	7	3	64.75
Condobolin	CAN	46.6	38.4	7	4	64.50
Wyalong	CAN	47.1	37.0	6	3	65.00
Southern NSW Weighted Average		**46.5**	**37.9**	**10**	**5**	**64.38**
NSW Weighted Average		**45.2**	**38.7**	**10**	**6**	**64.37**
NSW Minimum		*43.3*	*34.5*	*6*	*3*	*63.00*
NSW Maximum		*48.6*	*40.8*	*21*	*11*	*65.75*

[1] % in whole seed @ 6% moisture, [2] % in oil-free meal @ 10% moisture, [3] µmoles/g in oil-free meal @ 10% moisture, [4] µmoles/g in whole seed @ 6% moisture, [5] kilograms/ hectolitre

Table 4: Quality Data – South Australia

Region/ Zone/ Site	Grade	Oil	Protein	Glucosinolates		Test Weight
		%[1]	%[2]	µmoles/g[3]	µmoles/g[4]	kg/hL[5]
Adelaide						
Port Adelaide	CANO	45.0	38.4	9	5	66.75
Adelaide Weighted Average		45.0	38.4	9	5	66.75
Central						
Bowmans	CANO	45.5	38.3	14	7	65.50
Gladstone	CANO	45.3	38.2	11	6	65.75
Port Giles	CANO	44.9	36.5	15	8	65.50
Roseworthy	CANO	45.1	38.4	13	7	65.50
Central Weighted Average		45.3	38.1	13	7	65.57
Eastern						
Bordertown	CANO	44.9	39.8	8	5	66.50
Dooen	CANO	46.7	37.1	6	3	66.50
Frances	CANO	45.2	39.6	11	6	66.50
Keith	CANO	45.3	37.4	10	5	67.00
Millicent	CANO	46.3	38.1	14	7	64.50
Tailem Bend	CANO	46.2	37.6	14	8	66.50
Wolseley	CANO	44.4	38.7	12	7	66.50
Eastern Weighted Average		45.8	37.9	12	6	66.47
Western						
Cummins	CANO	45.7	37.6	13	7	66.75
Port Lincoln	CANO	46.4	37.0	11	6	66.75
Rudall	CANO	46.7	39.5	10	5	67.00
Tumby Bay	CANO	47.0	37.3	11	6	67.00
Western Weighted Average		**46.1**	**37.5**	**12**	**6**	**66.79**
SA Weighted Average		**45.8**	**37.8**	**12**	**7**	**66.40**
SA Minimum		*44.4*	*36.5*	*6*	*3*	*64.50*
SA Maximum		*47.0*	*39.8*	*15*	*8*	*67.00*

[1] % in whole seed @ 6% moisture, [2] % in oil-free meal @ 10% moisture, [3] µmoles/g in oil-free meal @ 10% moisture, [4] µmoles/g in whole seed @ 6% moisture, [5] kilograms/ hectolitre

Table 5: Quality Data – Victoria

Region/ Zone/ Site	Grade	Oil	Protein	Glucosinolates		Test Weight
		%[1]	%[2]	µmoles/g[3]	µmoles/g[4]	kg/hL[5]
Central Victoria						
Berrybank	CAN	46.9	36.9	11	6	65.50
Dunolly Sub	CAN	46.0	38.5	12	6	65.25
Elmore	CAN	47.3	39.4	12	6	65.00
Mitiamo	CAN	47.1	38.3	10	5	66.50
Murchison East	CAN	45.9	39.9	12	6	64.25
Westmere	CAN	48.8	37.3	10	5	66.00
North East						
Barnes Crossing	CAN	46.6	38.4	8	4	66.25
Deniliquin	CAN	45.1	39.1	10	5	65.50
Dookie	CAN	44.9	39.3	10	6	64.00
Oaklands	CAN	48.7	37.7	9	4	64.50
Oaklands	CANG	44.2	37.7	7	4	63.75
Tocumwal	CAN	47.1	40.0	9	5	65.25
Yarrawonga	CAN	46.5	38.8	11	6	64.50
Southern Mallee						
Beulah	CAN	47.3	35.7	8	4	66.25
Donald	CAN	45.1	38.6	8	5	65.75
Swan Hill						
Boort	CAN	46.9	37.3	11	6	64.75
Piangil	CAN	44.2	35.7	8	5	66.00
Quambatook	CAN	48.2	35.3	12	6	65.00
Wimmera						
Hamilton	CAN	47.2	36.9	12	6	65.25
Lillimur	CAN	45.4	38.3	11	6	66.00
Murtoa Sub	CAN	46.4	38.9	8	4	65.50
Naracoorte	CAN	46.3	38.4	11	6	66.00
Natimuk	CAN	47.1	39.4	10	5	66.50
Nhill	CAN	47.0	37.5	9	5	66.25
Warracknabeal	CAN	47.8	37.6	9	5	65.25
Victorian Weighted Average		**46.9**	**38.2**	**5**	**10**	**65.36**
Vic Minimum		*44.2*	*35.3*	*7*	*4*	*63.75*
Vic Maximum		*48.8*	*40.0*	*12*	*6*	*66.50*

