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Quality of western Canadian canola 2012

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Quality Innovation Service

Table of contents

Tables

Figures

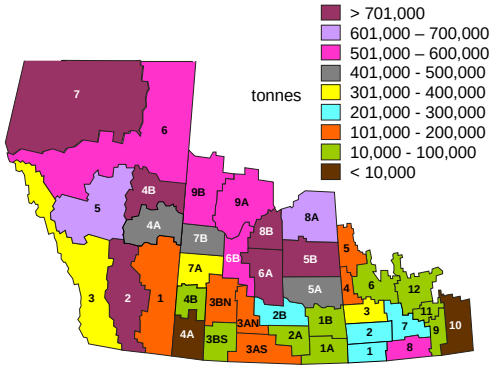
Acknowledgments

The Grain Research Laboratory acknowledges the cooperation of the canola producers, grain handling offices, and oilseed crushing plants in western Canada for supplying the samples of newly harvested canola. The assistance of the Industry Services Division of the Canadian Grain Commission in grading producer survey samples is also acknowledged. The technical assistance of the Oilseeds staff, Grain Research Laboratory is recognized. Seed images on cover are courtesy of Grain Biology, Grain Research Laboratory, Canadian Grain Commission.

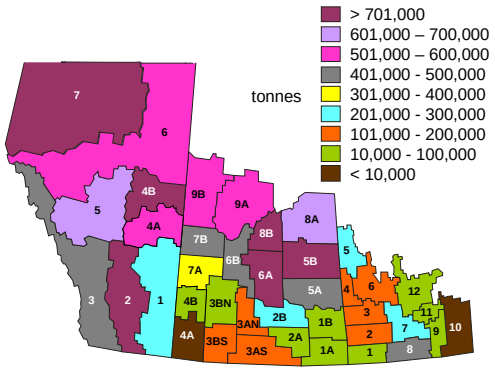
Introduction

This report presents quality data and information based on the Canadian Grain Commission (CGC) 2012 harvest survey of western Canadian canola. Quality parameters included are oil, protein, chlorophyll, glucosinolates, free fatty acids and the fatty acid composition of harvest samples. Quality data are from analyses of canola samples submitted to the CGC throughout the harvest period by producers, grain companies and oilseed crushing companies. The map (Figure 1) shows traditional growing areas for canola in western Canada with the 2010 and 2011 production data.

Figure 1 –Map of western Canada showing the 2010 and 2011 production (data obtained from Statistics Canada) for canola per crop district



2010 production



2011 production

Source: Statistics Canada

Summary

As in 2011, the 2012 canola crop showed regional differences in oil, protein, chlorophyll contents and in fatty acid composition. The 2012 harvest showed a lower number of samples graded Canola, No. 1 Canada (83.2%) than the 2011

harvest (85.2%). However, grade distribution showed important regional differences - 87.6% of samples from Manitoba received the grade Canola, No. 1 Canada versus 78.2% from Saskatchewan and 82.9% from Alberta (plus Peace River area of British Columbia) (Figure 3a and 3b).

Table 1 – Canola, No. 1 Canada: Quality data for 2012 harvest survey

Quality parameter	2012	2011	2010	2007-2011 Mean
Number of received samples	2108	1749	1641	1755
Number of Canola, No. 1 Canada samples	1716	1492	1276	1528
Oil content [1] (%)	43.5	45.2	44.3	44.4
Protein content [2] (%)	21.3	19.6	20.1	20.4
Oil-free protein[2] (%)	40.6	38.8	39.0	39.6
Chlorophyll content (mg/kg in seed)	17.4	15.9	12.6	13.9
Total glucosinolates[1] (μmol/g)	10.9	10.3	9.9	10.6
Free fatty acids (%)	0.14	0.12	0.16	0.14
Oleic acid (% in oil)	62.5	62.1	62.3	62.3
Linoleic acid (% in oil)	19.2	19.1	18.8	9.8
α-Linolenic acid (% in oil)	9.6	9.9	10.0	9.8
Erucic acid (% in oil)	0.01	0.01	0.01	0.02
Total saturated fatty acids[3] (% in oil)	6.6	6.8	6.9	6.9
Iodine value	113.3	113.6	113.8	113.5
Total mono-unsaturated fatty acids (MUFA)[4] (% in oil)	61.7	61.4	62.6	63.9
Total poly-unsaturated fatty acids (PUFA)[5] (% in oil)	31.4	31.5	30.3	28.7

[1] 8.5% moisture basis
[2] N x 6.25, 8.5% moisture basis
[3] Total saturated fatty acids are the sum of palmitic (C16:0), stearic (C18:0), arachidic (C20:0), behenic (C22:0), and lignoceric (C24:0).
[4] Total mono-unsaturated fatty acids are the sum of palmitoleic (C16:1), oleic (C18:1), eicosenoic (C20:1), erucic (C22:1), and nervonic (C24:1).
[5] Total poly-unsaturated fatty acids are the sum of linoleic (C18:2),linolenic (C18:2) and eicosadienoic (C20:2).
Results were calculated using western Canadian averages for each grade; provincial averages were weighted using Statistics Canada production estimate and of the grade distribution for each crop district.

The 2012 Western Canadian canola (Canola, No.1 Canada) crop was characterized by a significant decrease in oil content (43.5 versus 45.2%) and a higher protein contents (21.3 versus 19.6%) when compared to the 2011 Canola, No.1 Canada crop (Table 1). The average of the Canola, No.1 Canada chlorophyll content was higher in 2012 than in 2011 and 2010 – 17.4 mg/kg versus 15.9 and 12.6 mg/kg, respectively (Table 1). The 2012 canola crop had similar oleic acid, linoleic acid and α-linolenic acid (ALA) contents when compared to the 2011 crop (62.5, 19.2 & 9.6 % versus 62.1, 19.1 & 9.9% for oleic, linoleic acid, and ALA respectively). Total saturated fatty acid content was slightly lower than what was observed in 2011 (6.6 versus 6.8% in 2011). This resulted in a similar iodine value when compared to 2011 (113.3 in 2012 versus 113.6 units in 2011). The mean free fatty acid (FFA) levels in Canola, No.1 Canada seed was similar that what was observed in 2011 (0.14 versus 0.12%) (Table 1).

Weather and production review

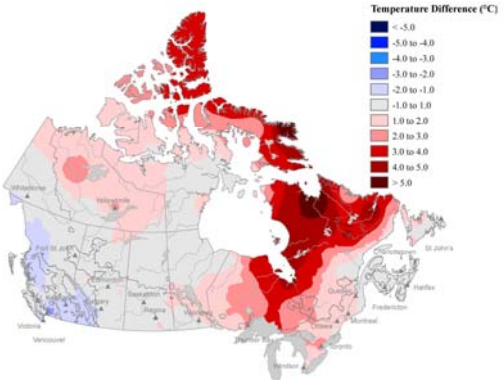
Weather review

Extreme and variable were the two terms that could characterize the 2012 growing season weather conditions.

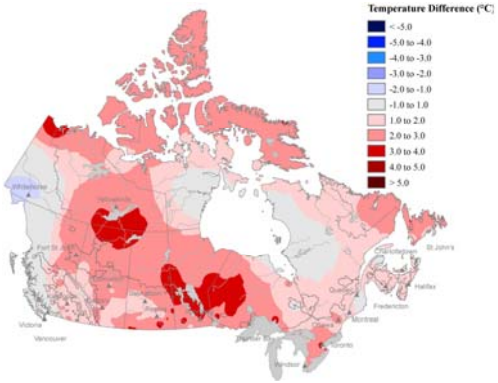
Winter was mild with low snow precipitation in the prairies; this seemed to be a good start for early seeding. Early April 2012 was also characterized by warm and dry weather conditions, allowing some producers to start seeding.

Cold weather and rain at the end of April halted seeding. As in 2011, May and June were characterized by excessive moisture with cooler than normal temperatures (Figures 2 & 3). Early seeded canola took time to germinate, and in some cases it had to be reseeded. Early July showed a drastic change in weather conditions (Figure 2). Early July was the start off dry and hot weather conditions that prevailed until the end of the growing season in the whole Canada and especially the prairies, except some areas in northern Saskatchewan and north-western Manitoba where heavy precipitation resulted in some ponding (Figure 3). The hot and dry growing conditions continued well into September. Daily minimum temperatures in July 2012 were significantly higher than the daily minimum temperatures observed July 2011. Overall, seeding was finished approximately 2 weeks earlier than normal (around the first week of June). Contrary to last year there were no unseeded areas due localized flooding from excessive moisture.

Figure 2 –Maps – Monthly mean temperature difference from normal (National) in Canada during the 2012 growing season



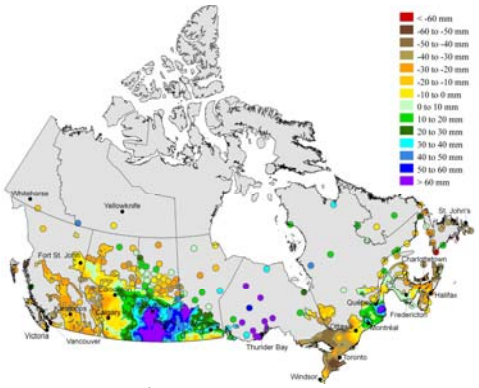
June 2012



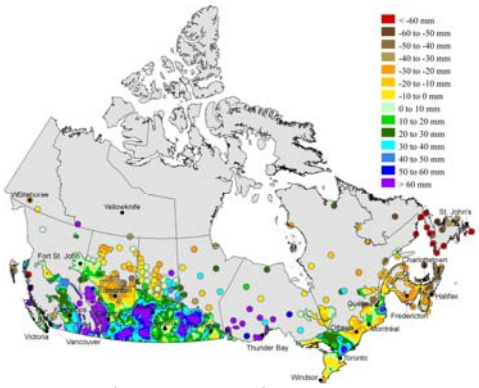
July 2012

Source: http://www4.agr.gc.ca/DW-GS/historical-historiques.jspx?lang=eng&jsEnabled=true

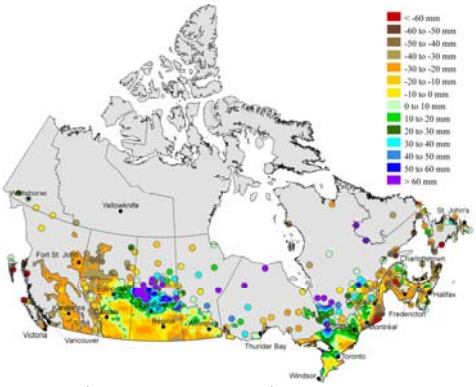
Figure 3 –Maps: Precipitation - departure from average precipitation (30 days rolling, static, National) - 2012 growing season



May 2nd to 31st, 2012 – 30 days



May 27th to June 25th, 2012 – 25 days



July 29th, to August 27th, 2012 – 27 days

Source: http://www4.agr.gc.ca/DW-GS/historical-historiques.jspx?lang=eng&jsEnabled=true

July-August weather conditions allowed the 2012 canola crop to mature rapidly and resulted in an early harvest. Canola started to be harvest as early as end of July in some parts of Manitoba and by August 20th canola harvest was completed in the eastern and interlake regions of Manitoba. Strong winds in some areas of Manitoba and Saskatchewan during swathing let to significant losses (e.g. shattering and scattering of the crop). Canola harvest was complete in the Prairies by the last week of September, about 2-3 weeks earlier than normal.

Weather maps for the whole growing season can be found at: http://www4.agr.gc.ca/DW-GS/historical-historiques.jspx?lang=eng&jsEnabled=true.

Production

Western Canadian farmers planted over 8.6 million hectares of canola in 2012 well over last year's area (Table 2). Statistics Canada's reported that the 2012 western Canada mean yield of 1,500 kg/ha was lower than the record yields reported in 2011 (1,900 kg/ha). This yield is below the 5-year mean of 1,840 kg/ha. The 2012 production (13.22 million metric tonnes) was below 2011 record production of 14.50 million metric tonnes of canola, well above the 5 year average production (10.76 million tonnes).

According to Statistics Canada's estimates of provincial production, Manitoba (MB), Saskatchewan (SK), and Alberta/British Columbia (AB/BC) accounted for 12.0, 50.7 and 37.3% respectively of the total canola production (Table 2). The 2012 observed yields were much lower in all the western provinces (Manitoba: 1,500 kg/ha, Saskatchewan: 1,400 kg/ha and or Alberta: 1,900 kg/ha) than the yields observed in the last two years (Western Canada average 1,900 kg/ha).

Table 2 - Seeded area and production for western Canadian canola

	Seeded area		Production[1]		Average production[2]
	thousand hectares		thousand tonnes		thousand tonnes
	2012	**2011**	**2012**	**2011**	**2007-2011**
Manitoba	1,446.8	1,102.8	2,100.1	1,746.3	2,232.1
Saskatchewan	4,540.6	3,957.8	6,137.1	7,348.2	4,807.2
Alberta[3]	2,679.1	2,523.2	4,981.6	5,403.9	3,716.1
Western Canada	**8,666.5**	**7,583.8**	**13,218.8**	**14,498.4**	**10,755.4**

1 Source: Statistics Canada. Table 001-0010 - Estimated areas, yield, production and average farm price of principal field crops, in metric units, annual.

2 Source: Field Crop Reporting Series, revised final estimates for 2007-2011.

3 Includes the part of the Peace River area that is in British Columbia

High precipitations and cold temperature in May and June followed by high temperatures with low precipitations from July to September in most of the prairies were in 2012 responsible of the low canola yields. Disease pressure was very high (e.g. sclerotinia and aster yellow) further decreasing the yield of already heat stressed plants. Moreover, strong winds at harvest in some areas also decreased the amount of harvest seed (yield).

