Quality of western Canadian canola

1999

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Summary

The 1999 western Canadian canola crop is above average in oil content. Compared to 1998, the oil content, 43.3%, is higher while the protein content, 20.6%, is lower. The oil content was 1.0% higher and the protein content 0.3% lower than the 10-year means.

Chlorophyll content, however, is higher than last year. The mean chlorophyll content for No. 1 Canada canola was 15 mg/kg, higher than the 13 mg/kg in 1998.

Despite a continuing trend toward more *Brassica napus* plantings, the fatty acid composition showed a significant shift back towards pre-1998 levels. With overall cooler growing conditions, the oil from the 1999 harvest survey samples showed

- higher iodine value, 113 units
- higher linolenic acid content, 9.8%
- decrease in total saturated fatty acids, 7.1%
- lower oleic acid content, 60.9%

Both the erucic acid, 0.2%, and the total glucosinolates, 10 µmol/g, were lower than those in 1998.

Table 1 • Quality data for 1999 harvest survey No. 1 Canada canola

Quality parameter	1999	1998	1989–98 Mean
Oil content[1], %	43.3	43.0	42.3
Protein content[2], %	20.6	21.3	20.9
Oil-free protein content[2] %	39.1	40.2	38.9
Chlorophyll content, mg/kg in seed	15	13	12
Total glucosinolates[1], µmol/g	10	11	14
Free fatty acids, %	0.2	0.2	0.3
Erucic acid, % in oil	0.2	0.3	0.5
Linolenic acid, % in oil	9.8	8.5	10.4
Oleic acid, % in oil	60.9	62.3	59.9
Total saturated fatty acids[3], % in oil	7.1	7.4	6.7
Iodine value	113	111	115

[1] 8.5% moisture basis

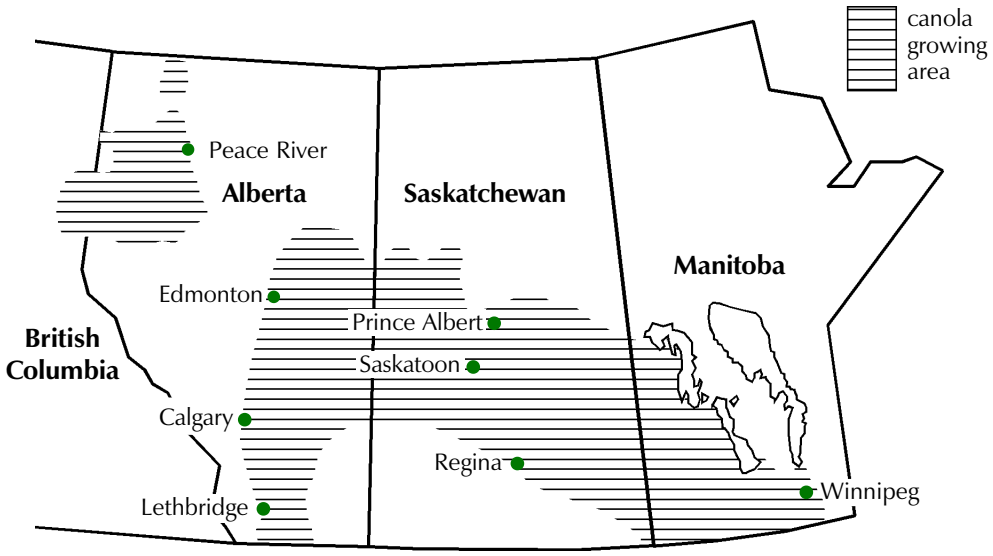
[2] N x 6.25; 8.5% moisture basis

[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 information on the major quality parameters for the 1999 crop of western Canadian canola. Included is information on the oil, protein, chlorophyll, glucosinolate, free fatty acid content and the fatty acid composition of harvest samples. Quality data are from analyses of canola samples submitted to the Grain Research Laboratory 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 5.56 million hectares of canola in 1999, which was a two percent increase from last year's area. The final 1999 yield estimate of 1600 kg/ha was well above both the 1400 kg/ha reported in 1998 and the ten-year values of 1297 kg/ha. With above average yields, total canola production in western Canada was a record 8.72 million tonnes according to estimates by Statistics Canada reported in *Field Crop Reporting Series No. 8,* December 3, 1999. Saskatchewan accounted for 46 percent of production in 1999, Alberta for 34 percent and Manitoba for 20 percent.

Weather review

The weather review for the 1999 canola harvest survey was provided by Weather and Crop Surveillance department of the Canadian Wheat Board. Late seeding and cool conditions over much of the prairie region resulted in a late harvest. Cool, moist growing conditions, however, resulted in record yields for canola.