[1] % in whole seed @ 6% moisture, [2] % in oil-free meal @ 10% moisture, [3] µmoles/g in oil-free meal @ 10% moisture, [4] µmoles/g in whole seed @ 6% moisture, [5] kilograms/ hectolitre

Table 6: Quality Data – Western Australia

Port Zone	Grade	Oil	Protein	Glucosinolates		Test Weight
		%[1]	%[2]	µmoles/g[3]	µmoles/g[4]	kg/hL[5]
Albany	N/A	49.1	35.7	8	4	N/A
Esperance	N/A	49.8	36.3	8	4	N/A
Geraldton	N/A	47.7	38.7	12	6	N/A
Kwinana	N/A	47.8	37.0	11	5	N/A
WA Weighted Average		**48.5**	**36.9**	**10**	**5**	**N/A**
WA Minimum		*47.7*	*35.7*	*8*	*4*	*N/A*
WA Maximum		*49.8*	*38.7*	*12*	*6*	*N/A*

[1] % in whole seed @ 6% moisture, [2] % in oil-free meal @ 10% moisture, [3] µmoles/g in oil-free meal @ 10% moisture, [4] µmoles/g in whole seed @ 6% moisture, [5] kilograms/ hectolitre

Fatty acid composition by state

Table 7: Fatty acid composition – New South Wales

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Northern NSW																			
Dubbo North																			
Gilgandra	0.06	4.0	0.3	0.2	0.1	2.1	62.1	18.8	10.3	0.5	1.1	0.2	<0.1	0.1	0.1	29.1	63.7	7.2	114.1
Dubbo West																			
Mungeribar	0.06	4.1	0.3	0.2	0.1	2.2	61.9	18.7	10.4	0.6	1.0	0.2	<0.1	0.1	0.1	29.1	63.5	7.4	114.1
Nevertire	0.05	4.1	0.3	0.1	0.1	1.8	59.0	21.8	10.5	0.6	1.0	0.3	<0.1	0.1	0.1	32.3	60.5	7.1	117.1
Trundle	0.05	3.9	0.2	0.1	0.1	1.8	63.3	18.1	10.2	0.6	1.1	0.3	<0.1	0.1	0.1	28.3	64.9	6.8	113.6
Moree North																			
Moree	0.05	3.9	0.3	0.2	0.2	2.1	63.5	17.2	10.5	0.6	1.0	0.3	<0.1	0.1	0.1	27.7	65.1	7.2	113.1
Werris Creek																			
Premer	0.06	4.0	0.3	0.2	0.2	2.3	62.8	18.2	9.8	0.6	1.0	0.3	<0.1	0.1	0.1	28.0	64.4	7.5	112.5
Willow Tree	0.05	3.9	0.3	0.2	0.2	2.3	62.9	17.7	10.3	0.6	1.0	0.3	<0.1	0.1	0.1	28.0	64.6	7.4	113.0
Northern NSW Weighted Average	**0.06**	**4.0**	**0.3**	**0.2**	**0.1**	**2.1**	**62.0**	**18.9**	**10.3**	**0.6**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.2**	**63.6**	**7.3**	**114.1**
Southern NSW																			
Borree Creek																			
Borree Creek	0.05	4.1	0.2	0.1	0.1	1.7	60.4	20.1	11.1	0.5	1.1	0.3	<0.1	0.1	0.2	31.2	61.9	6.9	31.2
Henty West	0.05	4.0	0.2	0.1	0.1	1.8	62.2	19.3	10.0	0.6	1.1	0.3	<0.1	0.1	0.1	29.2	63.8	7.0	29.2
Milbrulong	0.05	4.0	0.2	0.1	0.1	1.8	61.5	19.2	10.9	0.6	1.1	0.3	<0.1	0.1	0.2	30.1	63.0	6.9	30.1
Rand	0.05	4.1	0.2	0.1	0.1	1.8	59.5	20.9	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	31.9	61.1	7.0	31.9

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 7: Fatty acid composition – New South Wales – continued