For all production data please consult Statistics Canada's website at: http://www5.statcan.gc.ca/cansim/a26;jsessionid=B55793B90E933D944C2FBD3D8EEF92C0?lang=eng&retrLang=eng&id=0010010&tabMode=dataTable&srchLan=-1&p1=-1&p2=9

Harvest survey samples and grade distribution

Samples for the Canadian Grain Commission canola harvest survey were collected from producers, crushing plants and grain handling offices across western Canada. The samples were cleaned to remove dockage prior to testing. Individual harvest survey samples were analyzed for oil, protein, chlorophyll and total glucosinolates using a NIRSystems 6500 scanning near-infrared spectrometer. Industry Services grain inspectors assigned grade level based on the Official Grain Grading Guide for Canola and Rapeseed (Chapter 10) that can be found at: http://grainscanada.gc.ca/oggg-gocg/10/oggg-gocg-10-eng.htm. This report is based on the analyses of composite samples made of same grade samples per crop district and province. Composites were prepared by combining Canola, No. 1 Canada samples by provincial crop district; Canola, No. 2 by province, and Canola, No. 3 Canola and Sample Canada samples by western Canada.

The quality data of the 2012 harvest survey included samples received up to November 20th, 2012. Specialty oil samples such as high oleic acid, low linolenic acid, and high erucic acid, were excluded from this report. The quality data for this 2012 harvest survey report were based on the 2,108 samples, which was more than what was received in 2010 and 2011 (1,641 and 1,755 respectively). The harvest survey data were collected from producer and crushing plant samples that had been cleaned to remove dockage. Exports of commercially cleaned canola exports contained an average 1.89% dockage in November (ranging from 1.20 to 2.50%), which will affect quality factors such as oil content, chlorophyll and FFA. Canola exports containing over 2.5% dockage are considered not commercially clean (NCC) and will have even greater reductions in measured quality components. The composition of 2012 survey samples was compared to 2011 results and to long-term survey means (Tables 3 to 5). Comparison with the quality of Canadian canola exports shipments is provided in Table 6.

The percentage of samples graded Canola, No. 1 Canada (83.2%) in the 2012 harvest was lower than percentage of Canola, No. 1 Canada observed in 2011 (85.2%), with similar growing (Figure 4). This number (83.2%) was lower than the 5 year average of percentage of Canola, No. 1 Canada (87.0%). As in 2011, the grade distribution of the 2012 canola crop varied from crop district to crop district (Figure 5). Manitoba had the highest percent of samples graded Canola,

No. 1 Canada (87.6%), followed by Alberta (83.16%). Saskatchewan had the lowest percent of samples graded Canola, No. 1 Canada (80.9%). Central Saskatchewan and north-west of Manitoba were the areas showing the lowest percent of samples graded Canola, No. 1 Canada (< 80.0%).

The main degrading factor in 2012 from Canola, No. 1 to Canola, No. 2. was high green seed counts (DGR) . DGR were 0.90, 3.18, 6.70 and 1.07% in samples graded Canola, No. 1 Canada, Canola, No. 2 Canada, Canola, No. 3 Canada and Sample, respectively. Most of samples at the lowest (graded as Sample) were downgraded because of admixture and not green seed counts. Conspicuous admixture defined as material found in the sample after cleaning and is easily distinguished from canola without the use of magnification in the Official Grain Graiding Guide (http://grainscanada.gc.ca/oggg-gocg/10/oggg-gocg-10-eng.htm).

Figure 4 – Historic distribution of canola grade in harvest survey, 2004-2012

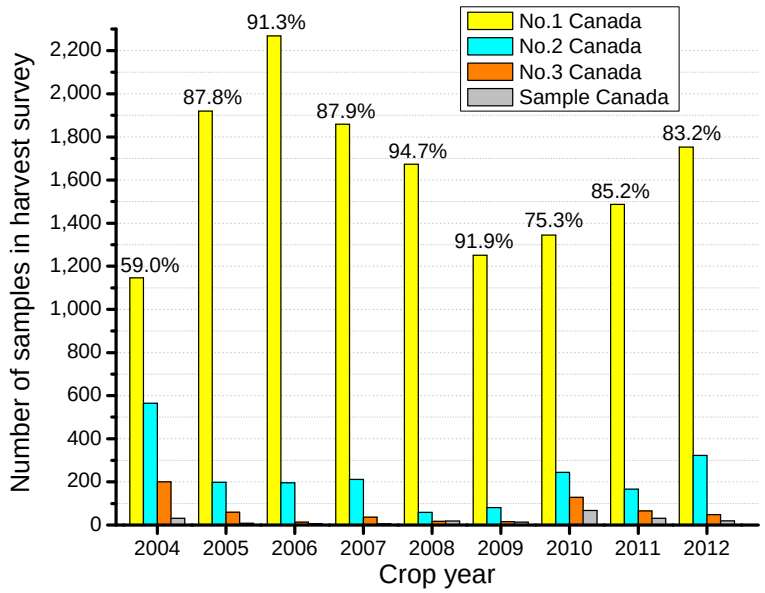
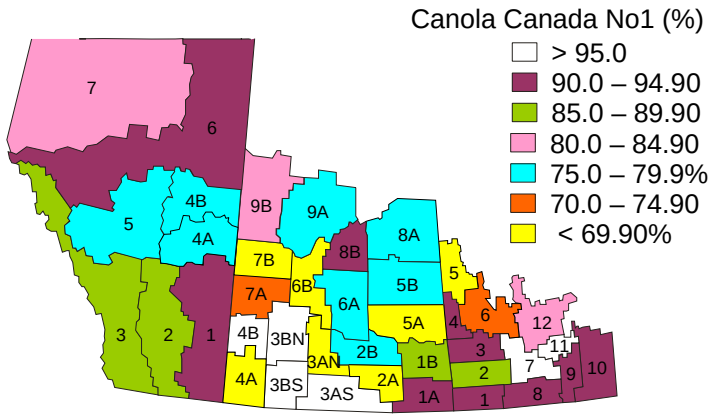


Figure 5 – Distribution of Canola, No. 1 Canada by crop district in western Canada samples received in 2012



Quality of western Canadian canola—2012

Tables 3 to 5 show detailed information on the quality of western Canadian canola harvested in 2012 whereas Table 6 compares the quality of 2012 harvest to the quality of recent canola exports. It is important to note that the numbers of samples in each grade or province may not be representative of the total production or grade distribution. However, there were sufficient samples to provide good quality information for each province and each grade. Provincial and western Canadian averages were calculated from results for each crop district, weighted by a combination of production by crop district using the averages of the 2010 and 2011 total production (Statistics Canada production estimate) combined with and an estimate of grade distribution per crop district using data presented in Figure 5.

All oil and protein content values discussed below are presented using the CGC's historical 8.5% moisture basis in order to permit annual and regional comparisons.

Exports of commercially cleaned canola contained up to 2.5% dockage, which will affect quality factors such as oil content, chlorophyll and FFA. Canola exports containing over 2.5% dockage are considered not commercially clean (NCC) and will have even greater reductions in measured quality components.

Oil content

For Canola No.1 Canada, the 2012 mean oil content (43.5%) was much lower than the mean oil content observed in 2011 (45.2%), 2010 (44.3%) and 2009 (44.5%) (Figure 6). This is below the ten year (2002-2011) mean of 43.8% (0.3% lower) and the five year (2007-2011) mean of 44.4% (Table 1, Figure 6). The oil content mean in Manitoba (41.6%) was lower than in Saskatchewan (43.9%) and Alberta (43.9%) (Table 3). The oil content of Canola No.1 Canada harvested in 2012 by producers across western Canada ranged from 35.6 to 47.8% in Manitoba, 38.3 to 50.4% in Saskatchewan and 37.6 to 49.6% in Alberta (Figure 6).

The oil content for Canola, No. 2 Canada (43.0%) was lower than to Canola, No. 1 Canada, (43.5%); the oil content for Canola, No. 2 Canada samples from western Canada ranged from 38.0% to 49.1% (Table 3).

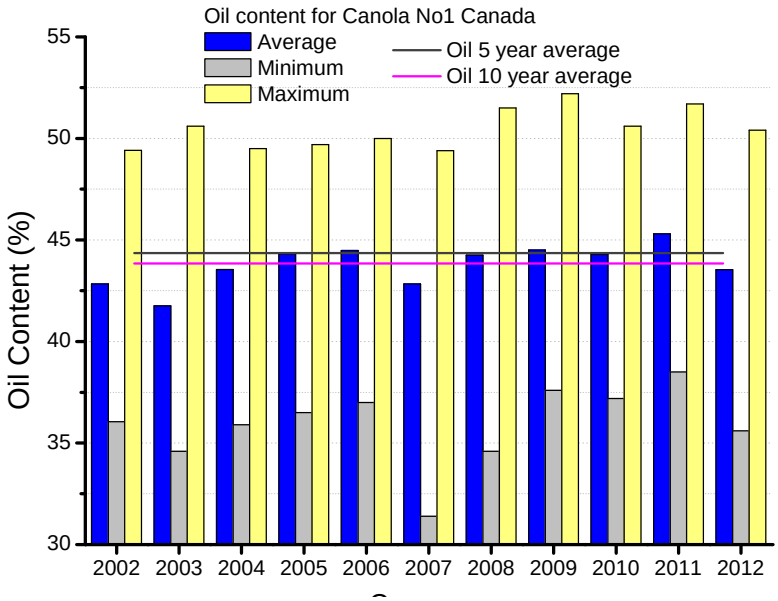
Oil content is influenced by both genetics and environment. For any known canola variety cool growing conditions will give higher oil content when compared to hot growing conditions. The summer of 2012 was very warm and dry (starting in June) in most of the Prairies (Figures 2 & 3). Overall, during the 2012 summer, monthly mean temperatures were 2 to 4°C higher than normal in July and September and about 1 to 2°C higher than normal in August in the Prairies. Last year, Manitoba nights were cool with temperatures as low as 9 to 10°C in some areas from July to September. In 2012, some temperature minimae were about 5°C higher than last year. Minimum temperatures (night temperatures) could have an important effect on canola oil content, especially night temperatures during the early plant development. July temperature minimae were high when compared to 2011, this could have greatly affected the oil content of the 2012 harvest. Disease pressure was high this year, due to the wet and cold June conditions followed by the hot July-September conditions. It is likely that disease also affected the canola oil content.

The 2012 oil decrease was due to a combination of various factors - temperatures (low then high), moisture (lack of moisture in some areas, excess in others) and diseases.

The mean oil content of commercially clean canola exports of Canola No.1 Canada was 43.1% in November 2012 and averaged 43.3% for the August-October 2012 exports (Table 6). The oil content averages were lower in non-commercially clean exports (42.3 and 41.9% for November 2012 and August-October 2012 exports, respectively). The oil content means for the actual shipping season were much lower than what was observed for last shipping season (44.4%). The oil content of the export since October reflected the lower oil content observed in the 2012 harvest when compared to the 2011 harvest (Tables 1 & 6).

It is expected that the mean oil content of the Canadian export will remain in the 42.5-43.5% range for most of the 2012-13 shipping season.

Figure 6 – Canola, No. 1 Canada
Oil content average, minimum and maximum of harvest survey samples, 2002-2012



Protein content

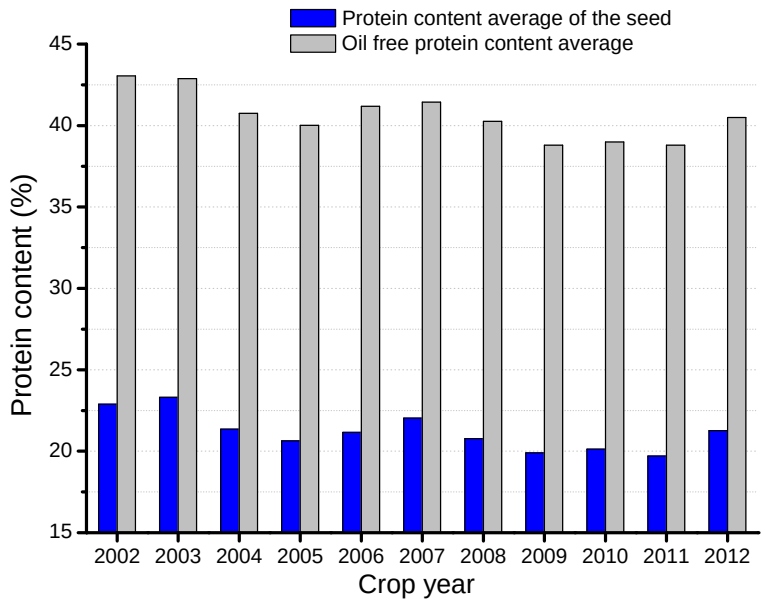
The 2012 crude protein content mean was 21.3, 21.8, 21.4 and 21.8% for Canola, No.1 Canada, Canola, No. 2 Canada, and Canola, No. 3 Canada and Samples, respectively. The average protein content for Canola, No.1 Canada was higher in 2012 (21.3%) than in 2011 (19.6%) and much higher than the five year averages (20.4%) (Table 1, Figure 7). This 2012 crude protein content mean was similar to the ten year average (21.2%). Protein content averages were 23.0, 20.9 and 21.0% in Manitoba, Saskatchewan and Alberta, respectively with protein content of individual producer samples ranging from 15.9 to 28.5% for Canola, No. 1 Canada samples and from 16.7 to 26.1% for Canola, No. 2 Canada samples (Table 3).

The 2012 protein content calculated to an oil-free meal at 8.5% moisture basis was 40.6%, which was significantly higher than what was observed in 2011 (38.8%) and well above the 39.6 calculated for the five-year average (Table 1, Figure 7). This 2012 average was identical to the ten-year calculated average (40.6%). The calculated protein content of the oil-free meal (100% defatted) was much higher in Manitoba (42.2%) than in Alberta (40.3%) or Saskatchewan (40.1%).

In canola, it is known that oil and protein contents follow an inverse relationship – the lower the oil, the higher the protein content. Since lower oil contents

were observed in 2012 compared to 2011, higher protein contents were expected in the 2012 canola harvest when compared to the 2011 averages.

Figure 7 – Canola, No. 1 Canada
Protein content (in seed and oil-free basis) of harvest survey samples, 2002–2012



The mean oil protein of Canola, No. 1 Canada commercially clean exports were 21.1 and 20.7% in November 2012 and August-to-October 2012, respectively (Table 6). The protein content averages for the actual shipping season were higher than what was observed for last shipping season (19.6% for Aug 2011 to July 2012). The higher export protein means reflected the higher protein content average observed in the 2012 harvest when compared to the 2011 harvest (Tables 1, 3 and 6).

The average calculated protein content of the meal was 39.9% for the November 2012 commercially clean exports of Canola, No. 1 Canada, this result is about 2% higher than was observed during last shipping season (averaged 38.1% for commercially clean exports of Canola, No. 1 from August 2011 to July 2012) (Table 6).

It is expected that the protein content of the Canadian exports will remain in the 21.0% range for most of the 2012-13 shipping season.

Chlorophyll content

Chlorophyll content averages of producer samples graded Canola, No. 1 Canada were 15.9, 19.1 and 16.2 mg/kg in Manitoba, Saskatchewan and Alberta, respectively (Table 3). The overall average for Canola, No. 1 Canada was 17.5 mg/kg, higher than the 15.9 mg/kg 12.6 mg/kg observed in 2011 and 2010, respectively (Table 3, Figure 8). Individual producer samples of Canola, No.1 Canada from Manitoba, Saskatchewan and Alberta had chlorophyll levels ranging from 4.0 to 43.0 mg/kg, 4.0 to 46.4 mg/kg and 4.0 to 54.9 mg/kg, respectively (Table 3). The mean chlorophyll content of each western province varies greatly from year to year (Figure 8) due to environmental conditions. Once again, location had an important effect on chlorophyll levels in samples. In 2012, compared to 2011, there was no severe frost reported in September. The dry conditions at harvest and the low moisture content the swathed seeds were likely responsible of the 2012 high chlorophyll averages.

Chlorophyll levels (Table 3) for Canola, No. 2 Canada samples averaged 34.5 mg/kg, slightly lower than what was observed in 2011 (37.0 mg/kg) but similar to the 2010 chlorophyll content (33.7 mg/kg). Samples graded Canola, No. 3 Canada showed an average chlorophyll content of 49.6 mg/kg much lower than the 72.3 mg/kg observed in 2011.

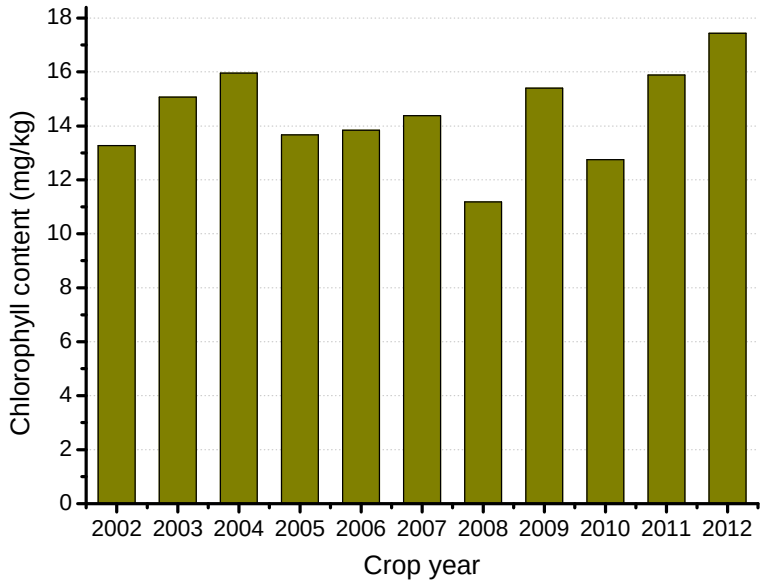
To be graded Canola, No. 1 Canada samples must contain no more than 2% distinctly green seeds (DGR). DGR averages were 0.78, 1.02 and 0.80% in Manitoba (0.67% in 2011), Saskatchewan (0.57% in 2011) and Alberta (0.59% in 2011) for Canola, No. 1 Canada samples, respectively.

The chlorophyll content of Canadian canola exports is affected by the DGR and the dockage content - no more than 2.5% for commercially clean exports. The dockage averages for Canola, No. 1 Canada were 1.89 and 1.91% for commercially clean cargoes in November 2012 and from August to October 2012 exports (3.07 and 3.22% for the not commercially clean exports for the same periods), respectively.

Since August 1st, 2012, the DGR contents for the individual cargoes of Canola, No. 1 Canada ranged 0.6 to 1.8%. Up to now, the DGR averaged 1.27% (November 2012) and 0.95% (August to October 2012) for the Canola, No. 1 Canada exports (Table 6). Chlorophyll content averages of the Canola, No. 1 Canada exports ranged from 16.3 to 30.5 mg/kg, with the commercially clean exports having statistically lower chlorophyll content than the not commercially clean exports (Table 6). Overall, in 2012, the chlorophyll content of the whole canola harvest averaged 21 mg/kg with a DGR average of 1.3% These chlorophyll contents are higher than the 2012 chlorophyll content of Canola, No. 1 Canada 2011 because the DGR averages are higher, moreover exports contain dockage whereas the tested harvest survey samples contain no dockage.

It is likely that the chlorophyll content of the Canola, No. 1 Canada shipments for 2012-2013 be similar to slightly lower than the chlorophyll content of the Canola, No. 1 Canada shipments for 2011-2012.

Figure 8 – Canola, No. 1 Canada
Chlorophyll content of harvest survey samples, 2000–2012

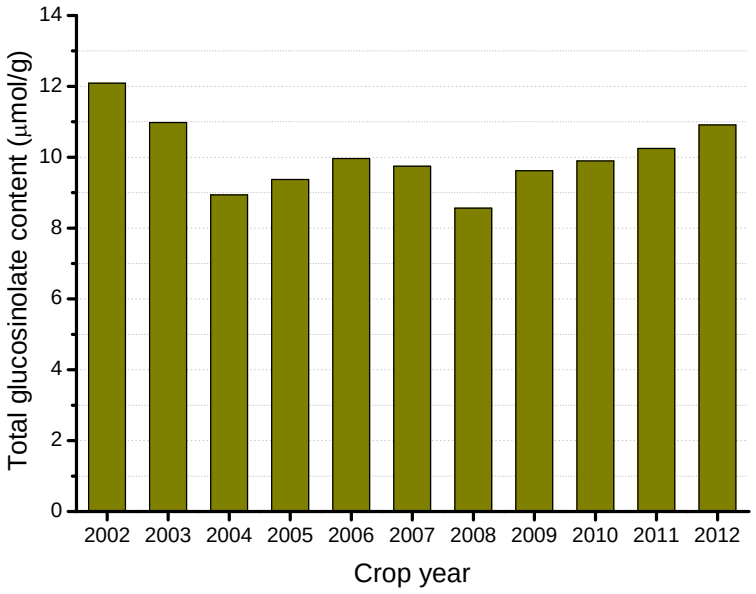


Glucosinolate content

The 2012 total glucosinolate content averaged 10.9 μmoles/gram similar to what was observed in 2011 (10.3 μmoles/gram) but slightly higher than what was observed in 2010 (9.6 μmoles/g) (Table 1, Figure 9). This constant low total glucosinolate content is a direct result of the constant breeding efforts from the various breeding programs and the very little proportion of *Brassica rapa* grown in Canada. Since 2006, *Brassica napus* varieties represented more than 99% of the samples received by the Canadian Grain Commission in its harvest survey program.

The average level of total seed glucosinolates in the November 2011 canola exports was 13.7 μmol/g of seed, similar to the average of the 2011-12 shipping season (13.1 μmol/g of seed) (Table 6). Glucosinolate contents of canola exports for the 2012-2013 shipping season will remain similar to the averages observed during the 2011-2012 shipping season (Table 6).

Figure 9 – Canola, No. 1 Canada
Total seed glucosinolate content of harvest survey samples, 2002–2012



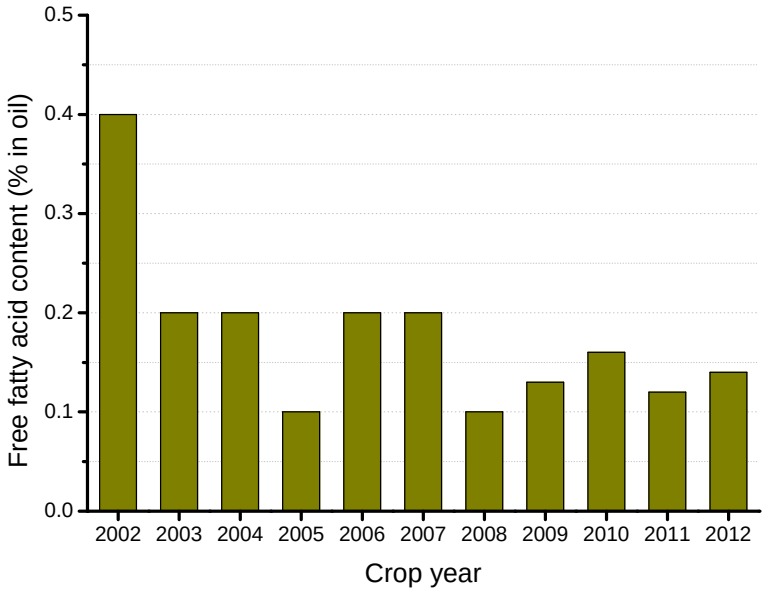
Free fatty acids content

The average free fatty acid content (FFA) of the oil for the 2012 canola was 0.14%, slightly higher but still comparable to what was observed last year (0.12%) and comparable to what was observed in 2010 and 2009, 0.16% and 0.15%, respectively (Tables 1 and 4, Figure 10). This level is similar to the five-year average of 0.14% (Table 1).

We have observed that FFA in canola can be high if temperatures are high during the growing season due to field heat stress. Average FFA levels in Canola, No.1 Canada samples from Manitoba (0.18%) and Alberta (0.16%) were slightly higher than in Saskatchewan (0.11%). FFA levels may change after harvest during storage if seeds are subjected to improper storage conditions

In November, the average FFA level for commercially clean Canola, No.1 Canada exports was 0.31% (0.29% for the August to October exports). These averages were higher for the not commercially clean exports (0.35 and 0.37%). Last year's average was 0.26% (Table 6).

Figure 10 – Canola, No. 1 Canada
Free fatty acid content of harvest survey samples, 2002–2012



Fatty acid composition

The average level of erucic acid in the 2012 crop was 0.01%, which is identical to what was observed for the last two yeas (0.01%), and similar to the five-year average of 0.02% (Tables 1 and 5, Figure 9) and below the ten-year average of 0.06%. These low values are a direct result of the breeding efforts of the Canadian canola industry.

For Canola, No.1 Canada samples the mean α-linolenic acid (C18:3) was 9.6% slightly lower that the means observed in 2011 (9.9%) and the five-year average (9.8%) (Table 1, Figure 12). The α-linolenic acid mean in Saskatchewan (9.8%) was slightly higher that the one in Alberta (9.5%) and higher than the one in Manitoba (9.0%) (Table 5). The hot and dry conditions observed in Manitoba and most of Alberta were responsible for the slightly lower α-linolenic acid content observed in 2012. The level of unsatruration, e.g. α-linolenic acid, is affected by temperature; high temperatures leading to lower levels of unsaturation (therefore lower α-linolenic acid) in the oil of canola seeds.

Figure 11 – Canola, No. 1 Canada
Erucic acid content of harvest survey samples, 2002–2012

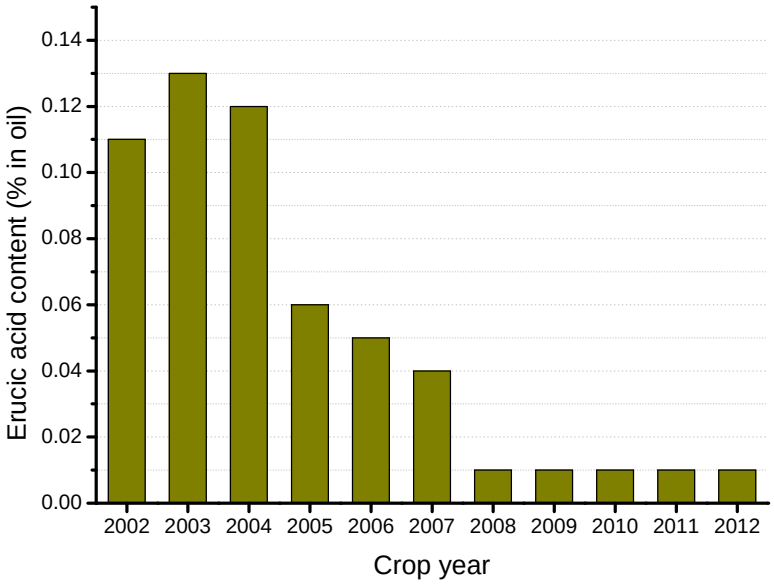
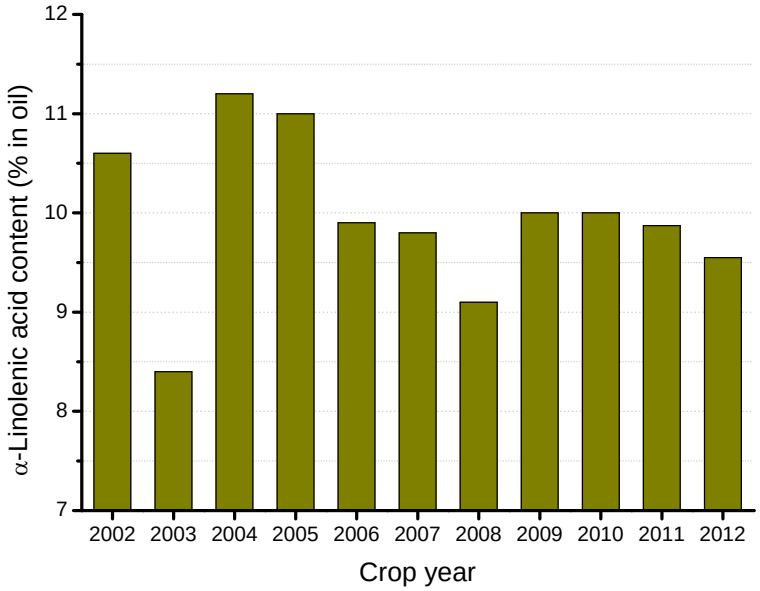
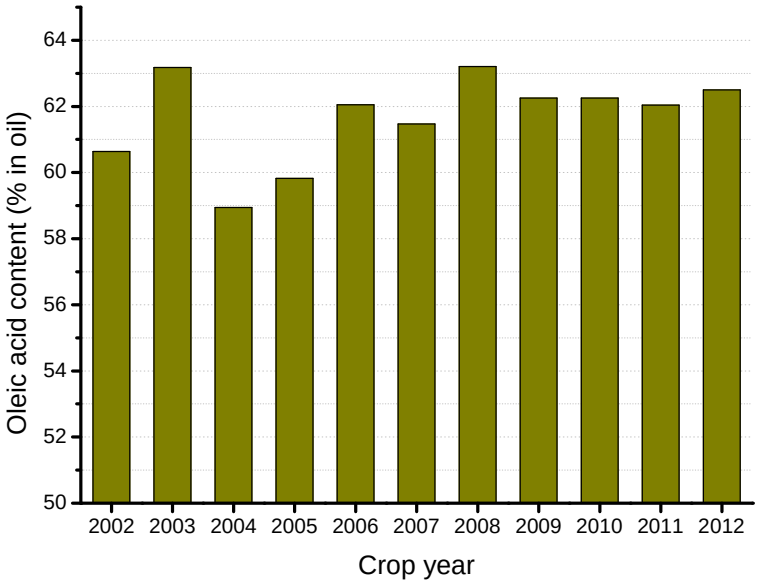


Figure 12 – Canola, No. 1 Canada
α-Linolenic acid content of harvest survey samples, 2002–2012



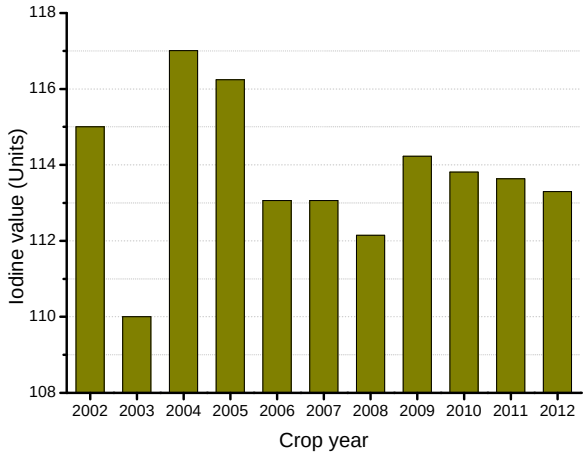
For Canola, No.1 Canada samples the mean oleic acid (C18:1) content of the 2012 crop was 62.5%, slightly higher than what was observed in 2011 (62.1%) (Table 1, Figure 13). This was also slightly higher than the five-year mean (62.3%) (Table 1). On average, oleic acid contents were slightly higher in Manitoba (62.8%) and Alberta (62.9%) than in Saskatchewan (62.0%) (Table 5).

Figure 13 – Canola, No. 1 Canada
Oleic acid content of harvest survey samples, 2002–2012



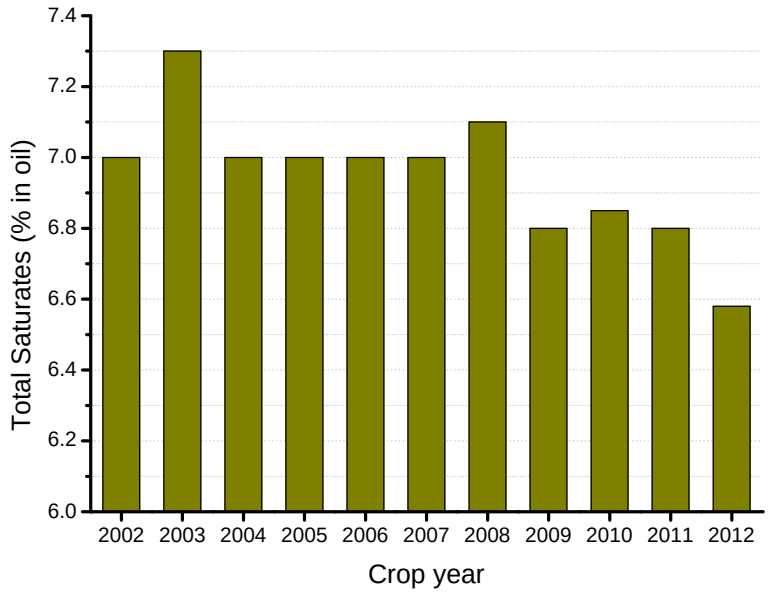
In 2012, there was a similar average for linoleic acid (C18:2) when compared to 2011 (19.2 versus 19.1%) (Table 1). The similarity in average results for oleic acid, linoleic acid and α-linolenic acid resulted in a similar iodine value when compared to 2011 (113.3 in 2012 versus 113.6 in 2011) (Table 1, Figure 14).

Figure 14 – Canola, No. 1 Canada
Iodine value of harvest survey samples, 2002–2012



The mean level of saturated fatty acids was 6.6% in 2012 (Table 1). The 2012 average was slightly lower than 2011 (6.8%) and 2010 (6.9%) (Table 1, Figure 13). As in 2011, in 2012 the mean saturated fatty acid levels were similar for the three provinces 6.6% (6.8, 6.8 and 6.7% for Manitoba, Saskatchewan and Alberta, respectively in 2011). Total saturates fatty acid contents are usually affected by the temperature, high temperatures leading to higher oil saturation. It is usually expected that total saturated fatty acid content varied between the three provinces, the southern part of the prairies having significantly higher temperatures than the northern regions. However, for two years in row, temperatures and lack of moistures were comparable in the northern and southern parts of the prairies; this could explain the non difference between the three provinces. It also seemed that total saturated fatty acid contents were not susceptible to high temperatures as was the case the previous years.

Figure 15 – Canola, No. 1 Canada
Total Saturated fatty acid of harvest survey samples, 2002–2012



For the first couples of months of the 2012-2013 shipping seasons, the α-linolenic acid averages (for clean and not commercially clean samples) ranged from 8.5 to 10.5%. The averages varied from 9.7 to 9.8% (Table 6). This is lower than what was observed during last shipping season (10.1%). When compared to last year's average, the iodine value averages were lower this year (113.2 to 113.7 units) until November 2012 than what was observed last year (114.0 units). The level of saturated fatty acids in the November 2012 canola exports remained very similar to the 2011-12 means (6.6-6.7% versus 6.8%). As last year, it is expected that the levels of erucic acid will remain low for the new shipping season (below 0.1%) since erucic acid contents were very low in the 2012 harvest survey.

No important variations are expected for the fatty acid averages in the 2012-2013 shipping season.

Table 3 – 2012 Harvest survey
Canola quality data by grade and province – Oil, protein and chlorophyll contents

	Number of samples	Oil content[1] %			Protein content[2] %			Chlorophyll content mg/kg		
		mean	min.	max.	mean	min.	max.	Mean	min.	max.
Canola, No. 1 Canada										
Manitoba	466	41.6	35.6	47.8	23.0	17.8	28.5	15.9	4.0	43.0
Saskatchewan	711	43.9	38.3	50.4	20.9	15.9	25.7	19.1	4.0	46.4
Alberta[3]	539	43.9	37.6	49.6	21.0	16.7	26.1	16.2	4.0	54.9
Western Canada[4]	**1716**	**43.5**	**35.6**	**50.4**	**21.3**	**15.9**	**28.5**	**17.5**	**4.0**	**54.9**
Canola, No. 2 Canada										
Manitoba	60	41.1	38.5	45.3	23.4	20.1	27.5	33.7	12.0	57.0
Saskatchewan	153	43.4	39.2	49.1	21.4	17.9	24.9	35.6	6.0	61.8
Alberta[3]	87	42.7	38.0	47.5	21.9	16.7	26.1	32.9	8.8	56.3
Western Canada[4]	**300**	**43.0**	**38.0**	**49.1**	**21.8**	**16.7**	**27.5**	**34.5**	**6.0**	**61.8**
Canola, No. 3 Canada										
Western Canada[4]	**45**	**42.9**	**37.5**	**46.0**	**21.4**	**19.1**	**24.8**	**49.6**	**11.5**	**97.4**
Canola, Sample Canada										
Western Canada[4]	**29**	**40.8**	**41.6**	**45.8**	**21.8**	**17.9**	**25.6**	**22.6**	**14.0**	**43.1**

[1] 8.5% moisture basis
[2] N x 6.25; 8.5% moisture basis
[3] Includes part of the Peace River area that is in British Columbia
[4] Values are weighted averages based on production by province as estimated by Statistics Canada

Table 4 – 2012 Harvest survey
Canola quality data by grade and province – glucosinolate and free acid acid contents

	Number of samples	Glucosinolates[1] µmol/g			Free fatty acids (%)
		mean	min.	max.	Mean
Canola, No. 1 Canada					
Manitoba	466	11.2	7.5	18.6	0.18
Saskatchewan	711	11.0	6.3	15.8	0.11
Alberta[2]	539	10.8	5.8	15.4	0.16
Western Canada[3]	**1716**	**10.9**	**5.8**	**18.6**	**0.14**
Canola, No. 2 Canada					
Manitoba	60	12.3	6.0	17.1	0.50
Saskatchewan	153	11.7	6.6	15.5	0.19
Alberta[2]	87	11.4	7.2	15.7	0.37
Western Canada[3]	**300**	**11.7**	**6.0**	**17.1**	**0.28**
Canola, No. 3 Canada					
Western Canada[3]	**45**	**11.1**	**7.1**	**14.7**	**0.12**
Canola, Sample Canada					
Western Canada[3]	**29**	**13.7**	**8.9**	**21.6**	**0.22**

[1] 8.5% moisture basis
[2] Includes part of the Peace River area that is in British Columbia
[3] Values are weighted averages based on production by province as estimated by Statistics Canada

Table 5 – 2012 Harvest survey
Canola quality data by grade and province – fatty acid composition, total saturate content and iodine value of the oil

	Relative fatty acid composition of the oil (%)					Total saturates[3]	Iodine value[4]
	C18:0	C18:1	C18:2	C18:3	C22:1	(%)	(Units)
Canola, No. 1 Canada							
Manitoba	1.72	62.79	19.40	9.04	0.00	6.60	112.6
Saskatchewan	1.70	62.01	19.47	9.77	0.03	6.55	114.0
Alberta[1]	1.76	62.94	18.73	9.50	0.00	6.62	112.8
Western Canada[2]	**1.73**	**62.50**	**19.17**	**9.55**	**0.01**	**6.58**	**113.0**
Canola, No. 2 Canada							
Manitoba	1.72	61.75	19.49	9.74	0.00	6.68	113.8
Saskatchewan	1.70	61.34	19.75	9.89	0.00	6.70	114.3
Alberta[1]	1.70	61.61	19.48	9.98	0.00	6.64	114.2
Western Canada[2]	**1.70**	**61.47**	**19.63**	**9.90**	**0.00**	**6.68**	**114.2**
Canola, No. 3 Canada							
Western Canada[2]	**1.70**	**60.76**	**20.03**	**10.14**	**0.00**	**6.84**	**114.9**
Canola, Sample Canada							
Western Canada[2]	**1.69**	**61.35**	**20.21**	**9.47**	**0.04**	**6.63**	**114.0**

[1] Includes part of the Peace River area that is in British Columbia

[2] Values are weighted averages based on production by province as estimated by Statistics Canada

[3] Total saturated fatty acids are the sum of palmitic (C16:0), stearic (C18:0), arachidic (C20:0), behenic (C22:0), and lignoceric (C24:0)

[4] Calculated from fatty acid composition

Table 6 – Canola, No. 1 Canada
Comparisons of quality data for 2012harvest survey with data for recent export shipments

Canola, No. 1 Canada - only	2012 survey	Exports				
		November 2012		August to October 2012		Previous year 2011-12
Quality parameter		**CC[4]**	**NCC[5]**	**CC**	**NCC**	**CC**
Oil content[1] (%)	43.5	43.1	42.3	43.3	41.9	44.4
Protein content[2] (%)	21.3	21.1	21.6	20.7	21.6	19.6
Oil-free protein content[2] (%)	40.5	39.9	40.2	39.3	39.8	38.1
Chlorophyll (mg/kg seed)	17.5	25.7	27.9	22.7	26.7	23.4
Total glucosinolates (µmol/g seed)	10.9	13.7	14.2	16.6	14.7	13.1
Free fatty acids, %	0.14	0.31	0.35	0.29	0.37	0.26
Erucic acid (% in oil)	0.00	0.02	0.03	0.04	0.01	0.02
Oleic acid (% inoil)	61.5	62.4	62.1	62.4	62.2	61.8
α-Linolenic acid (% in oil)	9.9	9.7	9.8	9.6	9.6	10.1
Total saturated fatty acids[3] (% in oil)	6.7	6.6	6.6	6.7	6.7	6.8
Iodine value	113.0	113.3	113.7	113.2	113.4	114.0
Distinctly Green seed (DGR, %)	0.90	1.22	0.75	0.95	0.72	1.38
Dockage (%)	0.00	1.89	3.07	1.91	3.22	1.88
Loading moisture (%)	NA	6.91	6.89	6.91	7.07	7.04
Number of export samples	1716	15	9	48	22	194
Tonnage	NA	446,808.71	311,198.56	1,365,058.13	607,283.66	6,998,591.80

[1] 8.5% moisture basis
[2] N x 6.25; 8.5% moisture basis
[3] Total saturated fatty acids are the sum of palmitic (C16:0), stearic (C18:0), arachidic (C20:0), behenic (C22:0), and lignoceric (C24:0).
[4] CC = Commercially Clean
[5] NCC = Not commercially clean
NA = Non applicable