Seeding

The planting of canola in 1999 started earlier than normal in those parts of the Prairies which had above normal temperatures in the second half of April. The warm, dry conditions continued into the first week of May and permitted some regions, especially southern Alberta and southeastern Manitoba, to seed a great portion of the canola crop at this time. For the rest of the prairie region, especially eastern Saskatchewan and western Manitoba, seeding was delayed by heavier than normal snow cover and excessive soil moisture levels. Over most of the southern and central Prairies, May precipitation was significantly above normal, while in northern regions precipitation was closer to normal.

Temperatures in May also turned cooler with most prairie locations reporting deviations of one to two degrees below normal. These conditions slowed seeding progress and resulted in serious planting delays. Despite these delays, over two-thirds of the canola crop was planted by the last week in May. The wet conditions continued through the first half of June, which resulted in continued planting delays in the eastern half of the Prairies. The waterlogged soil conditions in the eastern Prairies resulted in that area's seeding being delayed until early June. As a result of the prolonged seeding period, canola crop development varied greatly throughout the prairie region.

Growing conditions

Wet conditions persisted through June across most of the Prairies. In areas where crops had emerged, the moisture resulted in above average stands with excellent yield potential. The frequent rainfall continued through July which helped maintain crop conditions.

Temperatures remained cooler than normal through June and July, with stations reporting monthly averages ranging from 0.5°C to 3.0°C below normal. The coolest temperatures were in the western regions of the Prairies during June and July.

The cooler weather during late July and early August provided ideal conditions for canola flowering and the yield potential in most regions was above normal. August brought a change in the weather as rains generally tapered off and temperatures climbed to normal or above normal across the Prairies. The warm temperatures helped encourage crop development, although most regions were still 10 to 15 days behind normal development at the end of the month.

The only exception to the wetter than normal conditions in June and July was the Peace River region of Alberta. This region received below normal precipitation during June, which caused stress to canola crops. Dry conditions persisted in this region through July and August reducing yields significantly.

Harvest conditions

The lateness of the canola crop across the prairie region raised concerns about the potential for severe frost damage. The first sub-zero temperatures were reported in the foothills of southern and central Alberta and east-central Alberta during the first week of September. During the same week parts of northern and west-central Saskatchewan reported light frosts.

The remainder of the Prairies did not report freezing temperatures until the second half of September. In most regions, the first frost in 1999 was very close to or after the average frost date for the region.

Harvest began in southeastern Manitoba and southern Alberta by the middle of August, but these regions were the exception. The majority of the western Canadian canola harvest started in September and finished in late October. Precipitation during September and October was below normal, especially in the western half of the Prairies. This helped maintain the quality of the canola despite the prolonged harvest. The eastern half of the Prairies received normal to above normal precipitation during September and October, which resulted in some deterioration of crop quality.

Harvest survey samples

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. The 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.

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

The grades and chlorophyll content relationships are based on long term data. Samples with significant levels of other damage factors are graded by Industry Services grain inspectors.

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 Canada samples by province.

This year's harvest survey included 1423 samples from across western Canada. Manitoba contributed 277 samples, Saskatchewan 657 samples and Alberta and Peace River area in British Columbia 489 samples during the harvest survey period, August 15 to November 15, 1999. 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 1999 provincial production estimates in Statistics Canada's *Field Crop Reporting Series No. 8*, December 3, 1999. Factors used to calculate grade distributions are taken from crop reports published by the line elevator companies.

Acknowledgments

The Grain Research Laboratory acknowledges the cooperation of canola producers, grain handling offices, and oilseed crushing plants in western Canada for supplying the samples of canola harvested in 1999, the assistance of Industry Services grain inspectors for grading the doubtful samples, the Weather and Crop Surveillance department of the Canadian Wheat Board for providing the review of the 1999 growing season, and the GRL staff, in particular Ken Howard, Michelle Kisilowsky, Barry Misener, and Bert Siemens, for their technical assistance and for conducting the analyses.

Table 2 • Seeded area and production for the 1999 and 1998 western Canadian canola crop and average annual canola production for the 10-year period 1989 to 1998

	Seeded area[1] thousand hectares		Production[1] thousand tonnes		Average production[2] thousand tonnes
	1999	1998	1999	1998	1989–98
Manitoba	1004	1113	1709	1803	1054
Saskatchewan	2671	2529	3976	3232	2230
Alberta[3]	1882	1801	3033	2533	1930
Western Canada	**5556**	**5443**	**8717**	**7568**	**5214**

[1] Source—*Field Crop Reporting Series*, *No. 8*, December 3, 1999, Statistics Canada
[2] Source—*Field Crop Reporting Series*, revised final estimates for 1989–98
[3] Includes the part of the Peace River area that is in British Columbia