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Cunningar																			
Boorowa	0.05	4.2	0.2	0.2	0.1	1.9	63.9	19.2	8.2	0.5	1.0	0.3	<0.1	0.1	0.1	27.4	65.4	7.2	110.8
Cootamundra	0.06	4.1	0.3	0.2	0.1	2.1	63.7	17.3	9.9	0.6	1.1	0.3	<0.1	0.1	0.1	27.2	65.3	7.4	111.9
Cowra	0.05	4.0	0.2	0.1	0.1	1.9	62.5	18.8	10.1	0.5	1.1	0.3	<0.1	0.1	0.1	29.0	64.0	7.0	114.0
Cunningar	0.05	4.1	0.2	0.1	0.1	2.0	61.9	19.3	10.1	0.5	1.0	0.3	<0.1	0.1	0.1	29.4	63.4	7.2	114.1
Greenethorpe	0.05	4.0	0.2	0.1	0.1	1.9	61.8	19.3	10.3	0.6	1.1	0.3	<0.1	0.1	0.1	29.6	63.3	7.1	114.6
Harden	0.06	4.3	0.3	0.2	0.1	1.8	62.9	19.3	9.1	0.5	1.0	0.3	<0.1	0.1	0.1	28.4	64.4	7.2	112.4
Maimuru	0.05	4.0	0.2	0.1	0.1	2.0	61.3	19.9	10.2	0.6	1.1	0.3	<0.1	0.1	0.1	30.1	62.8	7.1	115.0
Griffith																			
Barellan	0.05	4.0	0.2	0.1	0.1	1.9	62.0	18.8	10.7	0.6	1.1	0.3	<0.1	0.1	0.1	29.5	63.6	7.0	114.9
Junee																			
Coolamon	0.05	4.1	0.2	0.1	0.1	1.8	60.5	20.3	10.7	0.5	1.0	0.3	<0.1	0.1	0.1	31.0	62.0	7.0	116.2
Grong Grong	0.05	3.9	0.3	0.1	0.1	1.9	62.2	17.4	11.8	0.6	1.1	0.3	<0.1	0.1	0.1	29.1	63.9	6.9	115.6
Junee Sub	0.05	4.0	0.2	0.1	0.1	1.9	61.5	19.5	10.4	0.5	1.0	0.3	<0.1	0.1	0.1	29.9	63.1	7.1	115.0
Matong	0.05	4.1	0.3	0.1	0.1	1.7	62.2	17.6	11.5	0.6	1.2	0.3	<0.1	0.1	0.2	29.1	63.9	7.0	115.2
Narrandera	0.05	4.2	0.2	0.1	0.1	1.7	60.2	20.3	11.1	0.5	1.0	0.2	<0.1	0.1	0.2	31.4	61.7	6.9	117.1
Parkes																			
Caragabal	0.05	4.1	0.2	0.1	0.1	1.8	60.9	20.0	10.6	0.6	1.1	0.3	<0.1	0.1	0.1	30.5	62.5	7.0	115.7
Manildra	0.05	3.9	0.2	0.1	0.1	2.0	64.3	17.6	9.6	0.5	1.1	0.3	<0.1	0.1	0.1	27.1	65.8	7.1	111.8
Parkes Sub	0.05	4.0	0.2	0.1	0.1	1.9	63.5	17.7	10.2	0.5	1.1	0.3	<0.1	0.1	0.1	28.0	65.0	7.0	113.2
Red Bend	0.05	4.0	0.2	0.1	0.1	1.8	62.5	18.6	10.4	0.6	1.1	0.3	<0.1	0.1	0.1	29.0	64.1	6.9	114.3

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 7: Fatty acid composition – New South Wales – continued

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Temora																			
Ardlethan	0.05	3.8	0.2	0.1	0.1	1.9	65.7	15.6	10.3	0.6	1.1	0.3	<0.1	0.1	0.1	25.9	67.3	6.8	111.6
Bribbaree	0.05	4.1	0.2	0.1	0.1	1.9	61.4	19.5	10.4	0.6	1.1	0.3	<0.1	0.1	0.1	29.8	63.0	7.2	114.8
Milvale	0.05	4.0	0.3	0.1	0.1	1.9	62.9	17.8	10.6	0.6	1.1	0.3	<0.1	0.1	0.1	28.3	64.6	7.1	113.7
Temora Sub	0.05	4.1	0.2	0.1	0.1	1.9	60.8	20.0	10.7	0.6	1.1	0.3	<0.1	0.1	0.1	30.6	62.3	7.0	115.9
Wyalong																			
Calleen	0.05	4.0	0.2	0.1	0.1	1.9	62.9	18.6	10.0	0.6	1.1	0.3	<0.1	0.1	0.1	28.6	64.4	7.0	113.6
Condobolin	0.05	3.9	0.3	0.1	0.1	2.0	64.6	18.5	8.3	0.5	1.0	0.2	<0.1	0.1	0.1	26.9	66.1	7.0	110.6
Wyalong	0.05	4.1	0.3	0.1	0.1	1.9	61.3	19.8	10.4	0.5	1.0	0.2	<0.1	0.1	0.1	30.2	62.7	7.0	115.4
Southern NSW Weighted Average	**0.05**	**4.0**	**0.2**	**0.1**	**0.1**	**1.9**	**62.0**	**19.0**	**10.4**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.4**	**63.6**	**7.0**	**114.5**
NSW Weighted Average	**0.05**	**4.0**	**0.3**	**0.1**	**0.1**	**2.0**	**62.0**	**19.0**	**10.3**	**0.6**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.3**	**63.6**	**7.2**	**114.3**
NSW Minimum	*0.05*	*3.8*	*0.2*	*0.1*	*0.1*	*1.7*	*59.0*	*15.6*	*8.2*	*0.5*	*1.0*	*0.2*	*<0.1*	*0.1*	*0.1*	*25.9*	*60.5*	*6.8*	*110.6*
NSW Maximum	*0.06*	*4.3*	*0.3*	*0.2*	*0.2*	*2.3*	*65.7*	*21.8*	*11.8*	*0.6*	*1.2*	*0.3*	*<0.1*	*0.1*	*0.2*	*32.3*	*67.3*	*7.5*	*117.3*

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 8: Fatty acid composition – South Australia

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Adelaide																			
Port Adelaide	0.06	4.3	0.3	0.2	0.1	2.0	60.8	19.1	11.2	0.5	1.0	0.2	<0.1	0.1	0.1	30.3	62.3	7.4	115.8
Adelaide Weighted Average	**0.06**	**4.3**	**0.3**	**0.2**	**0.1**	**2.0**	**60.8**	**19.1**	**11.2**	**0.5**	**1.0**	**0.2**	**<0.1**	**0.1**	**0.1**	**30.3**	**62.3**	**7.4**	**115.8**
Central																			
Bowmans	0.05	4.2	0.3	0.1	0.1	1.9	61.8	18.3	11.1	0.5	1.1	0.3	<0.1	0.1	0.1	29.4	63.4	7.1	115.1
Gladstone	0.06	4.3	0.3	0.1	0.1	1.9	62.4	19.0	9.9	0.5	1.0	0.2	<0.1	0.1	0.1	28.9	63.9	7.2	113.6
Port Giles	0.05	4.0	0.3	0.2	0.2	2.1	62.4	17.3	11.3	0.6	1.1	0.3	<0.1	0.1	0.1	28.6	64.1	7.3	114.4
Roseworthy	0.05	4.1	0.3	0.1	0.1	1.8	62.0	18.4	11.0	0.5	1.1	0.3	<0.1	0.1	0.1	29.5	63.6	7.0	115.2
Central Weighted Average	**0.05**	**4.2**	**0.3**	**0.1**	**0.1**	**1.9**	**62.1**	**18.4**	**10.8**	**0.5**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.2**	**63.7**	**7.1**	**114.7**
Eastern																			
Bordertown	0.06	4.3	0.3	0.1	0.1	1.8	59.3	20.2	11.7	0.5	1.1	0.3	<0.1	0.1	0.2	31.9	60.9	7.2	117.7
Dooen	0.05	4.1	0.3	0.1	0.1	2.0	61.0	19.4	10.8	0.6	1.1	0.3	<0.1	0.1	0.1	30.2	62.5	7.2	115.4
Frances	0.05	4.3	0.3	0.1	0.1	1.8	59.6	20.4	11.2	0.5	1.1	0.2	<0.1	0.1	0.1	31.6	61.2	7.2	117.1
Keith	0.05	4.1	0.3	0.2	0.1	2.0	61.7	18.0	11.4	0.5	1.1	0.3	<0.1	0.1	0.1	29.4	63.4	7.2	115.4
Millicent	0.05	4.1	0.3	0.2	0.2	1.8	59.8	19.7	11.5	0.6	1.2	0.3	<0.1	0.1	0.2	31.2	61.5	7.3	116.9
Tailem Bend	0.05	4.1	0.3	0.1	0.1	1.9	61.7	18.6	11.2	0.5	1.0	0.2	<0.1	0.1	0.1	29.8	63.3	7.0	115.7
Wolseley	0.06	4.1	0.3	0.2	0.1	1.9	60.6	18.9	11.6	0.6	1.1	0.3	<0.1	0.1	0.2	30.5	62.2	7.2	116.5
Eastern Weighted Average	**0.05**	**4.1**	**0.3**	**0.2**	**0.1**	**1.9**	**61.2**	**18.9**	**11.3**	**0.5**	**1.0**	**0.2**	**<0.1**	**0.1**	**0.1**	**30.1**	**62.8**	**7.1**	**115.9**

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 8: Fatty acid composition – South Australia – continued

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Western																			
Cummins	0.06	4.3	0.3	0.2	0.1	1.9	61.7	18.3	11.1	0.5	1.0	0.3	<0.1	0.1	0.1	29.4	63.3	7.3	115.0
Port Lincoln	0.05	4.1	0.3	0.2	0.1	1.9	62.4	17.5	11.2	0.6	1.1	0.3	<0.1	0.1	0.1	28.8	64.0	7.2	114.6
Rudall	0.06	4.5	0.3	0.1	0.1	1.8	58.9	21.4	10.9	0.5	1.0	0.2	0.1	0.1	0.2	32.3	60.4	7.3	117.3
Tumby Bay	0.06	4.3	0.3	0.1	0.1	1.8	60.3	20.0	11.0	0.5	1.0	0.2	<0.1	0.1	0.1	31.0	61.9	7.2	116.4
Western Weighted Average	**0.05**	**4.2**	**0.3**	**0.2**	**0.1**	**1.9**	**61.6**	**18.5**	**11.1**	**0.5**	**1.0**	**0.3**	**<0.1**	**0.1**	**0.1**	**29.6**	**63.2**	**7.2**	**115.2**
SA Weighted Average	0.05	4.2	0.3	0.1	0.1	1.9	61.6	18.6	11.1	0.5	1.0	0.3	<0.1	0.1	0.1	29.6	63.2	7.2	115.2
SA Minimum	0.05	4.0	0.3	0.1	0.1	1.8	58.9	17.3	9.9	0.5	1.0	0.2	<0.1	0.1	0.1	28.6	60.4	7.0	113.6
SA Maximum	0.06	4.5	0.3	0.2	0.2	2.1	62.4	21.4	11.7	0.6	1.2	0.3	0.1	0.1	0.2	32.3	64.1	7.4	117.7

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 9: Fatty acid composition – Victoria

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:0**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Central Victoria																			
Berrybank	0.05	4.1	0.2	0.1	0.1	1.7	59.2	20.8	11.5	0.5	1.1	0.3	<0.1	0.1	0.1	32.3	60.8	6.9	118.2
Dunolly Sub	0.05	4.2	0.2	0.1	0.1	1.9	59.5	21.0	10.8	0.6	1.0	0.3	<0.1	0.1	0.1	31.8	61.0	7.2	116.9
Elmore	0.05	4.1	0.2	0.1	0.1	1.8	58.2	22.2	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	33.2	59.8	7.1	118.3
Mitiamo	0.05	4.3	0.2	0.1	0.1	1.8	58.6	22.1	10.8	0.5	1.0	0.2	<0.1	0.1	0.1	32.9	60.1	7.1	117.9
Murchison East	0.05	4.1	0.2	0.1	0.1	1.8	60.4	20.0	11.0	0.6	1.1	0.3	<0.1	0.1	0.2	31.0	62.1	7.0	116.5
Westmere	0.05	4.1	0.2	0.1	0.1	1.8	60.2	20.4	11.0	0.5	1.1	0.3	<0.1	0.1	0.2	31.4	61.7	6.9	117.0
North East																			
Barnes Crossing	0.06	4.3	0.3	0.1	0.1	1.7	57.7	22.6	10.9	0.5	1.0	0.3	<0.1	0.1	0.2	33.5	59.3	7.2	118.5
Deniliquin	0.05	4.2	0.3	0.1	0.1	1.7	58.4	21.7	11.2	0.6	1.1	0.3	<0.1	0.1	0.2	32.9	60.1	7.0	118.4
Dookie	0.05	3.9	0.2	0.1	0.1	1.8	60.4	20.2	10.9	0.6	1.1	0.3	<0.1	0.1	0.1	31.1	62.0	6.9	116.7
Oaklands (CAN)	0.05	4.1	0.3	0.1	0.1	1.8	59.9	20.5	10.9	0.6	1.1	0.3	<0.1	0.1	0.1	31.5	61.5	7.0	116.8
Oaklands (CANG)	0.06	4.4	0.3	0.1	0.1	2.1	61.4	18.8	10.6	0.6	1.1	0.2	<0.1	0.1	0.1	29.5	63.0	7.5	114.4
Tocumwal	0.05	4.1	0.2	0.1	0.1	1.7	58.2	22.2	11.2	0.5	1.1	0.3	<0.1	0.1	0.2	33.4	59.7	6.9	118.9
Yarrawonga	0.05	4.0	0.2	0.1	0.1	1.8	60.4	20.2	10.8	0.6	1.1	0.3	<0.1	0.1	0.1	31.0	62.0	7.0	116.4
Southern Mallee																			
Beulah	0.06	4.3	0.3	0.2	0.2	1.9	60.8	19.0	11.5	0.5	0.9	0.2	<0.1	0.1	0.1	30.5	62.3	7.2	116.5
Donald	0.05	4.0	0.3	0.2	0.1	2.0	60.4	19.6	11.2	0.5	1.0	0.3	<0.1	0.1	0.1	30.9	62.0	7.1	116.5
Swan Hill																			
Boort	0.06	4.2	0.3	0.1	0.1	1.9	61.1	19.6	10.7	0.5	1.0	0.2	<0.1	0.1	0.1	30.3	62.7	7.1	115.6
Piangil	0.06	4.2	0.3	0.2	0.2	2.0	62.6	17.2	11.2	0.5	1.0	0.2	0.1	0.1	0.1	28.4	64.3	7.3	114.2
Quambatook	0.05	4.2	0.3	0.1	0.1	1.8	61.2	19.7	10.6	0.5	1.0	0.2	<0.1	0.1	0.1	30.4	62.7	7.0	115.6

