Quality of western Canadian canola

2000

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Summary

Western Canadian canola tested for the 2000 harvest survey is above average in both oil content and protein content. Oil content is 0.6 percentage units higher and protein content 0.3 percentage units higher than the 10-year means.

Compared to 1999, oil content, 43.2%, is slightly lower while protein content, 21.0%, is significantly higher. Chlorophyll content for No. 1 Canada canola is 14 mg/kg in the 2000 survey, slightly lower than 15 mg/kg in 1999.

The 2000 survey shows higher oleic acid content, 61.5%, but similar linolenic acid content, 9.9%. Total saturated fatty acid content, 7.1%, is also similar to 1999. The iodine value of 114 units, calculated from the fatty acid composition, is slightly higher for the 2000 harvest survey.

Erucic acid, 0.2%, and total glucosinolates, 10 µmoles/gram, were both similar to the 1999 survey results.

Table 1 • No. 1 Canada canola
Quality data for 2000 harvest survey

Quality parameter	2000	1999	1990–99 Mean
Oil content[1], %	43.2	43.3	42.6
Protein content[2], %	21.0	20.6	20.7
Oil-free protein content[2] %	39.8	39.1	38.7
Chlorophyll content, mg/kg in seed	14	15	13
Total glucosinolates[1], µmol/g	10	10	13
Free fatty acids, %	0.2	0.2	0.3
Erucic acid, % in oil	0.2	0.2	0.4
Linolenic acid, % in oil	9.9	9.8	10.4
Oleic acid, % in oil	61.5	60.9	59.9
Total saturated fatty acids[3], % in oil	7.1	7.1	6.8
Iodine value	114	113	115

[1] 8.5% moisture basis

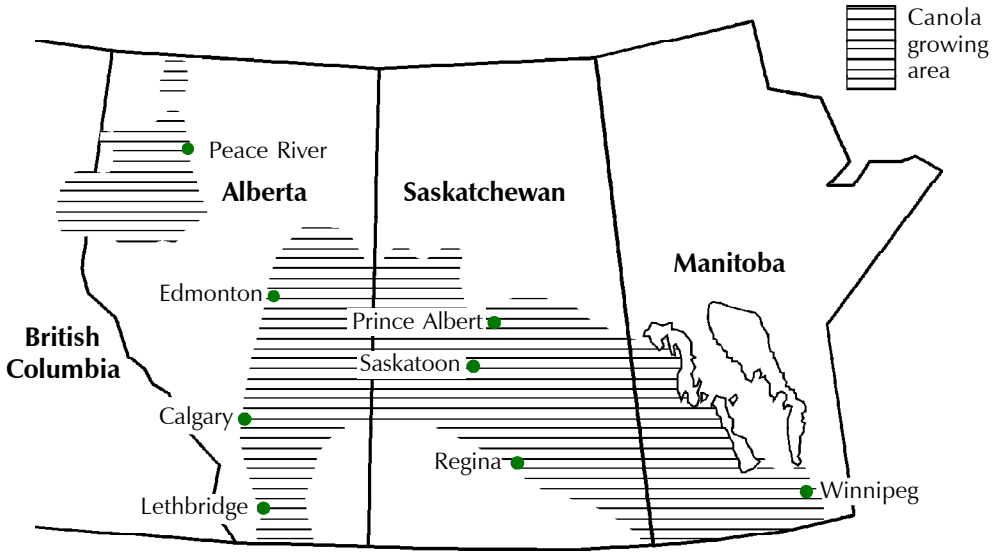
[2] N x 6.25; 8.5% moisture basis

[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).

Introduction

This report presents quality data and information based on the Canadian Grain Commission (CGC) 2000 harvest survey of western Canadian canola. Quality parameters included are oil, protein, chlorophyll, glucosinolates and free fatty acid contents, 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 shows the traditional growing areas for canola in western Canada.

Figure 1 • Map of western Canada showing traditional growing area for canola



Source: Canola Council of Canada

Weather and production review

Production review

Table 2 shows western Canadian farmers planted 4.87 million hectares of canola in 2000, which is a 12 percent decrease from last year's area. The final 2000 yield estimate of 1500 kg/ha is below the 1600 kg/ha reported in 1999 but above the 10-year mean of 1347 kg/ha. With less planted area and a drop in yield, total canola production in western Canada is down 19 percent to 7.08 million tonnes according to estimates by Statistics Canada reported in *Field Crop Reporting Series No. 8*, December 5, 2000. The largest proportion of 48 percent of 2000 production was grown in Saskatchewan. Alberta and British Columbia accounted for 31 percent and Manitoba for 21 percent.

Weather review

The Weather and Crop Surveillance department of the Canadian Wheat Board provided the weather review for the 2000 harvest survey.