Figure 2 • Progress of harvest of 1999 western Canadian canola by province

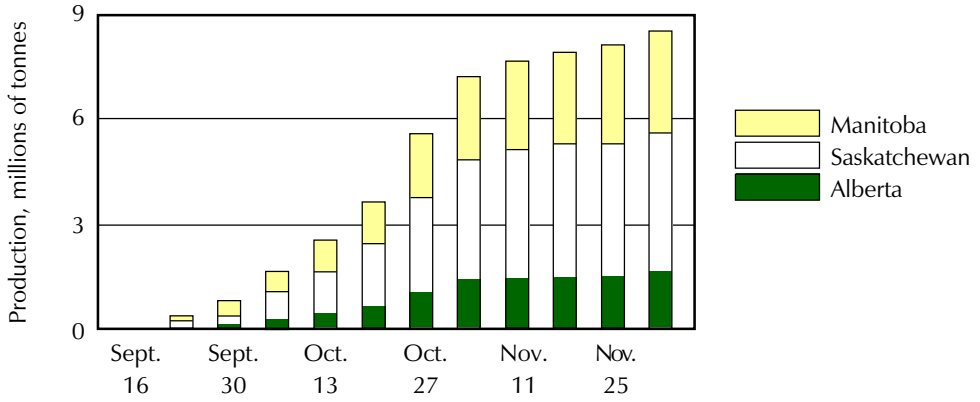
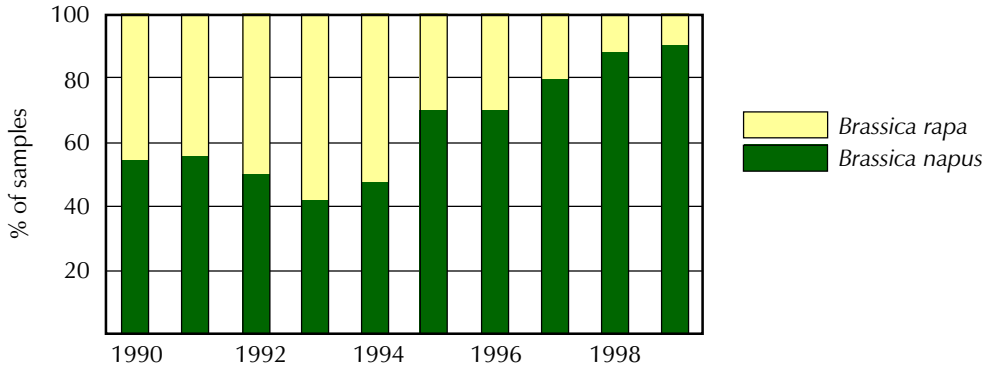


Figure 3 • Proportion of *Brassica rapa* and *Brassica napus* samples in GRL harvest surveys



Quality of 1999 canola

Tables 3, 4 and 5 show detailed information on the quality of Canadian canola harvested in 1999. Table 6 compares the quality of recent canola exports. The numbers of samples in each grade or province may not represent the actual 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 • Quality data for 1999 canola harvest survey by grade and province

	Number of samples tested	Oil content[1] %			Protein content[2] %			Chlorophyll content mg/kg		
		Mean	Min.	Max.	Mean	Min.	Max.	Mean	Min.	Max.
No. 1 Canada										
Manitoba	217	42.3	36.1	46.2	21.7	18.2	25.7	15	3	25
Saskatchewan	508	43.9	37.0	49.3	19.9	16.1	26.3	15	1	25
Alberta[3]	403	43.1	38.1	48.7	20.9	16.7	26.2	13	0	25
Western Canada[4]	**1128**	**43.3**	**36.1**	**49.3**	**20.6**	**16.1**	**26.3**	**15**	**0**	**25**
No. 2 Canada										
Manitoba	46	41.3	37.2	45.0	22.5	18.9	25.3	32	18	45
Saskatchewan	115	43.0	36.2	47.0	20.8	16.6	24.7	33	22	45
Alberta[3]	74	43.5	39.3	48.5	20.7	17.0	25.8	32	16	45
Western Canada[4]	**235**	**42.9**	**36.2**	**48.5**	**21.0**	**16.6**	**25.8**	**33**	**16**	**45**
No. 3 Canada										
Manitoba	14	42.1	40.4	46.1	21.7	18.3	24.2	57	46	96
Saskatchewan	34	42.8	38.2	45.6	20.8	18.5	25.7	56	39	98
Alberta[3]	12	42.8	39.4	45.1	21.2	18.8	24.6	56	44	94
Western Canada[4]	**60**	**42.7**	**38.2**	**46.1**	**21.1**	**18.3**	**25.7**	**56**	**39**	**98**

[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 estimated production by province (Statistics Canada).

Table 4 • Quality data for 1999 canola harvest survey by grade and province

	Number of samples in composite	Glucosinolates[1] µmol/g			Free fatty acids %
		Mean	Min.	Max.	
No. 1 Canada					
Manitoba	217	11	7	22	0.30
Saskatchewan	508	9	4	22	0.20
Alberta[2]	403	10	4	29	0.23
Western Canada[3]	**1128**	**10**	**4**	**29**	**0.23**
No. 2 Canada					
Manitoba	46	12	8	17	0.31
Saskatchewan	115	11	7	21	0.18
Alberta[2]	74	11	7	21	0.21
Western Canada[3]	**235**	**11**	**7**	**21**	**0.20**
No. 3 Canada					
Manitoba	14	11	8	13	0.29
Saskatchewan	34	11	7	18	0.25
Alberta[2]	12	12	8	17	0.44
Western Canada[3]	**60**	**11**	**7**	**18**	**0.32**

[1] 8.5% moisture basis; total glucosinolates

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

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

Table 5 • Fatty acid composition for the 1999 harvest survey canola 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	60.7	19.5	9.6	0.7	1.5	0.1
Saskatchewan	4.0	0.3	2.0	60.8	19.3	9.7	0.7	1.4	0.1
Alberta[4]	3.8	0.3	1.9	61.1	18.9	10.0	0.7	1.4	0.1
Western Canada[5]	**3.9**	**0.3**	**2.0**	**60.9**	**19.2**	**9.8**	**0.7**	**1.4**	**0.1**
No. 2 Canada									
Manitoba	4.0	0.3	1.9	59.5	19.9	10.0	0.7	1.7	0.1
Saskatchewan	4.0	0.3	1.9	60.1	19.7	9.9	0.7	1.5	0.1
Alberta[4]	3.9	0.3	1.9	61.1	19.0	10.0	0.7	1.4	0.1
Western Canada[5]	**4.0**	**0.3**	**1.9**	**60.2**	**19.6**	**9.9**	**0.7**	**1.5**	**0.1**
No. 3 Canada									
Manitoba	4.1	0.3	1.8	58.9	20.3	10.4	0.7	1.6	0.1
Saskatchewan	4.1	0.3	1.9	60.0	19.6	10.2	0.7	1.5	0.1
Alberta[4]	4.0	0.3	2.0	59.4	19.2	11.0	0.7	1.5	0.1
Western Canada[5]	4.1	0.3	1.9	59.6	19.6	10.5	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	0.2	0.1	0.2	7.2	113
Saskatchewan	0.4	0.2	0.1	0.2	7.2	113
Alberta[4]	0.4	0.2	0.1	0.3	7.0	113
Western Canada[5]	**0.4**	**0.2**	**0.1**	**0.2**	**7.1**	**113**
No. 2 Canada						
Manitoba	0.4	0.3	0.1	0.3	7.2	114
Saskatchewan	0.4	0.3	0.1	0.3	7.3	114
Alberta[4]	0.4	0.1	0.1	0.3	7.0	113
Western Canada[5]	**0.4**	**0.2**	**0.1**	**0.3**	**7.2**	**114**
No. 3 Canada						
Manitoba	0.4	0.2	0.1	0.3	7.2	115
Saskatchewan	0.4	0.2	0.1	0.3	7.2	114
Alberta[4]	0.4	0.2	0.1	0.4	7.3	115
Western Canada[5]	**0.4**	**0.2**	**0.1**	**0.3**	**7.2**	**115**

[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 estimated production by province (Statistics Canada).

Table 6 • Quality of No. 1 Canada canola
Comparison of data for 1999 harvest survey with data for recent export shipments

Quality parameter	1999 survey	October 1999 exports		1998–99 exports	
		Thunder Bay	Vancouver	Thunder Bay	Vancouver
Oil content[1], %	43.3	41.5	42.7	41.1	41.8
Protein content[2], %	20.6	21.2	20.7	22.2	21.6
Oil-free protein content, %	39.1	38.8	38.8	40.3	39.7
Chlorophyll content, mg/kg in seed	15	16	23	20	17
Total glucosinolates, µmol/g	10	12	11	12	12
Free fatty acids, %	0.2	0.6	0.3	0.6	0.5
Erucic acid, % in oil	0.2	0.2	0.2	0.3	0.3
Linolenic acid, % in oil	9.8	9.5	9.7	8.5	8.7
Oleic acid, % in oil	60.9	61.1	61.2	62.4	62.3
Total saturated fatty acids[3], % in oil	7.1	7.2	7.2	7.3	7.2
Iodine value	113	113	113	111	111

[1] 8.5% moisture basis

[2] N x 6.25; 8.5% moisture basis

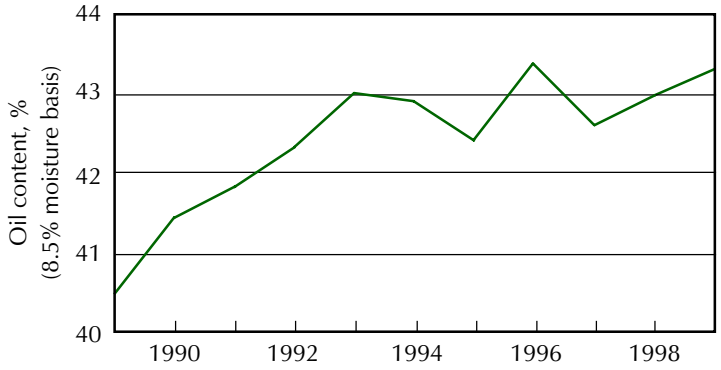
[3] Total saturated fatty acids are the sum of palmitic (C16:0), stearic (C18:0), arachidic (C20:0), behenic (C22:0), and lignoceric (C24:0).

Oil content

The oil content of 43.3% for No. 1 Canada canola from the 1999 harvest survey is higher than the 43.0% in 1998 and 1.0% higher than the 10-year mean of 42.3% as shown in Table 1. The Manitoba oil content of 42.3% is significantly lower than the 43.9% value for Saskatchewan and the 43.1% value for Alberta. Compared to 1998, mean oil contents have decreased by 0.8% for Manitoba while they have increased by 0.7% and 0.6% for Saskatchewan and Alberta, respectively. No. 1 Canada canola from producers across western Canada varied from 36.1% to 49.3%. The mean oil contents decreased with lower grades of canola.

As Table 6 shows, the oil content of canola exports from Vancouver was 42.7% by October 1999, about 1% higher than the 1998–99 mean. These shipments consisted of seed primarily from the western Prairies. The oil content of the remaining Vancouver exports in the 1999–2000 shipping season may decrease slightly from the October value if more of the eastern Prairie crop enters the system. The oil content of October 1999 Thunder Bay canola exports, represented by a single sample, was 41.5%, slightly higher than the 1998–99 average of 41.1%. The mean oil content of Thunder Bay canola exports could fall to around 41% during the 1999–2000 shipping season as more of the lower oil content Manitoba seed is sent to eastern export position.

Oil content of harvest survey samples of No. 1 Canada canola, 1989–99



1999 average	43.3%
1998 average	43.0%
1989–98 mean	42.3%

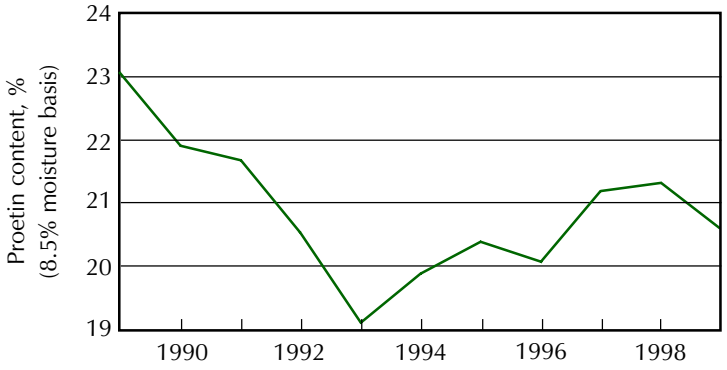
Protein content

The seed protein content of 20.6% for No. 1 Canada canola from the 1999 harvest survey is lower than the 21.3% in 1998 and slightly below the 10-year mean of 20.9%. The 1999 protein content calculated on an oil-free, 8.5% moisture basis is 39.1% compared to 40.2 % in 1998. The Saskatchewan protein content of 19.9% is significantly lower than the 21.7% in Manitoba and the 20.9% in Alberta. Compared to 1998, mean protein contents have increased by 0.1% in Manitoba and decreased by 0.9% in each of Alberta and Saskatchewan. No. 1 Canada canola samples from producers across western Canada varied in protein content from 16.1% to 26.3%. The mean protein contents increased with lower grades of canola.

As Table 6 shows, the protein content of canola exports from Vancouver averaged 20.7% in October 1999 compared to 21.6% during the 1998–99 shipping season. The protein content in Vancouver exports could be a bit higher in the remainder of the 1999–2000 shipping season if more of the eastern prairie crop enters the system. The average protein

content of canola exports from Thunder Bay decreased 1.0% to 21.2% by October 1999. The value for the remainder of the 1999–2000 shipping season could be slightly higher if more of the high protein content Manitoba seed moves to export position at Thunder Bay.

Protein content of harvest survey samples of No. 1 Canada canola, 1989–99



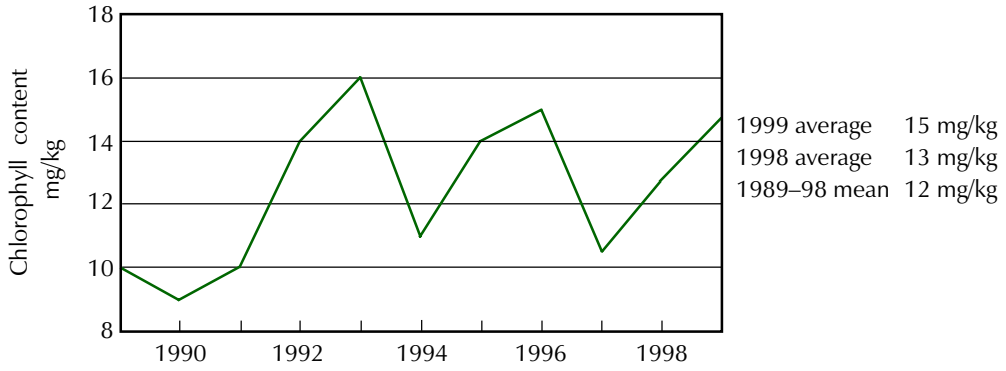
1999 average	20.6%
1998 average	21.3%
1989–98 mean	20.9%

Chlorophyll content

Farm deliveries of No. 1 Canada canola averaged 15 mg/kg chlorophyll in the 1999 survey, higher than the 13 mg/kg in the 1998 harvest, as shown in Table 1. The chlorophyll levels of 13 mg/kg for Alberta, which contains the lowest proportion of *Brassica napus* seed, were slightly lower than the 15 mg/kg for Saskatchewan and Manitoba. Chlorophyll levels for No. 2 Canada canola are averaging 33 mg/kg, higher than the 29 mg/kg for No. 2 Canada canola seed in 1998. Samples from late seeded areas of the Prairies have higher levels of chlorophyll.

The October 1999 shipments of canola leaving Vancouver had an average chlorophyll level of 23 mg/kg, significantly higher than the average chlorophyll level of 17 mg/kg in the 1998–99 exports. The levels of chlorophyll in Vancouver export shipments are expected to be significantly higher than in the previous few years. A combination of the high proportion of *B. napus* seed grown coupled with the long cool maturation period led to higher levels of chlorophyll. As of early October, the chlorophyll content of Thunder Bay canola exports remained relatively low at 16 mg/kg. The chlorophyll levels, however, of the 1999–2000 Thunder Bay exports are expected to increase as more of the late harvested Manitoba seed moves into export position.

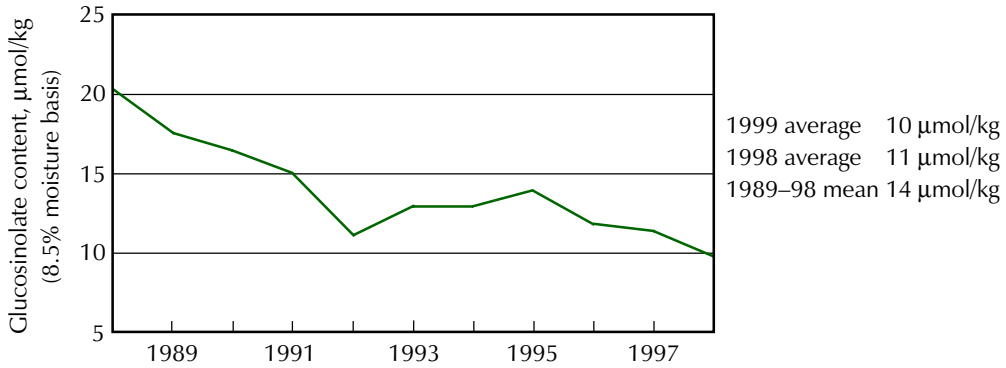
Chlorophyll content of harvest survey samples of No. 1 Canada canola, 1989–99



Glucosinolate content

For the 1999 survey, the total glucosinolate content of No. 1 Canada canola averaged 10 µmol/g, slightly lower than the 1998 value of 11 µmol/g. The continuing low level of glucosinolates is due largely to increased use in 1999 of new *Brassica napus* varieties. The average level of total seed glucosinolates, 11 µmol/g, in the October 1999 Vancouver canola exports is lower than the 12 µmol/g of the 1998–99 shipping season. Glucosinolate levels in Vancouver exports should remain similar to those in the 1998–99 shipping season. The average level of total glucosinolates in the October 1999 Thunder Bay exports was similar to the 1998–99 level of 12 µmol/g.

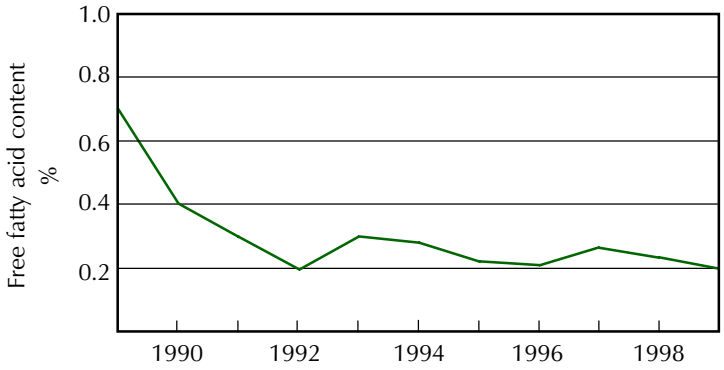
Total seed glucosinolate content of harvest samples of No. 1 Canada canola, 1989–99



Free fatty acid content

The 1999 harvest survey of No. 1 Canada canola had a mean free fatty acid (FFA) content of 0.23%. This level remains similar to the long term mean of 0.31%. The FFA content, 0.30%, of Manitoba seed is slightly higher than the 0.20% in Saskatchewan samples and the 0.23% in Alberta samples. The FFA content of late harvested material could be significantly higher. For exports, FFA levels are expected to remain at levels similar to 1998–99 as shown in Table 6.

Free fatty acid content of harvest survey samples of No. 1 Canada canola, 1989–99



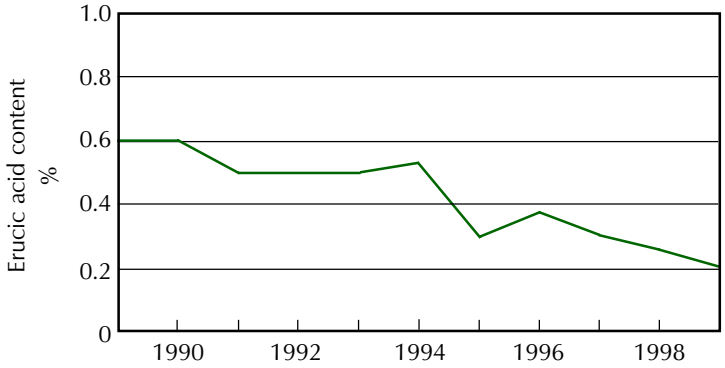
Fatty acid composition

The mean iodine value of the canola oil from 1999 harvest survey samples was 113 units compared to 111 units in 1998. The linolenic acid was 9.8% in 1999, which was higher than 1998 at 8.5% but lower than the 10-year mean at 10.4%. At 10.0%, the linolenic acid in Alberta was higher than in Saskatchewan, 9.7%, and Manitoba, 9.6%. The oleic acid content of the 1999 crop decreased to 60.9% from 62.3% in 1998. The growing conditions in 1999 are likely responsible for the changes in the oleic acid, linolenic acid and iodine value as there were similar percentages of *Brassica napus* samples in the 1999 and 1998 surveys. Samples from the GRL harvest survey indicate the 1999 crop was comprised of 91% *Brassica napus* types compared to 89% in 1998.

The average level of erucic acid in the 1999 crop was 0.2%, slightly lower than the 0.3% in 1998 and well below the 10-year mean of 0.5%. The mean level of saturated fatty acids is 7.1% in 1999, significantly lower than the 7.4% in 1998. The levels of saturated fatty acids are slightly higher in Manitoba, 7.2%, and Saskatchewan, 7.2%, than in Alberta, 7.0%.

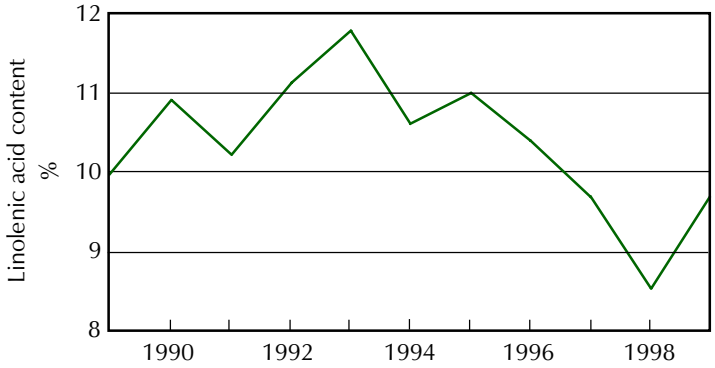
Based on the October 1999 data in Table 6, the linolenic acid content for both Thunder Bay and Vancouver No. 1 Canada canola exports has increased by 1.0% compared to the 1998–99 levels. At 113 units, the iodine value for both Thunder Bay and Vancouver canola exports has increased by 2 units compared to the 1998–99 levels. The level of saturated fatty acids in October 1999 Thunder Bay and Vancouver canola exports was 7.2%, similar to the levels in 1998–99 exports. The levels of erucic acid in both Thunder Bay and Vancouver exports during the 1999–2000 shipping season will likely remain near 0.2%.

Erucic acid content of harvest survey samples of No. 1 Canada canola, 1989–99



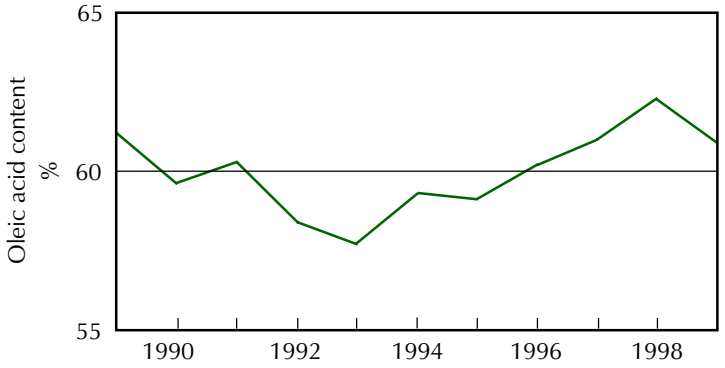
1999 average	0.2%
1998 average	0.3%
1989–98 mean	0.4%

Linolenic acid content of harvest survey samples of No. 1 Canada canola, 1989–99



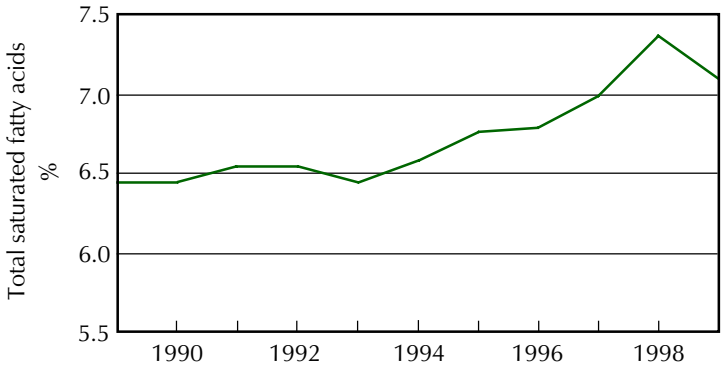
1999 average	9.8%
1998 average	8.5%
1989–98 mean	10.4%

Oleic acid content of harvest survey samples of No. 1 Canada canola, 1989–99



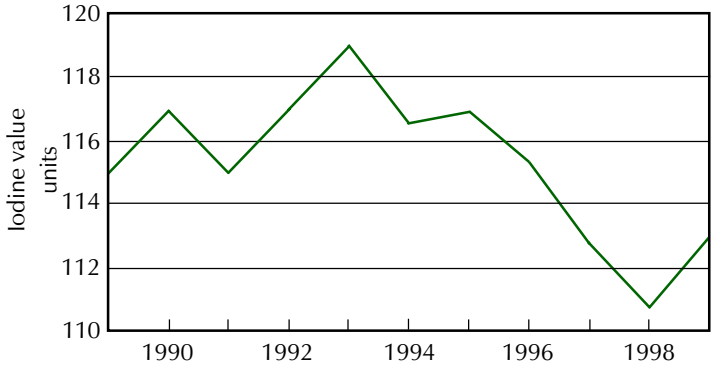
1999 average	60.9%
1998 average	62.3%
1989–98 mean	59.9%

Total saturated fatty acids of harvest survey samples of No. 1 Canada canola, 1989–99



1999 average	7.1%
1998 average	7.4%
1989–98 mean	6.7%

Iodine value of harvest survey samples of No. 1 Canada canola, 1989–99



1999 average	113
1998 average	111
1989–98 mean	116

Methods

Chlorophyll content

Chlorophyll content is determined by International Organization for Standardization method reference number ISO 10519:1992(E), Rapeseed—Determination of chlorophyll content—Spectrometric method. Results are expressed as milligrams per kilogram (mg/kg), seed basis.

Fatty acid composition

Fatty acid composition is determined by the International Organization for Standardization method reference number ISO 5508:1990 (E), Animal and vegetable fats and oils—Analysis by gas chromatography of methyl esters of fatty acids. A 15m by 0.32mm column with a 0.25µm Supelcowax 10 coating is used. Major and important fatty acids are reported although samples may also contain as much as 1% of other minor fatty acids which are included in the calculations.

Free fatty acid content

Free fatty acid content is determined by a method adapted from the procedure of Ke et al, *Analytica Chemica Acta* 99:387–391 (1978), and is expressed as a percentage by weight of fatty acid of a specified molecular weight in the oil. Oleic acid with a molecular weight of 282 is used.

Glucosinolate content

Glucosinolate content is determined by International Organization for Standardization method reference number ISO 9167-391(E), