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# Quality of western Canadian canola 2010

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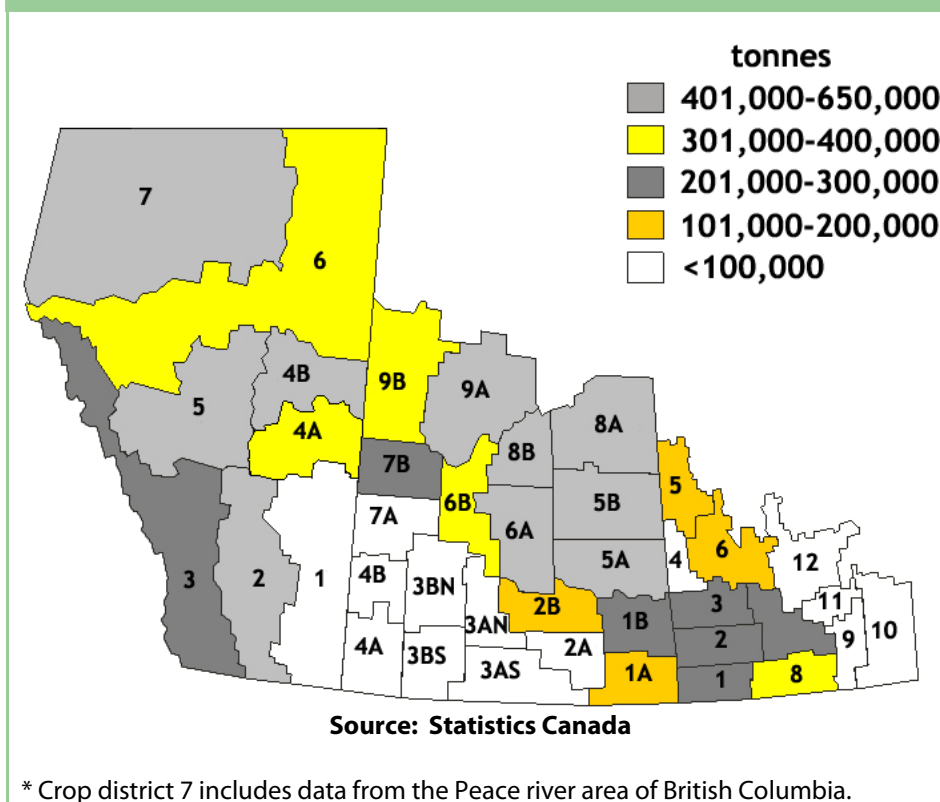
## Acknowledgments

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) 2010 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 5 year production averages. The map (Figure 1) shows traditional growing areas for canola in western Canada by crop district, with the 5 year production averages.

**Figure 1 –Map of western Canada showing the 5 year production averages (2005-2009) for canola**



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## Summary

The 2010 canola crop showed important regional differences in oil, protein, chlorophyll contents and in fatty acid composition. There was also an important difference in the grade distribution; 87.7% of samples received from Manitoba received the grade Canola, No.1 Canada versus 77.4% from Saskatchewan and 62.5% from Alberta (plus Peace River area of British Columbia) (Figure 3a and 3b).

The 2010 Western Canadian canola (Canola, No.1 Canada) crop is characterized by similar oil contents (44.3 versus 43.5%), somewhat lower chlorophyll levels (12.6 versus 14.5 mg/kg) and slightly lower protein contents (20.1 versus 21.5%) when compared to the 5-year (2005 to 2009) means (Table 1).

The 2010 means of Canola, No.1 Canada were similar to the 2009 samples when comparing the oil contents (44.3% versus 44.5% in 2009) and the protein contents (20.1 versus 19.9%). The mean chlorophyll content for Canola, No.1 Canada was 12.6% in 2010 notably lower than the 15.4 mg/kg observed in 2009. However, only 77.9% of the canola samples received in the 2010 harvest survey had chlorophyll contents lower than 22.5 mg/kg compared to 87.4% in 2009.

The 2010 canola crop is similar in oleic acid content, 62.3% ,  $\alpha$ -linolenic acid (ALA) content (10.0%) and linolenic acid (18.9) when compare to the 2009 crop (62.2, 10.0 and 18.8 % for oleic, ALA and linoleic acid, respectively).

For Canola, No.1 Canada seed, the total saturated fatty acid content was similar at 6.9% (versus 6.8% in 2009). This results in oil with a higher mean iodine value of 114 units. The erucic acid (0.01%) and the total seed glucosinolates (9.9  $\mu$ moles/gram) are similar to last year and well within canola specifications.

The mean free fatty acid (FFA) levels in Canola, No.1 Canada seed were similar than the results observed in 2009 (0.16 versus 0.15%).

**Table 1 – Canola, No. 1 Canada: Quality data for 2010 harvest survey**

Quality parameter	2010		2009	2005-2009 Mean
	N = 1641 <sup>a</sup>	N = 1785 <sup>b</sup>		
Oil content <sup>1</sup> (%)	44.3	44.4	44.5	44.3
Protein content <sup>2</sup> (%)	20.1	20.1	19.9	20.8
Oil-free protein <sup>2</sup> (%)	39.0	39.2	38.7	40.2
Chlorophyll content (mg/kg in seed)	12.6	12.9	15.4	13.8
Total glucosinolates <sup>1</sup> (μmol/g)	9.9	9.9	9.6	12.6
Free fatty acids (%)	0.16		0.15	0.15
Oleic acid (% in oil)	62.3		62.2	61.8
Linoleic acid (% in oil)_	18.9		18.8	19.0
α-Linolenic acid (% in oil)	10.0		10.0	10.0
Erucic acid (% in oil)	0.01		0.01	0.04
Total saturated fatty acids <sup>3</sup> (% in oil)	6.9		6.8	7.0
Iodine value	114		114	113

<sup>1</sup> 8.5% moisture basis

<sup>2</sup> N x 6.25, 8.5% moisture basis

<sup>3</sup> Total saturated fatty acids are the sum of palmitic (C16:0), stearic (C18:0), arachidic (C20:0), behenic (C22:0), and lignoceric (C24:0).

<sup>a</sup> N = 1641 samples of all grades were analyzed, the results were obtained from the analyses of composite samples made of 1276 Canola, No. 1 Canada samples received up to November 17, 2010

<sup>b</sup> N = 1785 samples of all grades were analyzed, the results were obtained using NIR results of 1345 Canola, No. 1 Canada individual samples received up to January 6, 2011.

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.

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# Weather and production review

## Weather review

April 2010 showed warmer than normal temperatures in Manitoba and south-west Saskatchewan, allowing an early seeding - sometimes earlier than normal. Then, in May cooler temperatures and heavy rain delayed seeding with some areas not seeded due to excess moisture. Below normal temperatures and heavy rains were experienced in the prairies from May to September except the Peace River area of Alberta and British Columbia. Overall, the 2010 growing season was characterized by excessive moisture - record precipitation - associated with cool conditions from May to September. By the end of August, growth was several weeks behind normal for most crops and harvest was delayed for the prairies. Severe frost was reported in Alberta and Saskatchewan mid-September. For most of the growing season, only the Peace River region reported above normal temperatures and below normal precipitation causing drought conditions. As a result, the Peace River region was the one of the first regions to be harvested, which is very unusual. By October 7, 2010 more than 90% of the Peace River region was harvested compare to 40% for southern Alberta and only 27% for central Alberta (Alberta Crop Harvest Update, October 28, 2010). The last week of September and October were dry and warmer than normal, allowing harvest to be completed in most of the prairie. Details on the 2010 growing conditions can be found at: <http://www4.agr.gc.ca/DW-GS/historical-historiques.jsp?lang=eng&jsEnabled=true>

## Production

Western Canadian farmers planted 6.7 million hectares of canola in 2010, similar to last year's area (Table 2). Statistics Canada's *Field Crop Reporting Series No. 8* reported that the 2010 western Canada mean yield of 1,821 kg/ha, lower than the records yields reported in 2009 and 2008, 1,950 and 1,945 kg/ha, respectively. This yield is slightly above the 5-year mean of 1,793 kg/ha. The expected 2010 production was 11.78 million metric tonnes of canola, similar to last year's production (11.76 million tonnes). In comparison the record production was obtained in 2008 with a production of 12.56 million metric tonnes. According to Statistics Canada's estimates of provincial production (December 3, 2010, Field Crop Reporting Series), Manitoba (MB), Saskatchewan (SK), and Alberta/British Columbia (AB/BC) accounted for 18.8, 42.8 and 38.4% respectively of the total canola production) (Table 2).

**Table 2 - Seeded area and production for western Canadian canola**

	Seeded area		Production <sup>1</sup>		Average production <sup>2</sup>
	thousand hectares		thousand tonnes		thousand tonnes
	2010	2009	2010	2009	2005-2009
Manitoba	1,363.8	1,295.0	2,215.8	2,828.1	2,041.2
Saskatchewan	3,156.5	3,176.8	5,034.9	5,726.6	4,691.5
Alberta <sup>3</sup>	2,246.0	2,053.8	4,525.8	3,206.9	3,553.9
<b>Western Canada</b>	<b>6,766.3</b>	<b>6,525.6</b>	<b>11,776.5</b>	<b>11,761.6</b>	<b>10,286.6</b>

<sup>1</sup> Source: Field Crop Reporting Series, No. 8, Vol 89, December 3rd, 2010; Statistics Canada

<sup>2</sup> Source: Field Crop Reporting Series, revised final estimates for 2005-2009.

<sup>3</sup> Includes the part of the Peace River area that is in British Columbia

## Harvest survey samples and grade distribution

Samples for the Canadian Grain Commission canola harvest survey are collected from producers, crushing plants and grain handling offices across western Canada. The samples are cleaned to remove dockage prior to testing. Harvest survey samples are analyzed for oil, protein, chlorophyll and total glucosinolates using a NIRSystems 6500 scanning near-infrared spectrometer. Industry Services grain inspectors assign 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>. Composite samples were used for all quality parameters, especially free fatty acids and fatty acid composition analyses. Composites are prepared by combining Canola, No. 1 Canada samples by provincial crop district; Canola, No. 2 and No. 3 Canada samples by province, and Canola, Sample Canada samples by western Canada.

The quality data of the 2010 harvest survey included samples received up to November 17, 2010. 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 2010 harvest survey report are based on the 1,641 samples, which is more than the 1,484 samples analyzed in 2009 and similar to the 1,677 samples analyzed in 2008, but less than the 1,884 samples analyzed in 2007. The harvest survey data are from producer samples that have been cleaned to remove dockage. Recent exports of commercially cleaned canola from Vancouver contained in average 1.8% dockage (ranging from 1.3 to 2.0%), 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 2010 survey samples is compared to 2009 results and to long-term survey means (Tables 3 to 7). The quality of December 2010 Canadian canola exports shipments is provided in Table 4.

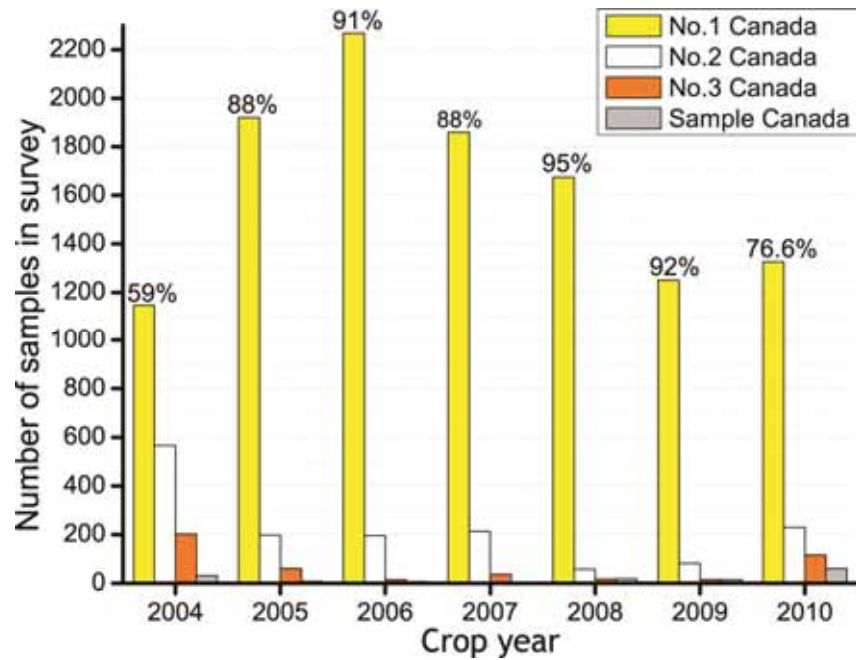


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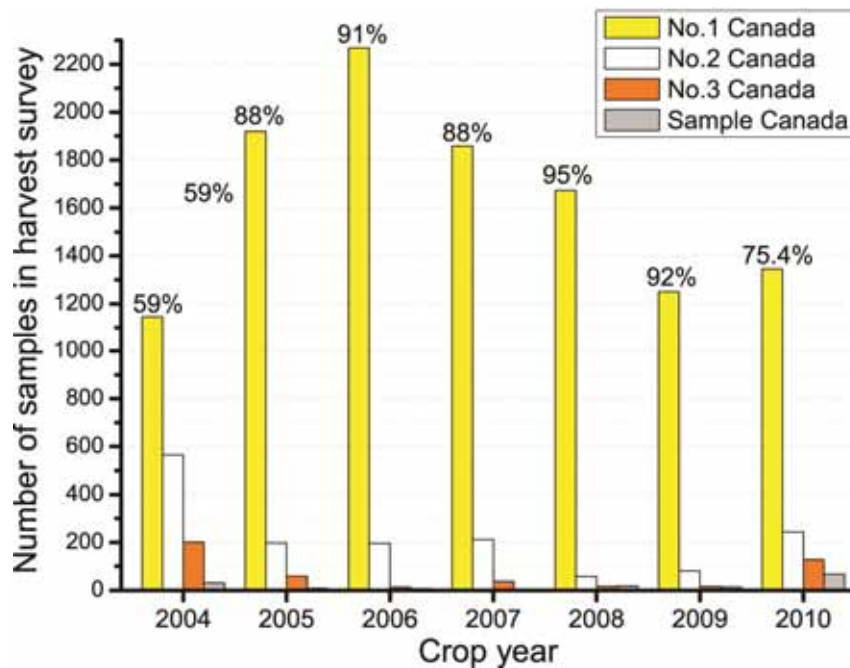
The grade pattern of the 2010 canola crop was very different to that of 2009 (Figures 2a and 2b). The lowest percent of canola No.1 Canada was observed in 2010 when compared to the previous five years. However, this number is still considerably better than the 59 % of canola No.1 Canada observed in 2004, when a severe early frost (August 18, 2004) occurred over the prairies. This year, the main downgrading factor was distinctly green seeds (DGR) suggesting immaturity and high chlorophyll content. The cold weather and the important precipitations observed during the 2010 growing season resulted in seeding delays and slow growing conditions leading to high DGR in canola samples.

Location had an important effect on the grading results of the harvest survey samples. Manitoba samples were received mostly in September and the first harvest report (published October 14, 2010) reported 91.4% of samples graded Canola, No. 1 Canada. Samples received later, mainly from Saskatchewan and Alberta, showed higher percent of downgraded samples. The harvest survey up-date published early November, reported that the program received about 1,500 samples but only 80% of these samples graded as Canola No.1. Canada. By end of November 1,484 samples were received allowing us to make composites according to the crop district and to produce a map of the distribution of the percent canola No.1 Canada per crop district (Figure 3a). Due to the poor weather conditions and the delayed harvest, it was decided to extend the sample receipt date for the 2010 harvest survey. By January 6, 2011, another 300 samples were received, graded, analyzed and added to the 2010 survey. Most of these samples presented high levels of DGR and were downgraded. As a result, the distribution of the percent canola No.1 Canada per crop district changed greatly as shown in Figure 3b. Alberta showed the lowest percent of canola No.1 Canada (62.5%). The Peace River area still showed the highest percent of canola No.1 Canada when compared to other Alberta crop districts - due to the warm weather observed in this region of the prairies. Overall, the harvest survey showed that 75.4% of the samples from Western Canada were graded canola No.1 Canada; 87.7% of the samples from Manitoba were canola No.1 Canada versus 77.5% and 62.5% from Saskatchewan and Alberta, respectively. Table 1 showed that adding the samples received after November 17, 2010 did not modify the quality parameters of canola No.1 Canada since Industry Services grain inspectors assigned the grade level based on the Official Grain Grading Guide for Canola and Rapeseed (Chapter 10). By adding these samples, only the percent and the distribution of each grade were changed.

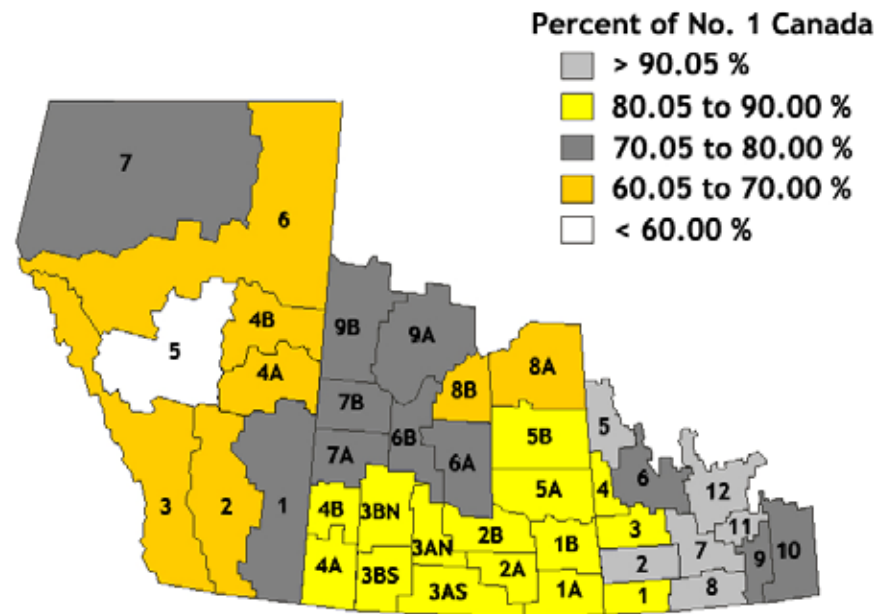
**Figure 2a – Historic distribution of canola grade (using samples recieved up to November 17, 2010).**



**Figure 2b – Historic distribution of canola grade (using samples recieved up to January 6, 2011).**

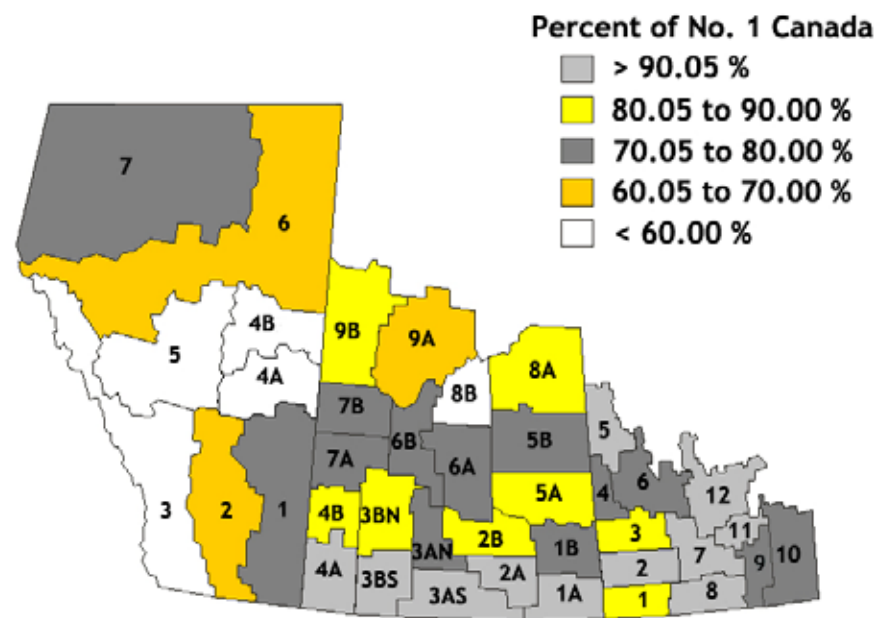


**Figure 3a – Distribution of Canola No1 Canada by crop district in western Canada samples received up to November 17, 2010.**



\* Crop district 7 includes data from the Peace river area of British Columbia.

**Figure 3b – Distribution of Canola No1 Canada by crop district in western Canada samples received and analyzed up to January 6, 2011.**



\* Crop district 7 includes data from the Peace river area of British Columbia.

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# Quality of western Canadian canola—2010

Tables 3 to 5 show detailed information on the quality of western Canadian canola harvested in 2010. Table 6 compares 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. Provincial means were calculated from results for each crop district, weighted by a combination of five-year average production by crop district, and an estimate of grade distribution from crop reports. To calculate western Canadian averages for each grade, provincial averages are weighted by the Statistics Canada production estimate and the estimate of grade distribution.

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 could contain 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

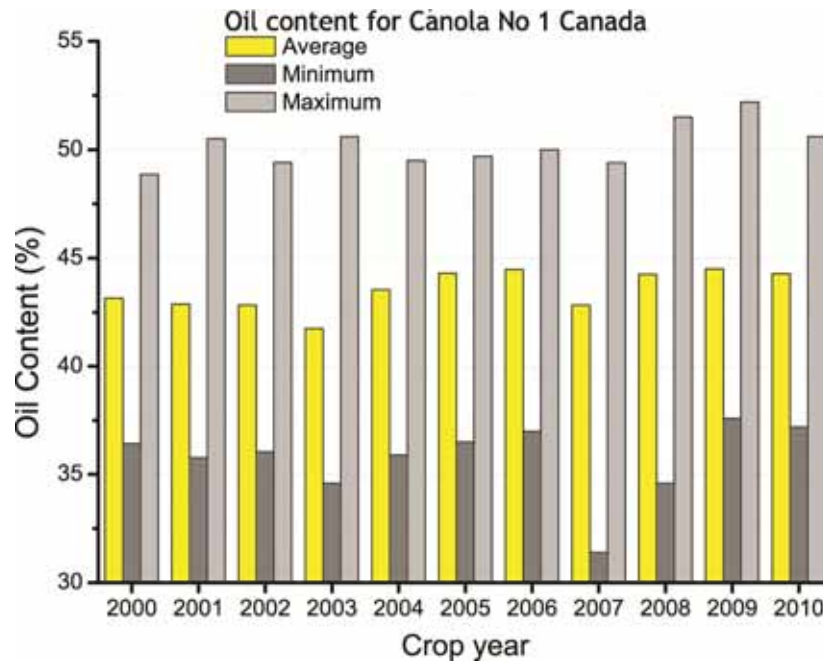
For Canola, No.1 Canada, the 2010 mean oil content (44.3%) was very similar to the 2009 and 2008 mean oil contents (44.5% and 44.3%, respectively), well above (1.0% higher) the five-year (2005-2009) mean of 43.5% (Table 1). The mean oil content in Manitoba (43.2%) is lower than in Saskatchewan (44.7%) and Alberta (44.6%) (Table 3). The oil content of Canola, No.1 Canada harvested in 2010 by producers across western Canada ranged from 37.2 to 47.8% in Manitoba (37.9% to 49.9% in 2009), 38.7 to 50.6% in Alberta (37.6% to 49.9% in 2009). In Saskatchewan the oil content ranged from 39.2% to 50.3% versus 38.2% to 52.2% in 2009 (Table 3). The oil content for Canola, No.2 Canada was similar to Canola, No.1, (44.3%); the oil content for Canola, No.2 Canada from western Canada ranged from 37.9% to 48.9% (Table 3).

As in 2009, the good oil content average was the result of the generally cooler growing conditions experienced from May to September over much of the western Canadian canola growing areas (Figure 4). The important breeding efforts implemented by the Canadian canola industry also played an important role in the high oil content observed in 2010, despite experiencing more than mediocre growing conditions.

Despite the high number of canola samples graded Canola, No.1 Canada in the Peace River, the drought like conditions along with the higher than normal temperatures, observed in this region of Alberta and British Columbia, were responsible for some stress on canola quality.

The mean oil content of canola exports from Vancouver was 43.6% in October 2010, similar to the 2009-10 mean (43.9%) (Table 6). It is expected that the mean oil content of the Vancouver exports in the 2010-11 shipping season should remain around 43-44% on a 8.5% moisture basis.

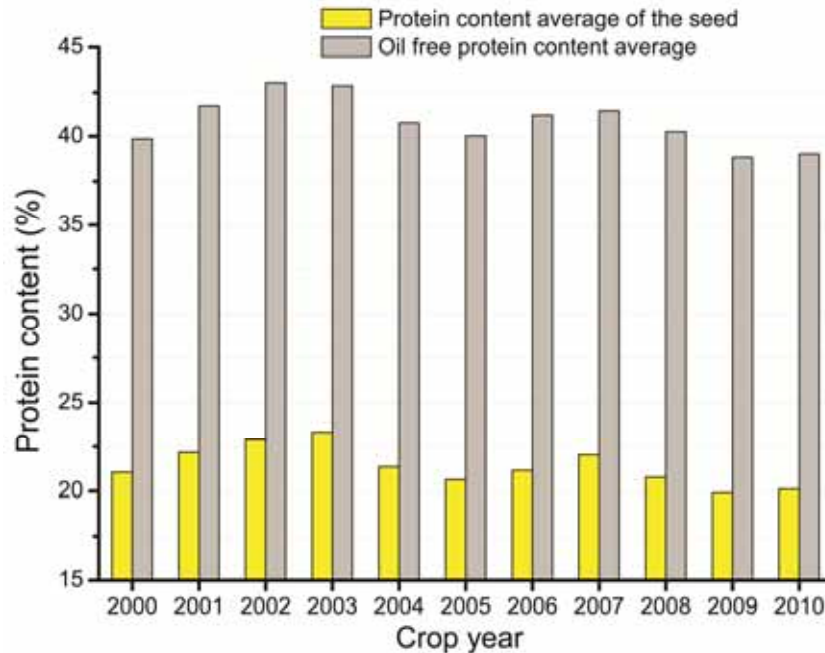
**Figure 4 – Canola, No. 1 Canada**  
Oil content average, minimum and maximum of harvest survey samples, 2000-2010



## Protein content

The 2010 mean crude protein content 20.1% was very similar to the 2009 average (19.9%) and slightly lower than the ten-year mean value of 21.5% (Table 1, Figure 5). The 2010 protein content calculated to an oil-free, 8.5% moisture basis was 39.0%, similar to the 38.7% obtained in 2009, lower than the 40.3 % obtained in 2008 (Tables 1 and 3). In Saskatchewan, protein contents (19.6%) were lower than in Manitoba (21.1%) and Alberta (20.2%). Canola, No.1 Canada samples from producers across western Canada varied in protein content from 15.2% to 26.9% (Table 3).

**Figure 5 – Canola, No. 1 Canada**  
**Protein content (in seed and oil-free basis) average of harvest**  
**survey samples, 2000–2010**



## Chlorophyll content

Producer samples of Canola, No. 1 Canada averaged 12.6 mg/kg in the 2010 harvest, lower than the 15.4 mg/kg chlorophyll observed in the 2009 survey, but still significantly higher than the 11.1 mg/kg in the 2008 harvest (Table 1).

The mean chlorophyll content of each western province varied greatly, location had an important effect on chlorophyll levels. The mean chlorophyll level for Alberta samples (14.8 mg/kg) was higher than for Manitoba (10.7 mg/kg) and Saskatchewan (12.5 mg/kg) (Table 3).

The chlorophyll contents of Canola, No.1 Canada harvested by producers in Alberta in 2010 ranged from below 5 to 55.2 mg/kg. Samples of Canola, No.1 Canada obtained from producers from Manitoba had chlorophyll contents ranging from below 5 to 42.2 mg/kg, whereas in samples from Saskatchewan had chlorophyll contents ranging from below 5 to 53.1 mg/kg. Taking into account all the samples received by the Canadian Grain Commission harvest survey, the chlorophyll content distribution showed that overall the chlorophyll levels were higher than last year (Figure 6). Only 73.2% of the samples received in 2010 had chlorophyll contents lower than 25 ppm compared to 87.0% and 96.2% in 2009 and 2008, respectively. This number was still higher than the 55.0% obtained in 2004 which was another year of cold growing conditions and very early frost. However, 2010 showed a number of samples with very high

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levels of chlorophyll; about 5% of the samples had chlorophyll contents higher than 80 pm (Figure 6).

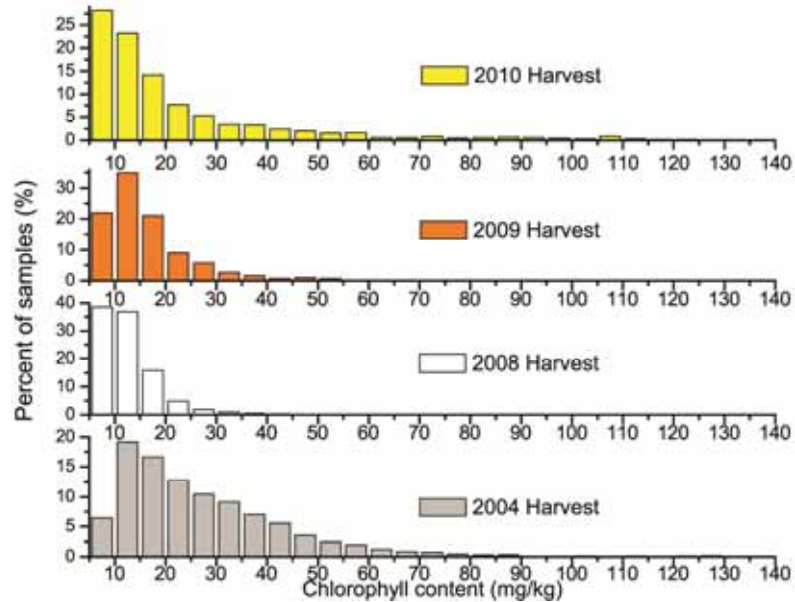
Chlorophyll levels for Canola No. 2 Canada samples averaged 33.7 mg/kg much higher than the 2009 chlorophyll content (27.9 mg/kg). Samples graded Canola No. 3 Canada had even higher chlorophyll content; the average was 64.2 mg/kg (Table 3).

The average chlorophyll content for canola samples graded Canola Sample Canada was similar to the chlorophyll content of Canola, No. 3 Canada because some samples were down graded for a mixture of factors such as distinctly green seed count (DGR), admixture - total conspicuous admixture (> 2.0%) and/or inconspicuous admixture (> 5.0%) - and heated seeds.

Distinctly green seed (DGR) levels were higher than last year's results; they ranged from 0 to 74 % whereas last year the maximum was 29%. In comparison, in 2008 they ranged from 0 to 15%. Results showed higher DGR in Alberta than in Saskatchewan and Manitoba.

The October 2010 shipments of canola leaving Vancouver had average chlorophyll levels of 17.9 mg/kg (Table 6). The chlorophyll value in October was about 2 ppm higher than the 2009-10 exports chlorophyll average. Overall (all grades combined), chlorophyll content average was higher for 2010 harvest than for 2009 harvest, however Canola, No. 1 Canada chlorophyll content average was lower than 2009. The DGR average of the 2010 harvest Canola, No.1 Canada samples was 0.6% with an average chlorophyll of 12.6 ppm. The DGR levels were 0.6, 1.1 and 1.2 % for October, November and December Canola, shipments of No.1 Canada canola leaving from Vancouver. This DGR differences are likely the reason why there is such an important difference between the chlorophyll harvest survey data and the chlorophyll data of the 2010 shipments of canola leaving from Vancouver. It has been found that harvest survey samples averaging 1.2 DGR could have chlorophyll content varying from 15 to 27 ppm. It is difficult to predict how the chlorophyll levels in the cargo exports will be, grade and dockage are affecting greatly the chlorophyll content of the samples since chlorophyll is done on samples as is. However, it is likely that canola export shipments for 2010-2011 season will have higher chlorophyll levels than when compare to the 2009-10 exports. It is expected that the chlorophyll content of the 2010 canola shipments will remain in the high chlorophyll range as it was in November and December.

**Figure 6 – Canola samples received by harvest survey program - Chlorophyll content distribution in harvest survey samples collected in 2004, 2008, 2009 and 2010**



## Glucosinolate content

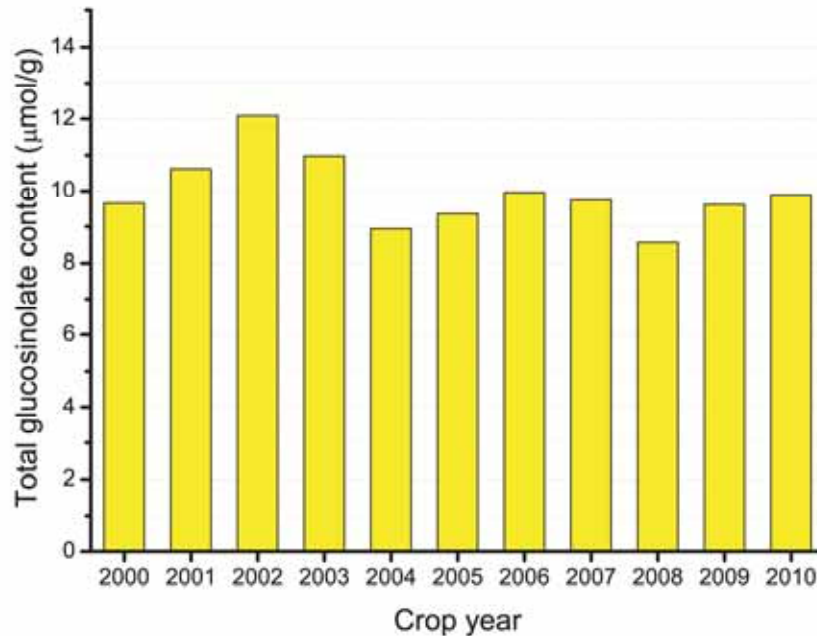
The 2010 total seed glucosinolate level was 9.9  $\mu$ moles per gram, very similar to the 9.6  $\mu$ moles per gram observed in 2009 (Tables 1 & 4). This constant low total glucosinolate content observed in the last two to three years is the result of constant breeding effort, absence of widespread heat stress and the large proportion of *Brassica napus* seed seeded and harvested in Canada (Figure 7).

The GRL 2010 harvest survey, *Brassica napus* represented more than 99.5% of the samples received by the GRL, this 99% has been constant in the harvest survey since 2006. This also a factor helping to maintain low glucosinolate levels.

The average level of total seed glucosinolates in the October 2010 canola exports was similar to the average of the 2009-10 shipping season (Table 6). The 2010 harvest survey results suggested that glucosinolate levels in exports will be similar to those of the previous shipping season.



**Figure 7 – Canola, No. 1 Canada**  
**Total seed glucosinolate content of harvest survey samples,**  
**2000–2010**



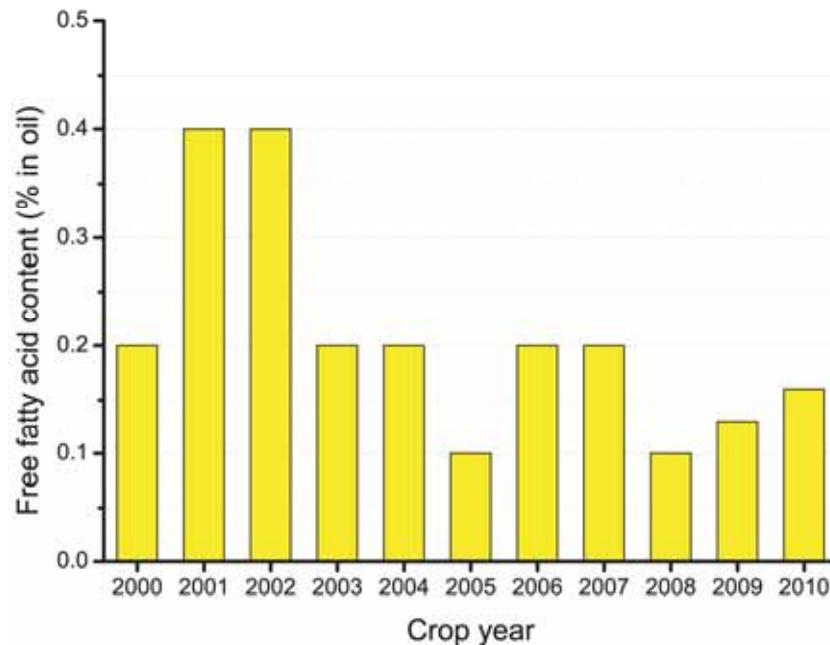
## Free fatty acids content

The 2010 harvest survey of Canola, No.1 Canada had a mean free fatty acid (FFA) content of 0.16%, similar to the 2009 content (Tables 1 & 4). This level was significantly higher than the 2008 value of 0.10% and lower than the long-term mean of 0.20% (Figure 8).

FFA levels may be elevated in seeds that were subjected to wet harvesting conditions (rain in September) or improper storage conditions.

In October, the FFA level mean for Canola No.1 Canada exports was 0.41%, the 2010-11 exports are expected to be around that value for Canola, No.1 Canada (Table 6). However, it is known that FFA levels towards the end of the shipping season tend to be higher than the values seen in October shipments since FFA levels tend to increase over time.

**Figure 8 – Canola, No. 1 Canada**  
**Free fatty acid content of harvest survey samples, 2000–2010**



## Fatty acid composition

The average level of erucic acid in the 2010 crop was 0.01% identical to last year average (0.01%), similar to the five-year average (0.04%) (Table 1) and well below the ten-year average (0.08%). This is also a direct result of the breeding efforts of the Canadian canola industry (Figure 9).

For Canola, No.1 Canada samples the mean  $\alpha$ -linolenic acid (C18:3) was 10.0% equal the mean observed in 2009 (10.0%) and for the five-year mean (Table 1). The  $\alpha$ -linolenic acid mean in Alberta (10.5%) was slightly higher than in Saskatchewan (10.0%) and Manitoba (9.4%) (Table 5, Figure 10).

For Canola, No.1 Canada samples the mean oleic acid (C18:1) content of the 2010 crop was 62.2%, identical to the average observed in 2009 (62.2%) (Table 1). In average, oleic acid content was much higher in Manitoba than in Saskatchewan and Alberta (Table 5, Figure 11).

In 2010, there was also a similar average for linoleic acid (C18:2) when compare to 2009 (18.9 versus 18.8%) (Table 1). These similar averages results for oleic acid, linoleic acid and  $\alpha$ -linolenic acid resulted in a similar iodine value when compare to 2009.

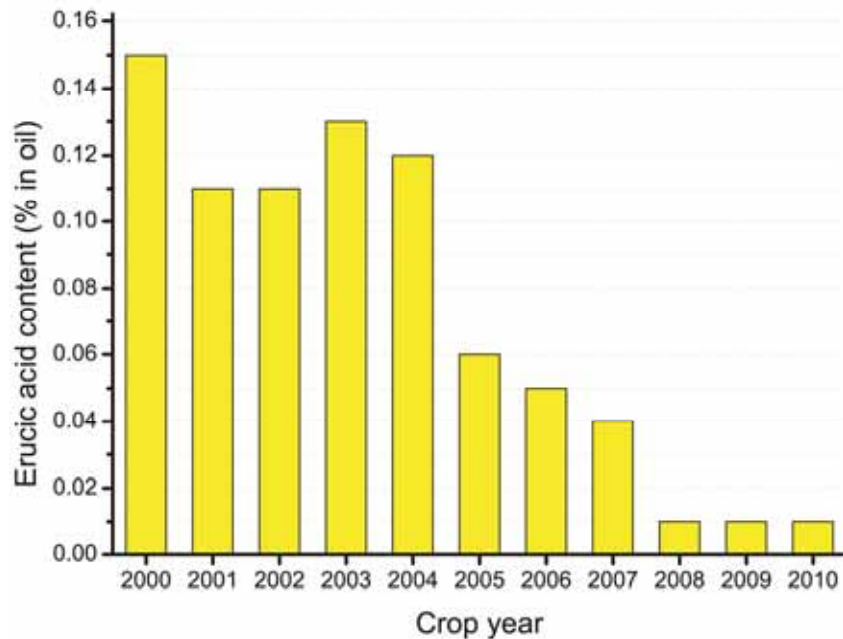
The mean level of saturated fatty acids was 6.85% in 2010, similar to the 2009 value of 6.8% (Table 1). The mean saturated fatty acid levels were slightly different of the three provinces (Table 5) in 2010 (7.0, 6.9 and 6.7% for Manitoba,

Saskatchewan and Alberta, respectively). Usually, samples from the southern prairies have significantly higher saturated fatty acids than samples from the northern regions (Figure 12).

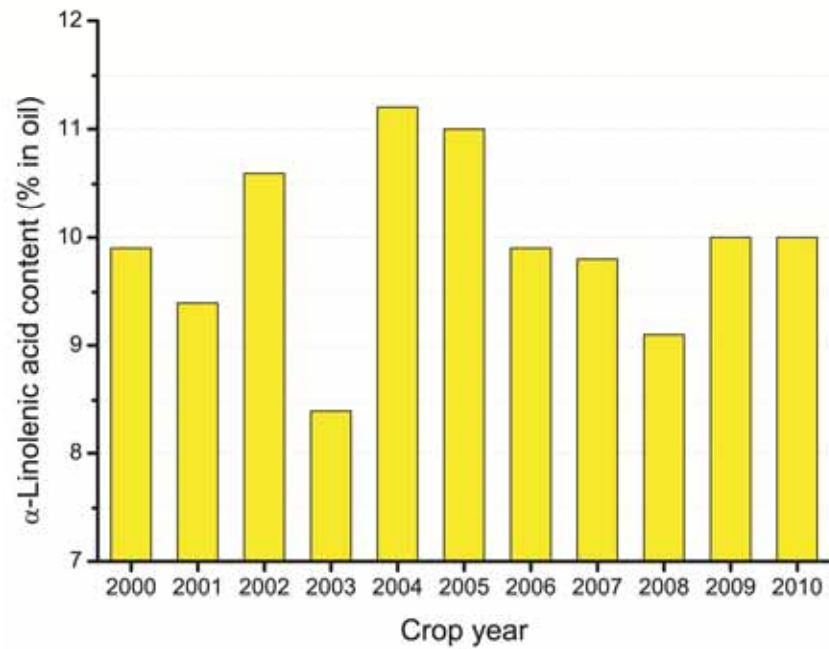
For Canola, No.1 Canada samples, the mean iodine value of the oil was 113.8 units similar to last year results (113.7 units) (Table 5, Figure 13).

The October 2010 data showed that the  $\alpha$ -linolenic acid mean for Canola No.1 Canada exports was 10.1 %, slightly higher than the 2009-2010 export mean (9.8%, Table 6). At 114.3 units, the iodine value for December 2010 canola exports increased by 1 units from the 2009-10 levels. The level of saturated fatty acids in the December 2010 canola exports remained very similar to the 2009-10 means (6.6% versus 6.8%). It is expected that the levels of erucic acid will remain constant during the 2009-10 shipping season, between 0.03% and 0.05%, well below 0.1%. It is likely that there will be no significant change in average for export canola shipments regarding iodine value, erucic acid, oleic acid and  $\alpha$ -linolenic acid contents for the 2010-11 shipping season.

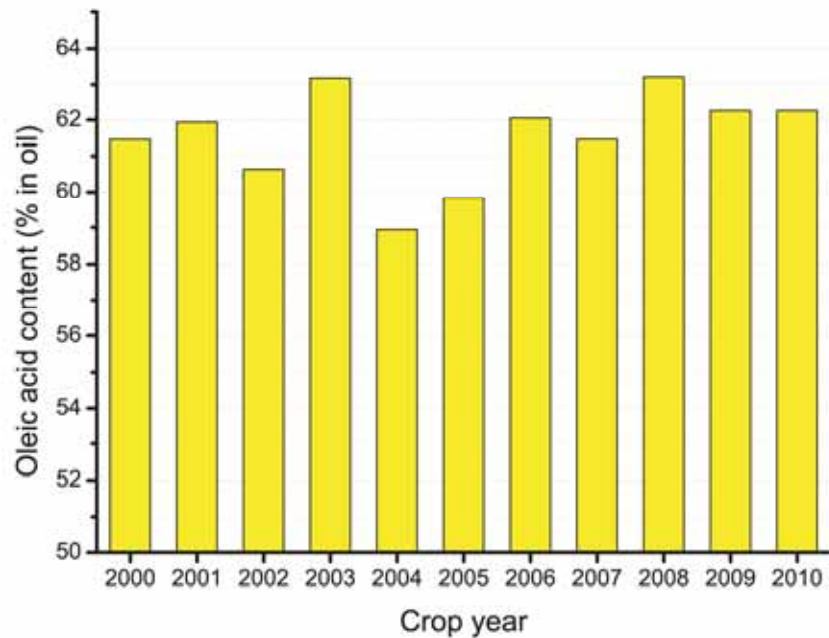
**Figure 9 – Canola, No. 1 Canada  
Erucic acid content of harvest survey samples, 2000–2010**



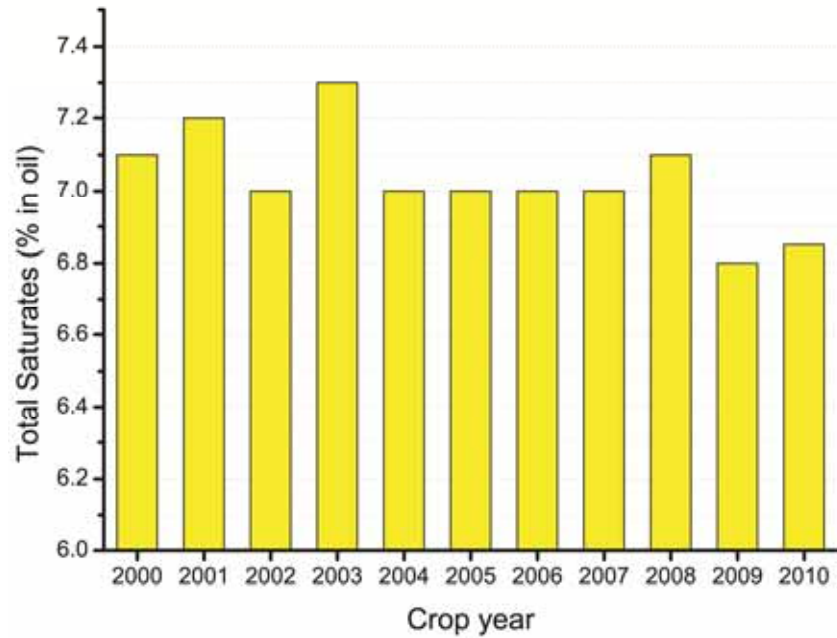
**Figure 10 – Canola, No. 1 Canada**  
 **$\alpha$ -Linolenic acid content of harvest survey samples, 2000–2010**



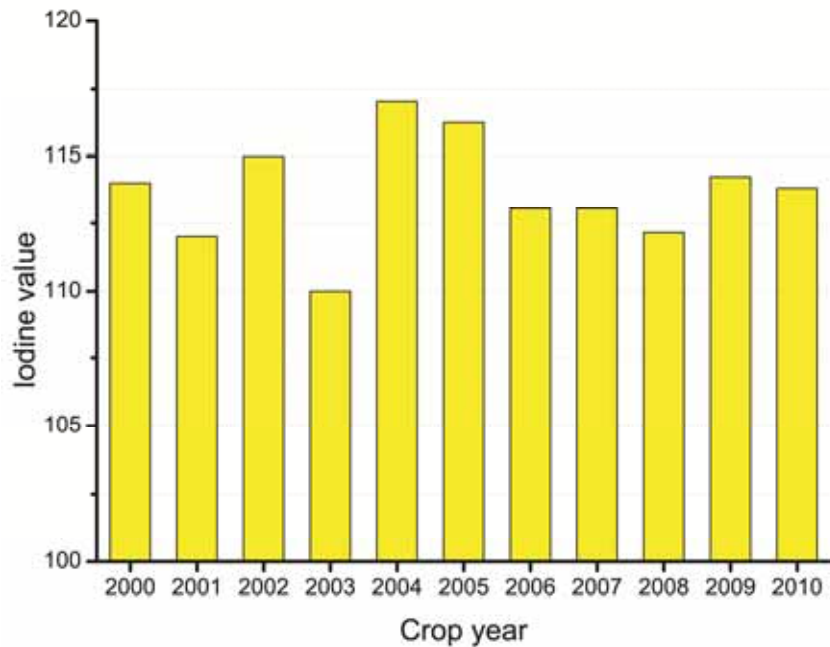
**Figure 11 – Canola, No. 1 Canada**  
**Oleic acid content of harvest survey samples, 2000–2010**



**Figure 12 – Canola, No. 1 Canada**  
**Total Saturated fatty acid of harvest survey samples, 2000–2010**



**Figure 13 – Canola, No. 1 Canada**  
**Iodine value of harvest survey samples, 2000–2010**



**Table 3 – 2010 harvest survey****Canola quality data by grade and province – Oil, protein and chlorophyll contents**

	Number of samples	Oil content <sup>1</sup>			Protein content <sup>2</sup>			Chlorophyll content		
		%			%			mg/kg		
		mean	min.	max.	mean	min.	max.	Mean	min.	max.
<b>Canola, No. 1 Canada</b>										
Manitoba	368	43.2	37.2	47.8	21.1	17.2	26.5	10.7	< 5.0	42.2
Saskatchewan	594	44.7	39.2	50.3	19.6	15.2	24.3	12.5	< 5.0	53.1
Alberta <sup>3</sup>	310	44.6	38.7	50.6	20.2	15.8	26.9	14.8	< 5.0	55.2
<b>Western Canada<sup>4</sup></b>	<b>1272</b>	<b>44.3</b>	<b>37.2</b>	<b>50.6</b>	<b>20.1</b>	<b>15.2</b>	<b>26.9</b>	<b>12.6</b>	<b>&lt; 5.0</b>	<b>55.2</b>
<b>Canola, No. 2 Canada</b>										
Manitoba	36	42.9	38.8	48.1	21.3	17.7	26.2	23.7	5.5	58.3
Saskatchewan	82	44.4	38.2	48.9	19.9	15.4	24.5	31.7	< 5.0	109.4
Alberta <sup>3</sup>	97	44.6	37.9	48.9	20.6	15.7	25.9	39.2	< 5.0	88.2
<b>Western Canada<sup>4</sup></b>	<b>215</b>	<b>44.3</b>	<b>37.9</b>	<b>48.9</b>	<b>20.4</b>	<b>15.4</b>	<b>26.2</b>	<b>33.7</b>	<b>&lt; 5.0</b>	<b>109.4</b>
<b>Canola, No. 3 Canada</b>										
Manitoba	7	42.1	38.7	45.5	21.2	19.4	22.9	36.5	6.6	77.4
Saskatchewan	47	44.6	39.3	50.0	19.7	14.9	22.3	60.0	8.2	110.9
Alberta <sup>3</sup>	49	44.3	40.0	50.8	20.6	16.6	23.9	71.3	12.2	123.1
<b>Western Canada<sup>4</sup></b>	<b>103</b>	<b>44.3</b>	<b>38.7</b>	<b>50.8</b>	<b>20.2</b>	<b>14.9</b>	<b>23.9</b>	<b>64.2</b>	<b>6.6</b>	<b>123.1</b>
<b>Canola, Sample Canada</b>										
<b>Western Canada<sup>4</sup></b>	<b>50</b>	<b>44.3</b>	<b>37.9</b>	<b>50.1</b>	<b>20.0</b>	<b>14.5</b>	<b>25.3</b>	<b>59.8</b>	<b>&lt; 5.0</b>	<b>184.2</b>

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

**Table 4 – 2010 harvest survey****Canola quality data by grade and province – Glucosinolate and free acid contents**

	Number	Glucosinolates <sup>1</sup>			Free fatty acids
	of samples	μmol/g			%
		mean	min.	max.	Mean
<b>Canola, No. 1 Canada</b>					
Manitoba	368	10.1	5.8	15.1	0.19
Saskatchewan	594	9.9	5.7	17.9	0.15
Alberta <sup>2</sup>	310	9.7	5.9	24.4	0.14
<b>Western Canada<sup>3</sup></b>	<b>1272</b>	<b>9.9</b>	<b>5.7</b>	<b>24.4</b>	<b>0.16</b>
<b>Canola, No. 2 Canada</b>					
Manitoba	36	10.7	7.0	13.6	0.35
Saskatchewan	82	10.1	6.7	14.3	0.22
Alberta <sup>2</sup>	97	10.1	6.6	21.0	0.18
<b>Western Canada<sup>3</sup></b>	<b>215</b>	<b>10.2</b>	<b>6.6</b>	<b>21.0</b>	<b>0.22</b>
<b>Canola, No. 3 Canada</b>					
Manitoba	7	11.2	8.7	13.8	0.87
Saskatchewan	47	9.7	6.6	13.2	0.27
Alberta <sup>2</sup>	49	9.9	6.6	13.7	0.39
<b>Western Canada<sup>3</sup></b>	<b>103</b>	<b>9.9</b>	<b>6.6</b>	<b>13.8</b>	<b>0.36</b>
<b>Canola, Sample Canada</b>					
<b>Western Canada<sup>3</sup></b>	<b>50</b>	<b>11.1</b>	<b>4.8</b>	<b>15.4</b>	<b>0.39</b>

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

**Table 5 – 2010 harvest survey****Canola quality data by grade and province – Fatty acid composition, total saturates content and iodine value of the oil**

	Relative fatty acid composition of the oil (%)					Total saturates <sup>3</sup> (%)	Iodine value <sup>4</sup> (Units)
	C18:0	C18:1	C18:2	C18:3	C22:1		
<b><u>Canola, No. 1 Canada</u></b>							
Manitoba	1.86	62.98	18.68	9.41	0.00	6.99	112.5
Saskatchewan	1.77	62.11	18.94	10.05	0.00	6.87	114.0
Alberta <sup>1</sup>	1.68	61.75	18.89	10.54	0.03	6.67	114.9
<b>Western Canada<sup>2</sup></b>	<b>1.77</b>	<b>62.25</b>	<b>18.86</b>	<b>10.00</b>	<b>0.01</b>	<b>6.85</b>	<b>113.8</b>
<b><u>Canola, No. 2 Canada</u></b>							
Manitoba	1.79	61.58	19.53	9.61	0.00	7.13	113.5
Saskatchewan	1.64	59.38	20.13	11.34	0.00	6.88	117.2
Alberta <sup>1</sup>	1.61	60.01	19.78	11.20	0.00	6.76	116.7
<b>Western Canada<sup>2</sup></b>	<b>1.65</b>	<b>60.01</b>	<b>19.88</b>	<b>11.00</b>	<b>0.00</b>	<b>6.87</b>	<b>116.4</b>
<b><u>Canola, No. 3 Canada</u></b>							
Manitoba	1.79	60.50	20.09	9.87	0.00	7.27	114.3
Saskatchewan	1.63	59.16	20.54	11.04	0.00	6.98	116.9
Alberta <sup>1</sup>	1.58	58.21	20.63	11.69	0.00	6.94	118.1
<b>Western Canada<sup>2</sup></b>	<b>1.61</b>	<b>58.77</b>	<b>20.56</b>	<b>11.30</b>	<b>0.00</b>	<b>6.97</b>	<b>117.4</b>
<b><u>Canola, Sample Canada</u></b>							
<b>Western Canada<sup>2</sup></b>	<b>1.69</b>	<b>59.68</b>	<b>20.17</b>	<b>10.72</b>	<b>0.00</b>	<b>7.12</b>	<b>115.9</b>

<sup>1</sup> Includes part of the Peace River area that is in British Columbia<sup>2</sup> Values are weighted averages based on production by province as estimated by Statistics Canada<sup>3</sup> % of total fatty acids including: Palmitic (C16:0), Stearic (C18:0), Arachidic (C20:0), Behenic (C22:0), & lignoceric (C24:0)<sup>4</sup> Calculated from fatty acid composition



**Table 6 – Canola, No. 1 Canada**  
**Comparisons of quality data for 2010 harvest survey with data for recent export shipments**

Quality parameter	2010 survey	Exports		
		December 2010	Aug. to Nov. 2010	Previous year 2009–10
Oil content <sup>1</sup> (%)	44.3	43.1	43.5	43.9
Protein content <sup>2</sup> (%)	20.1	20.7	20.4	20.0
Oil-free protein content <sup>2</sup> (%)	39.0	39.1	38.4	38.4
Chlorophyll (mg/kg seed)	12.6	20.63	18.6	15.9
Total glucosinolates (μmol/g seed)	9.9	12.66	13.0	13.0
Free fatty acids, %	0.16	0.38	0.36	0.33
Erucic acid (% in oil)	0.01	0.03	0.04	0.03
Oleic acid (% in oil)	62.2	62.0	61.8	62.5
α-Linolenic acid (% in oil)	10.0	10.3	10.2	9.8
Total saturated fatty acids <sup>3</sup> (% in oil)	6.9	6.8	6.8	6.8
Iodine value	113.8	114.3	113.3	113.3
Distinctly Green seed (DGR, %)	0.6	1.2	0.7	0.6
Loading moisture (%)	ND	7.8	7.7	7.7
Number of export samples		13	74	182