Seeding

Seeding on the Prairies in 2000 was completed in early June, and the average seeding date was approximately two weeks earlier than normal.

Early seeding was a welcome contrast to the delays experienced during seeding in 1999. Because of warmer than normal temperatures and dry conditions during April and the first half of May, seeding began early and was completed quickly, especially in Manitoba and Alberta. Close to half of the crop in Alberta and over three-quarters of the crop in Manitoba was in the ground by the second week of May. While seeding was slightly slower in Saskatchewan, it was nevertheless earlier than normal.

Soil moisture was significantly below normal in southern and eastern Alberta and western Saskatchewan due to a lack of precipitation during the fall and winter. Although parts of this area received precipitation in the second half of May, drought conditions persisted in southern Alberta and parts of western Saskatchewan throughout the growing season.

Growing conditions

Cooler temperatures during the second half of May and most of June slowed early crop development. Some of the benefits of early seeding were lost to slow growth during this period. Temperatures were 1–5°C below normal across the Prairies during the month of June. Cooler temperatures helped minimize crop stress in southern Alberta and western Saskatchewan.

Precipitation during June ranged from significantly above normal in the eastern Prairies to well below normal in southern Alberta. Dry regions of western Saskatchewan received rainfall during the month of June, considerably reducing the size of the area affected by drought. Remaining dry areas were concentrated in the west-central region of the province, where soil moisture levels only partially recovered.

Temperatures during July increased to near normal levels improving crop development. Frequent, heavy rainfall covered a good portion of the Prairies during July, with exceptional amounts reported in various locations in the eastern Prairies. While the cloudy weather that accompanied the rainfall slowed crop development slightly, crops were on average one week ahead of schedule by the end of the month. Rains during July caused concerns about disease development in crops, especially in the eastern growing areas. Southern Alberta, however, received only 3–7 mm of moisture during July. The dry weather combined with the warm temperatures caused significant stress to crops, eventually resulting in significantly lower than normal yields in the region. Scattered frosts during the middle of July in northeastern and east central Saskatchewan caused some damage to flowering oilseed and cereal crops.

Harvest conditions

The harvest began during the first two weeks in August in Manitoba and Alberta where crops were seeded early and matured quickly. Elsewhere in Alberta and southern Saskatchewan, most of the crops were not ready to harvest until the third week in September. Weather during September was poor for harvesting. Below normal temperatures, i.e., 1–2°C, and moderate to heavy rainfall persisted throughout the month. Particularly damaging was a heavy and widespread rainfall across the Prairies during the first weekend in September. Combined with damp conditions during the following weeks, it caused some cereal and oilseed crops to sprout. Severe frost during the third week in September caused some damage to crops in the Peace River region.

Harvest survey samples

Canola samples for the Canadian Grain Commission 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 NIRS 6500 scanning near-infrared spectrometer. Grain Research Laboratory staff assign grade level based on chlorophyll content. Industry Services grain inspectors grade samples with significant levels of visible damage.

Grades and chlorophyll content relationships are based on long term data.

No. 1 Canada	25 mg/kg or less
No. 2 Canada	26 to 45 mg/kg
No. 3 Canada	46 to 100 mg/kg

Composite samples are used for free fatty acids and fatty acid composition analyses. Composites are prepared by combining No. 1 Canada samples by provincial crop district and No. 2 and No. 3 grade samples by province.

This year's harvest survey included 1415 samples from across western Canada. Saskatchewan contributed 691 samples, Manitoba 318 samples, and Alberta and British Columbia 406 samples during the survey period, August 15 to November 30, 2000. Weighting factors used to calculate provincial and western Canadian means are derived from the previous five years average production for each crop district and the 2000 provincial production estimates in Statistics Canada's *Field Crop Reporting Series No. 8*, December 5, 2000. Factors used to calculate grade distributions are taken from crop reports published by the line elevator companies.

Acknowledgments

The CGC acknowledges the cooperation of canola producers, grain handling offices, and oilseed crushing plants in western Canada for supplying the samples of canola harvested in 2000, and the Weather and Crop Surveillance department of the Canadian Wheat Board for providing the review of the 2000 growing season. The CGC recognizes Industry Services grain inspectors for grading the damaged harvest survey samples and GRL staff for conducting the analyses and preparing the report.

Table 2 • Seeded area and production for western Canadian canola

	Seeded area[1] thousand hectares		Production[1] thousand tonnes		Average production[2] thousand tonnes
	2000	1999	2000	1999	1990–1999
Manitoba	951	1004	1488	1708	1184
Saskatchewan	2367	2671	3379	3976	2491
Alberta[3]	1554	1882	2210	3033	2087
Western Canada	**4872**	**5557**	**7077**	**8717**	**5761**

[1] Source—*Field Crop Reporting Series*, *No. 8*, December 5, 2000, Statistics Canada
[2] Source—*Field Crop Reporting Series*, revised final estimates for 1990–99
[3] Includes the part of the Peace River area that is in British Columbia

Figure 2 • 2000 western Canadian canola Progress of harvest by province

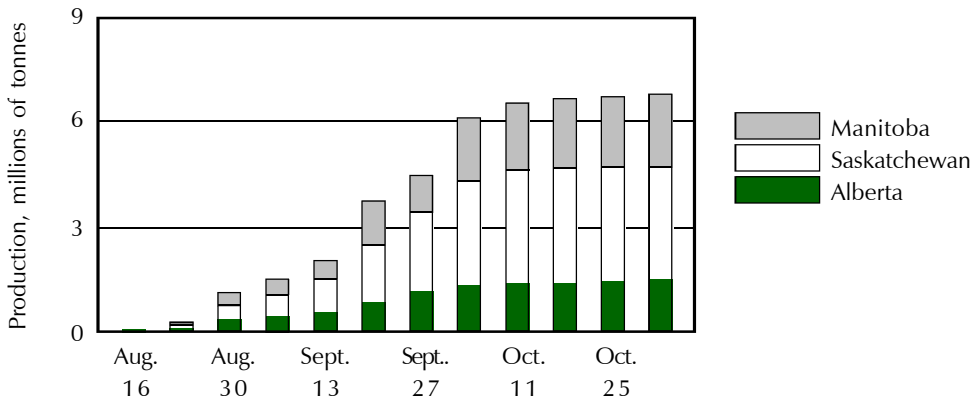
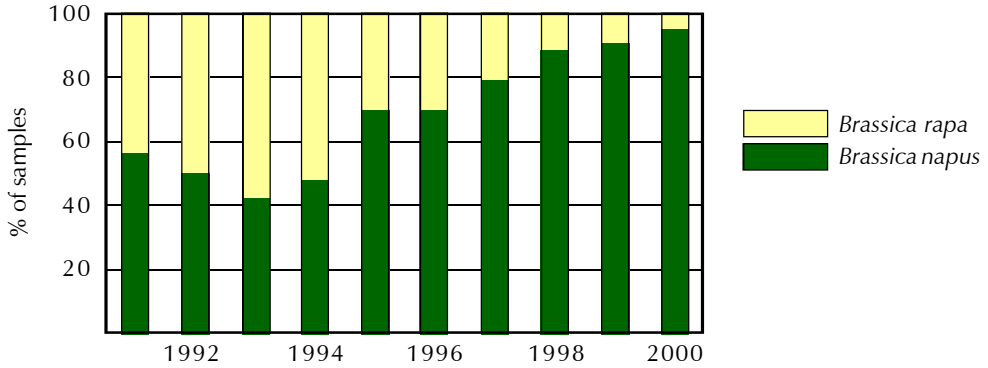


Figure 3 • 2000 harvest survey Proportion of samples identified as *Brassica rapa* and *Brassica napus*



Quality of 2000 canola

Tables 3, 4 and 5 show detailed information on the quality of western Canadian canola harvested in 2000. Table 6 compares the quality of recent canola exports. 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 line elevator companies. To calculate western Canadian averages for each grade, provincial averages are weighted by the Statistics Canada production estimate and the estimate of grade distribution.

Table 3 • 2000 harvest survey
Canola quality data by grade and province

	Number of samples	Oil content[1] %			Protein content[2] %			Chlorophyll content mg/kg		
		Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
No. 1 Canada										
Manitoba	278	42.0	37.2	47.0	22.0	17.3	27.0	12	1	25
Saskatchewan	509	43.7	37.8	48.9	20.4	15.7	25.6	15	0	25
Alberta[3]	304	43.2	36.4	48.6	21.2	16.5	29.0	15	0	25
Western Canada[4]	**1091**	**43.2**	**36.4**	**48.9**	**21.0**	**15.7**	**29.0**	**14**	**1**	**25**
No. 2 Canada										
Manitoba	30	41.3	39.0	44.6	22.6	19.3	24.7	19	3	35
Saskatchewan	152	43.6	39.7	50.2	20.9	16.9	24.5	33	4	46
Alberta[3]	72	42.2	37.0	48.9	22.3	17.6	27.4	32	18	45
Western Canada[4]	**254**	**42.9**	**37.0**	**50.2**	**21.5**	**16.9**	**27.4**	**30**	**3**	**46**
No. 3 Canada										
Manitoba	10	41.5	40.2	44.7	22.4	20.3	24.8	35	8	83
Saskatchewan	30	42.4	36.4	47.4	21.5	18.3	26.4	53	7	90
Alberta[3]	30	42.0	37.6	47.6	22.8	18.2	28.4	58	18	95
Western Canada[4]	**70**	**42.1**	**36.4**	**47.6**	**22.1**	**18.2**	**28.4**	**51**	**7**	**95**

[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 • 2000 harvest survey
Canola quality data by grade and province

	Number of samples[1]	Glucosinolates[2] µmol/g			Free fatty acids %
		Mean	Min.	Max.	
No. 1 Canada					
Manitoba	278	10	5	15	0.37
Saskatchewan	509	9	5	21	0.21
Alberta[3]	304	10	4	24	0.19
Western Canada[4]	**1091**	**10**	**4**	**24**	**0.24**
No. 2 Canada					
Manitoba	30	12	8	16	0.38
Saskatchewan	152	10	7	22	0.20
Alberta[3]	72	12	8	22	0.34
Western Canada[4]	**254**	**11**	**7**	**22**	**0.26**
No. 3 Canada					
Manitoba	10	11	9	14	0.55
Saskatchewan	30	11	4	19	0.37
Alberta[3]	30	12	7	19	0.38
Western Canada[4]	**70**	**11**	**4**	**19**	**0.41**

[1] Composite samples
[2] 8.5% moisture basis; total glucosinolates
[3] Includes part of the Peace River area that is in British Columbia
[4] Values are weighted averages based production by province as estimated by (Statistics Canada).

Table 5 • 2000 harvest survey
Fatty acid composition by grade and province

	Fatty acid composition, %[1]								
	C16:0	C16:1	C18:0	C18:1	C18:2	C18:3	C20:0	C20:1	C20:2
No. 1 Canada									
Manitoba	4.0	0.3	2.0	61.8	19.4	9.2	0.7	1.3	0.1
Saskatchewan	3.9	0.3	2.0	61.6	19.0	9.9	0.7	1.3	0.1
Alberta[4]	3.8	0.3	1.9	61.1	19.0	10.5	0.7	1.4	0.1
Western Canada[5]	**3.9**	**0.3**	**2.0**	**61.5**	**19.1**	**9.9**	**0.7**	**1.4**	**0.1**
No. 2 Canada									
Manitoba	4.0	0.3	2.0	61.1	19.6	9.5	0.7	1.4	0.1
Saskatchewan	3.8	0.3	1.9	61.1	19.2	10.2	0.7	1.4	0.1
Alberta[4]	3.8	0.3	1.9	60.0	19.5	10.9	0.7	1.4	0.1
Western Canada[5]	**3.8**	**0.3**	**1.9**	**60.8**	**19.4**	**10.3**	**0.7**	**1.4**	**0.1**
No. 3 Canada									
Manitoba	3.9	0.3	1.9	59.7	20.3	10.2	0.7	1.5	0.1
Saskatchewan	4.0	0.3	1.9	59.8	19.8	10.7	0.7	1.4	0.1
Alberta[4]	3.9	0.3	1.8	58.9	19.8	11.6	0.7	1.5	0.1
Western Canada[5]	**3.9**	**0.3**	**1.9**	**59.5**	**19.9**	**10.9**	**0.7**	**1.5**	**0.1**

	C22:0	C22:1	C24:0	C24:1	Total saturates[2]	Iodine value[3]
No. 1 Canada						
Manitoba	0.4	0.1	0.2	0.2	7.3	112
Saskatchewan	0.3	0.2	0.2	0.2	7.1	113
Alberta[4]	0.4	0.2	0.1	0.2	6.9	115
Western Canada[5]	**0.4**	**0.2**	**0.2**	**0.2**	**7.1**	**114**
No. 2 Canada						
Manitoba	0.4	0.1	0.2	0.2	7.3	113
Saskatchewan	0.4	0.1	0.2	0.2	6.9	114
Alberta[4]	0.4	0.1	0.2	0.2	7.0	116
Western Canada[5]	**0.4**	**0.1**	**0.2**	**0.2**	**7.0**	**115**
No. 3 Canada						
Manitoba	0.4	0.3	0.2	0.2	7.1	115
Saskatchewan	0.4	0.1	0.2	0.2	7.2	115
Alberta[4]	0.4	0.2	0.2	0.3	7.0	117
Western Canada[5]	**0.4**	**0.2**	**0.2**	**0.2**	**7.1**	**116**

[1] Percentage of total fatty acids including: palmitic (C16:0), palmitoleic (C16:1), stearic (C18:0), oleic (C18:1), linoleic (C18:2), linolenic (C18:3), arachidic (C20:0), gadoleic (C20:1), eicosadienoic (C20:2), behenic (C22:0), erucic (C22:1).lignoceric (C24:0), nervonic (C24:1)

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

[3] Calculated from fatty acid composition

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

[5] Values are weighted averages based on production by province as estimated by (Statistics Canada).

Table 6 • No. 1 Canada canola
Comparison of 2000 harvest survey quality data with recent export shipments

		October 2000 exports		1999–2000 exports	
Quality parameter	2000 survey	Thunder Bay[4]	Vancouver	Thunder Bay	Vancouver
Oil content[1], %	43.2		42.5	41.5	42.6
Protein content[2], %	21.0		21.1	21.6	20.7
Oil-free protein content, %	39.8		39.4	39.6	38.8
Chlorophyll content, mg/kg in seed	14		23	22	24
Total glucosinolates, µmol/g	10		11	12	11
Free fatty acids, %	0.2		0.5	0.6	0.4
Erucic acid, % in oil	0.2		0.2	0.2	0.2
Linolenic acid, % in oil	9.9		10.0	9.8	9.8
Oleic acid, % in oil	61.5		61.2	60.7	61.2
Total saturated fatty acids[3], % in oil	7.1		7.2	7.1	7.1
Iodine value	114		114	114	113

[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)

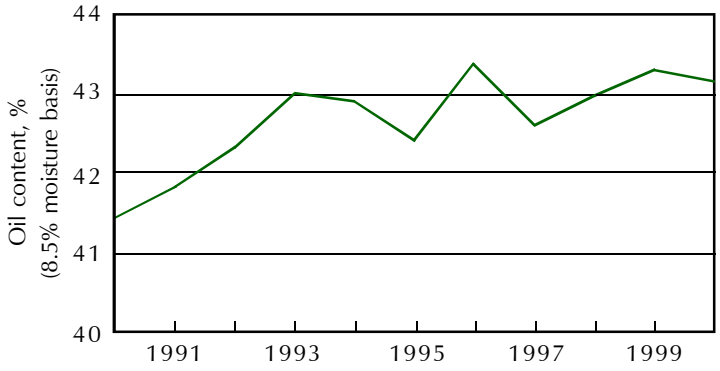
[4] No commercially cleaned, No. 1 Canada canola was shipped from Thunder Bay during October, 2000

Oil content

The oil content of 43.2% for No. 1 Canada canola from the 2000 harvest survey is slightly lower than the 43.3% in 1999 but 0.6 percentage units higher than the 10-year mean of 42.6%. The Manitoba oil content of 42.0% is significantly lower than the 43.7% value for Saskatchewan and the 43.2% value for Alberta. Compared to 1999, mean oil contents have decreased by 0.3 and 0.2 percentage units for Manitoba and Saskatchewan, respectively, while they have increased by 0.1 percentage units for Alberta. The oil content of No. 1 Canada canola from producers across western Canada varies from 36.4% to 48.9%. The mean oil contents decreases with lower grades of canola.

As Table 6 shows, the oil content of canola exports from Vancouver was 42.5% in October 2000, similar to the 1999-00 mean of 42.6%. These shipments consist of seed primarily from the western prairies. The oil content of the remaining Vancouver exports in the 2000-01 shipping season may decrease slightly from the October value if more of the eastern prairie crop enters the system.

No. 1 Canada canola
Oil content of harvest survey samples, 1990–2000

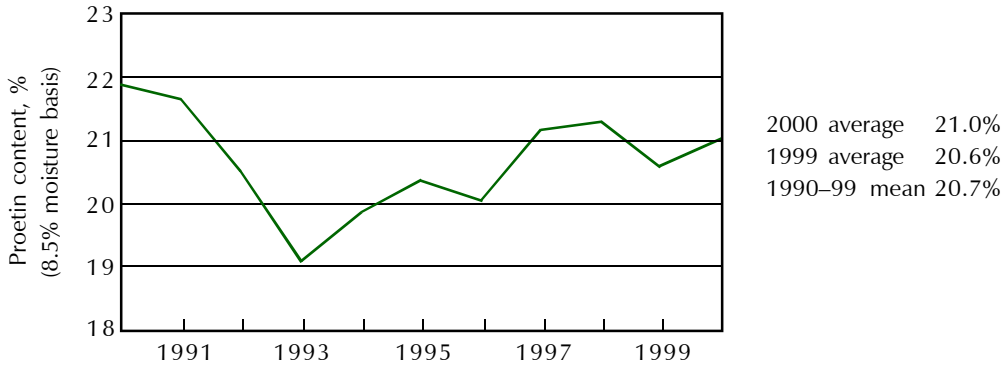


Protein content

The protein content of 21.0% for No. 1 Canada canola from the 2000 harvest survey is higher than both the 20.6% in 1999 and the 10-year mean of 20.7%. The 2000 protein content, calculated on oil-free, 8.5% moisture basis, is 39.8% compared to 39.1% in 1999. The Saskatchewan protein content of 20.4% is significantly lower than the 22.0% in Manitoba and the 21.2% in Alberta. Compared to 1999, mean protein contents have increased by 0.3 percentage units in Manitoba and Alberta, and by 0.5 percentage units in Saskatchewan. Protein content of No. 1 Canada canola samples from producers across western Canada varies from 15.7% to 29.0%. The mean protein contents increases with lower grades of canola.

As Table 6 shows, the protein content of canola exports from Vancouver averaged 21.1% in October 2000 compared to 20.7% during the 1999-00 shipping season. The protein content in Vancouver exports may increase slightly in the remainder of the 2000-01 shipping season if more of the eastern prairie crop enters the system.

No. 1 Canada canola
Protein content of harvest survey samples , 1990–2000



Chlorophyll content

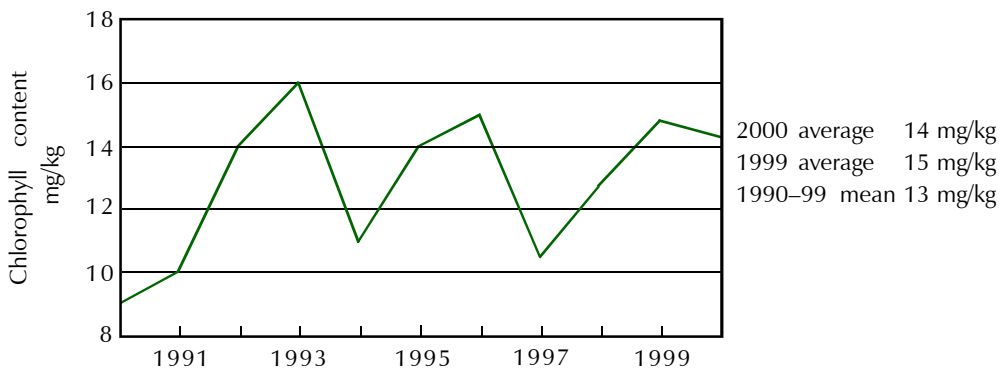
Harvest survey samples of No. 1 Canada canola average 14 mg/kg chlorophyll in 2000, slightly less than 15 mg/kg in 1999 (Table 2). Similarly, the chlorophyll level of 12 mg/kg for Manitoba, is slightly lower than 15 mg/kg for Saskatchewan and Alberta.

Chlorophyll levels for No. 2 Canada canola are averaging 30 mg/kg, lower than 33 mg/kg for No. 2 Canada canola seed in 1999. Samples from late harvested areas of the prairies have higher levels of chlorophyll.

This year, some of the samples graded No. 2 and No. 3 on account of grading factors such as sprout damaged and not by chlorophyll content or distinctly green seeds. For this reason, Manitoba No. 2 and No. 3 grades of canola are lower in mean chlorophyll content than Alberta and Saskatchewan canola of the same grades.

The October 2000 shipments of canola leaving Vancouver had an average chlorophyll level of 23 mg/kg, similar to the average chlorophyll level of 24 mg/kg chlorophyll in the 1999-00 exports. The levels of chlorophyll in Vancouver export shipments are expected to remain similar to 1999-00.

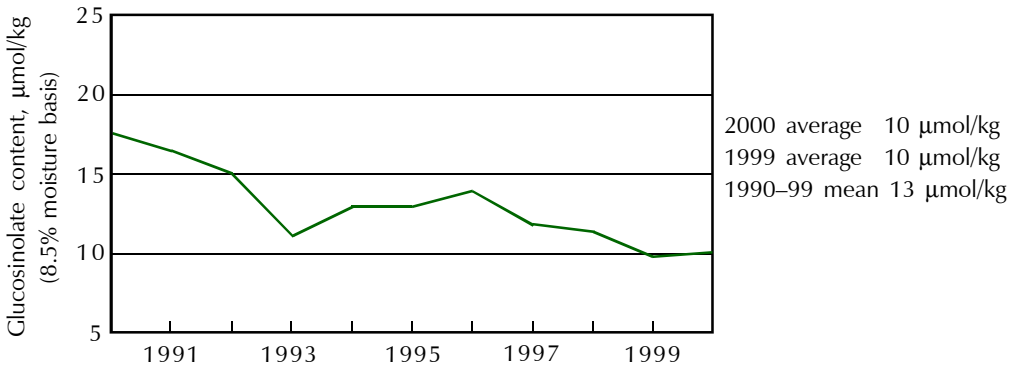
No. 1 Canada canola
Chlorophyll content of harvest survey samples, 1990–2000



Glucosinolate content

For the 2000 harvest survey, the total seed glucosinolate content of No. 1 Canada canola averages 10 µmol/g, similar to the 1999 value. The continuing low level of glucosinolates is due largely to increased use of newer *Brassica napus* varieties in 2000. The average level of total seed glucosinolates, 11 µmol/g, in the October 2000 Vancouver canola exports indicates glucosinolate levels in Vancouver exports should remain similar to those in the 1999-00 shipping season.

No. 1 Canada canola
Total seed glucosinolate content of harvest survey samples, 1990-2000

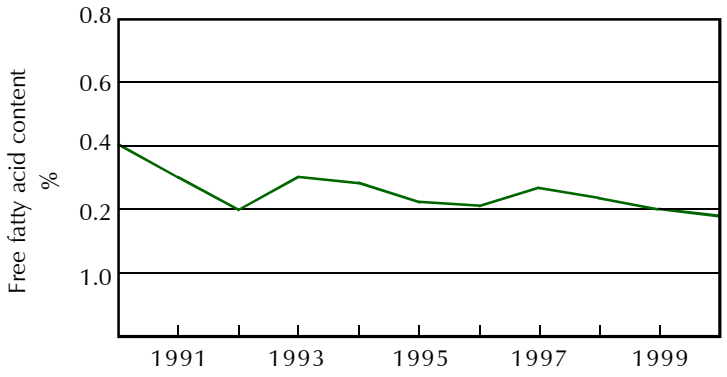


Free fatty acid content

No. 1 Canada canola for 2000 has a mean free fatty acid (FFA) content of 0.24%. This level remains similar to the long-term mean of 0.27%. However, the FFA content of 0.37% for Manitoba canola is significantly higher than 0.21% in Saskatchewan samples and 0.19% in Alberta samples. There is a general trend for higher FFA levels in lower grade canola samples received later in the survey. In some areas, significant rainfall followed by warm temperatures caused varying degrees of sprout damage in swathed canola. Individual samples from these areas are correspondingly higher in FFA than the reported mean (0.6% to 0.9% compared to the 0.2% mean). For 2000-01 exports, FFA levels are expected to be at least 0.5% as shown in Table 6.

The GRL has initiated a study to examine the relationship of FFA and other quality parameters to the incidence of sprouted seed.

No. 1 Canada canola
Free fatty acid content of harvest survey samples, 1990–2000



2000 average 0.2%
1999 average 0.2%
1990–99 mean 0.3%

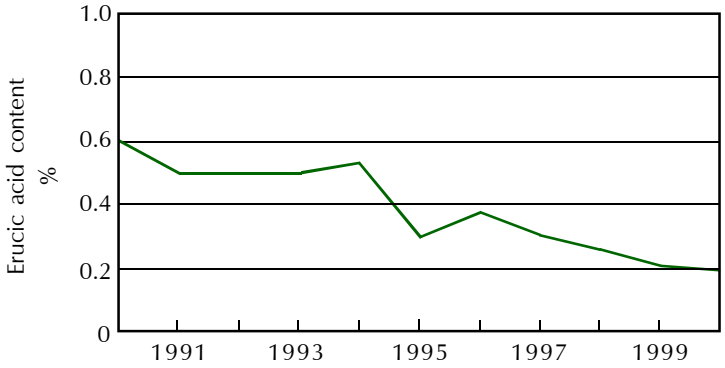
Fatty acid composition

The mean iodine value of canola oil from the 2000 harvest survey is calculated as 114 units compared to 113 units in 1999. The linolenic acid content is 9.9% in 2000, which is slightly higher than the 9.8% in 1999 but lower than the 10-year mean of 10.4%. At 10.5%, the linolenic acid in Alberta canola is higher than in Saskatchewan, 9.9%, and Manitoba, 9.2% samples. The oleic acid content has increased to 61.5% from 60.9% in 1999. Samples collected in 2000 are predominately *Brassica napus* types—97% compared to 91% in 1999.

The average level of erucic acid in the 2000 harvest survey is 0.2%, similar to 1999 and below the 10-year mean of 0.4%. The mean level of saturated fatty acids is 7.1% for 2000, the same as the 1999 value of 7.1% and significantly lower than the record high of 7.4% in 1998. The levels of saturated fatty acids are somewhat higher in Manitoba, 7.3%, and Saskatchewan, 7.1%, than in Alberta, 6.9%.

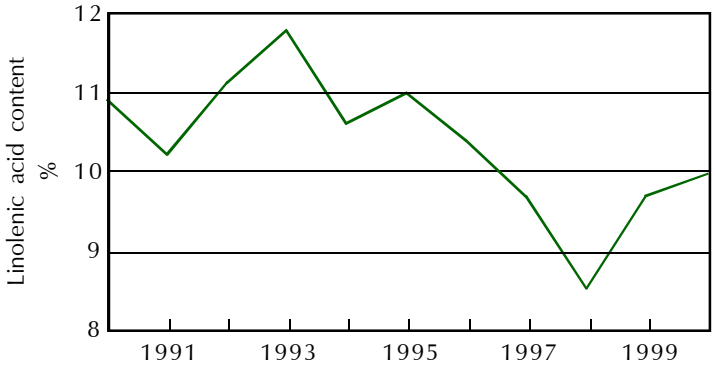
Based on the October 2000 data shown in Table 6, the linolenic acid content for No. 1 Canada canola exports out of Vancouver was slightly higher than the 1999-00 levels. At 114 units, the iodine value for Vancouver canola exports has increased by one unit compared to 1999-00 levels. The level of saturated fatty acids in October 2000 Vancouver canola exports was 7.2%, similar to 1999-00 exports. The levels of erucic acid in exports during the 2000-01 shipping season will likely remain near 0.2%.

No. 1 Canada canola
Erucic acid content of harvest survey samples, 1990–2000



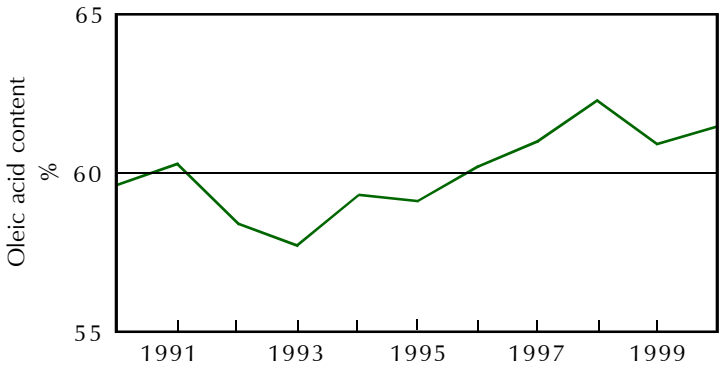
2000 average 0.2%
1999 average 0.2%
1990–99 mean 0.4%

No. 1 Canada canola
Linolenic acid content of harvest survey samples, 1990–2000



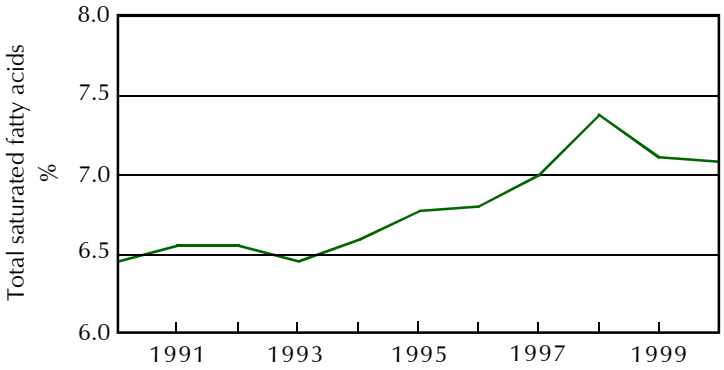
2000 average 9.9%
1999 average 9.8%
1990–99 mean 10.4%

No. 1 Canada canola
Oleic acid content of harvest survey samples, 1990–2000



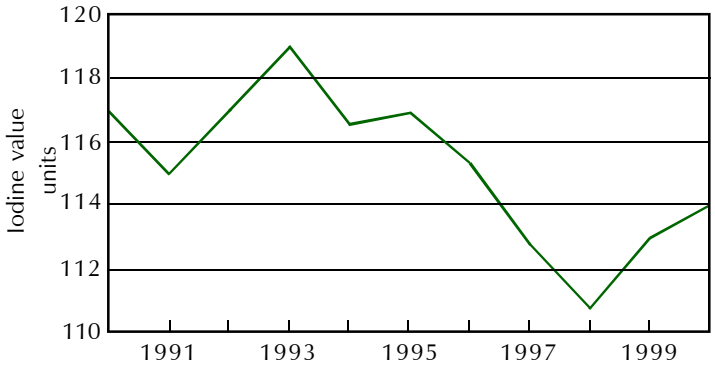
2000 average 61.5%
1999 average 60.9%
1990–99 mean 59.9%

No. 1 Canada canola
Total saturated fatty acids of harvest survey samples, 1990-2000



2000 average	7.1%
1999 average	7.1%
1990–99 mean	6.8%

No. 1 Canada canola
Iodine value of harvest survey samples, 1990-2000



2000 average	114
1999 average	113
1990–99 mean	115