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 9: Fatty acid composition – Victoria – continued

Region/ Zone/ Site	**14:0**	**16:0**	**16:1**	**17:0**	**17:1**	**18:0**	**18:1**	**18:2**	**18:3**	**20:0**	**20:1**	**22:1**	**24:0**	**24:1**	**Poly[1]**	**Mono[2]**	**Sat[3]**	**IV[4]**
Wimmera																		
Hamilton	0.05	4.1	0.2	0.1	0.1	1.8	60.4	19.8	11.1	0.5	1.1	0.3	0.1	0.1	0.1	30.9	62.1	7.0	116.5
Lillimur	0.06	4.2	0.3	0.2	0.1	1.9	60.1	19.3	11.8	0.6	1.1	0.3	<0.1	0.1	0.2	31.0	61.7	7.2	117.0
Murtoa Sub	0.05	4.1	0.3	0.1	0.1	2.0	61.0	19.5	10.7	0.6	1.0	0.3	<0.1	0.1	0.1	30.2	62.6	7.3	115.3
Naracoorte	0.05	4.2	0.3	0.2	0.2	1.8	59.9	19.3	11.8	0.6	1.1	0.3	<0.1	0.1	0.2	31.1	61.6	7.3	117.0
Natimuk	0.05	4.1	0.2	0.1	0.1	1.8	59.7	20.2	11.5	0.6	1.1	0.3	<0.1	0.1	0.2	31.6	61.3	7.0	117.5
Nhill	0.06	4.2	0.3	0.2	0.1	1.9	60.3	19.8	11.3	0.5	1.0	0.2	<0.1	0.1	0.1	31.0	61.8	7.2	116.6
Warracknabeal	0.05	4.1	0.3	0.1	0.1	1.9	60.4	20.3	10.9	0.5	1.0	0.2	<0.1	0.1	0.1	31.1	61.8	7.0	116.5
Victorian Weighted Average	**0.05**	**4.1**	**0.3**	**0.1**	**0.1**	**1.8**	**59.9**	**20.4**	**11.0**	**0.5**	**1.1**	**0.3**	**<0.1**	**0.1**	**0.1**	**31.5**	**61.5**	**7.0**	**116.9**
Vic Minimum	*0.05*	*3.9*	*0.2*	*0.1*	*0.1*	*1.7*	*57.7*	*17.2*	*10.6*	*0.5*	*0.9*	*0.2*	*0.1*	*0.1*	*0.1*	*28.4*	*59.3*	*6.9*	*114.2*
Vic Maximum	*0.06*	*4.4*	*0.3*	*0.2*	*0.2*	*2.1*	*62.6*	*22.6*	*11.8*	*0.6*	*1.1*	*0.3*	*0.1*	*0.1*	*0.2*	*33.5*	*64.3*	*7.5*	*118.9*

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Table 10: Fatty acid composition – Western Australia

Port Zone	14:0	16:0	16:1	17:0	17:1	18:0	18:1	18:2	18:3	20:0	20:1	22:0	22:1	24:0	24:1	Poly[1]	Mono[2]	Sat[3]	IV[4]
Albany	0.05	4.1	0.2	0.1	0.1	1.9	59.5	21.1	10.8	0.5	1.0	0.3	<0.1	0.1	0.2	31.9	61.0	7.1	117.1
Esperance	0.05	4.0	0.2	0.1	0.1	1.8	60.1	20.8	10.6	0.5	1.0	0.3	<0.1	0.1	0.2	31.4	61.6	7.0	116.6
Geraldton	0.05	3.9	0.2	0.1	0.1	2.0	61.3	19.4	10.9	0.5	1.1	0.3	<0.1	0.1	0.1	30.3	62.8	6.9	116.0
Kwinana	0.05	4.2	0.2	0.1	0.1	1.9	58.8	21.0	11.5	0.5	1.0	0.3	<0.1	0.1	0.2	32.5	60.4	7.2	118.0
WA Weighted Average	0.05	4.1	0.2	0.1	0.1	1.9	59.8	20.6	11.0	0.5	1.0	0.3	<0.1	0.1	0.2	31.7	61.3	7.1	117.1
WA Minimum	0.05	3.9	0.2	0.1	0.1	1.8	58.8	19.4	10.6	0.5	1.0	0.3	<0.1	0.1	0.1	30.3	60.4	6.9	116.0
WA Maximum	0.05	4.2	0.2	0.1	0.1	2.0	61.3	21.1	11.5	0.5	1.1	0.3	<0.1	0.1	0.2	32.5	62.8	7.2	118.0

[1] Poly – sum of polyunsaturated fatty acids (18:2 & 18:3), [2] Mono – sum of monounsaturated fatty acids (16:1, 17:1, 18:1, 20:1, 22:1 & 24:1), [3] Sat – sum of saturated fatty acids (14:0, 16:0, 18:0, 20:0, 22:0 & 24:0), [4] IV – iodine value calculated from fatty acid composition

Chlorophyll

The average chlorophyll for the Australian harvest in 2016 was 8 mg/kg (8ppm) in whole seed as received. Chlorophyll content ranged from 3 mg/kg for the Geraldton port zone in Western Australia to 13 mg/kg for the Kwinana port zone in Western Australia.

Table 11: Chlorophyll by region/ port zone

State	Region/ Port Zone	Chlorophyll (mg/kg)[1]
NSW	Northern	9
NSW	Southern	8
SA	Adelaide	6
SA	Central	6
SA	Eastern	7
SA	Western	6
Vic	Victoria	6
WA	Albany	6
WA	Esperance	7
WA	Geraldton	3
WA	Kwinana	13
Australian weighted average		**8**

[1] mg/kg in whole seed as received

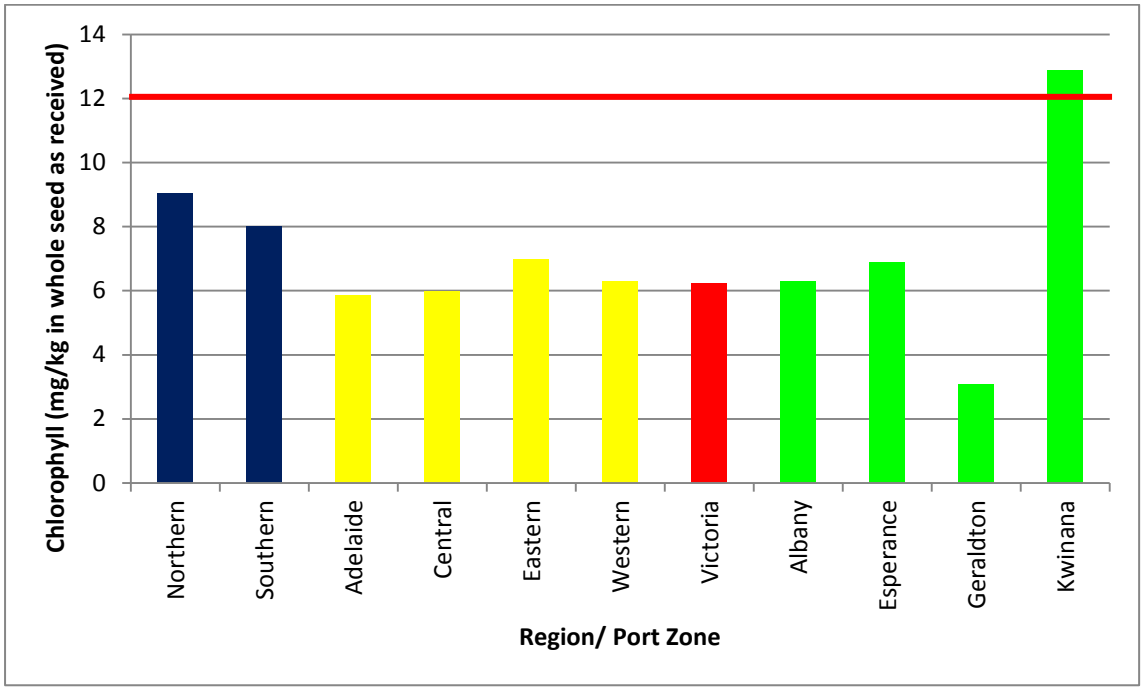

Figure 30: Average chlorophyll content by region/ port zone 2016

Red line shows the AOF limit of 12 mg/kg in whole seed

Blue = NSW regions, Yellow = SA regions, Red = Victoria, Green = WA port zones, see Figures 25 to 29

Definitions

Canola

Canola is defined as seed of the species Brassica napus or Brassica rapa but containing less than 30 micromoles of specified glucosinolates per gram of oil-free air-dry solids and not more than 2% erucic acid of total fatty acids in the oil component. The specified glucosinolates are any one or a mixture of 3-butenyl, 4-pentenyl, 2-hydroxy-3-butenyl and 2-hydroxy-4-pentenyl glucosinolates (AOF 2015, page 27). Canola is traded under the grade ‘CAN’ by GrainCorp Operations Limited and ‘CANO’ by Viterra Pty Ltd.

GM canola

The term "genetically modified organism" (GMO) is legally defined by the European Commission.

An organism is "genetically modified" if “the genetic material has been altered in a way that does not occur naturally by mating and/or natural recombination” (Directive 2001/18/EC 2001, page 4). GM canola is traded under the grade ‘CANG’ by GrainCorp Operations Limited and is not grown in South Australia.

Methods

Moisture Content

Moisture is determined on whole seed using a 6500 near infrared (NIR) spectrometer calibrated using AOF 4-1.6: “Moisture Content of Oilseeds Oven Method”. The moisture contents are used to convert the raw data for oil, protein and glucosinolates to the appropriate moisture content for reporting.

Oil Content

Oil content is determined by NIR, calibrated from results obtained using method ISO 659 “Oilseeds -- Determination of oil content (Reference method)”. Oil is extracted from ground seed on either a Foss Soxtec™ 2050 or 8000 Extraction System using hexane for four hours. The sample is reground and extracted for 2 hours. The sample is again ground and extracted for a further 2 hours. The results are reported as a percentage of the whole seed at 6% moisture.

Protein Content

Protein content is determined on whole seed by NIR, calibrated from samples analysed by the LECO elemental analyser using AOF 4-3.3: “Protein, Crude, of Meals (Combustion)”. Results are reported as percent protein (Nitrogen x 6.25) in oil-free meal at 10% moisture.

Glucosinolate Content

Total glucosinolate content is determined by NIR, calibrated by method AOF 4-1.22: “Glucosinolate Content, Glucose Method, Canola and Rapeseed”. The method involves an enzymatic hydrolysis to release glucose followed by a colorimetric reaction and determination by a UV-Vis spectrophotometer. The method has compared favourably with the HPLC methodology of the AOCS with the added advantage of speed and economy. Results are reported as µmoles glucosinolates/ gram in oil-free meal at 10% moisture and µmoles glucosinolates/ gram in whole seed at 6% moisture.

Fatty Acid Composition

Fatty acid composition involves methylation of fatty acids with a methanolic solution of potassium hydroxide. The method is based on IOC COI/T.20/Doc. No. 33 2015: “Determination of Fatty Acid Methyl Esters by Gas Chromatography”. The methyl esters are then separated on a gas chromatograph using a BPX70 capillary column. Fatty acids are reported as a percentage of the total fatty acids in the oil portion of the seed.

Iodine Values

Iodine values are calculated from the fatty acid profile using AOCS Cd 1c-85: Calculated Iodine Value.

Test Weight

Test weight is a volumetric grain weight measured using a Franklin chrondrometer and reported as kilograms/hectolitre.

Chlorophyll Content

Chlorophyll content was determined using AOCS method Ak 2-92 “Determination of Chlorophyll Content in Rapeseed/ Canola”. Ground canola seed is placed in a mechanical microgrinder with solvent for one hour. The sample is then filtered and the absorbance of the solution is determined on a UV-Vis spectrophotometer at 625nm, 665nm and 705nm. Results are reported as mg/kg in whole seed as received.

References

Australian Oilseeds Federation Section 1: Quality Standards, Technical Information & Typical Analysis (2015) Issue 14

DIRECTIVE 2001/18/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 12 March 2001 on the deliberate release into the environment of genetically modified organisms and repealing Council Directive 90/220/EEC (2001) L106, pp 1-38.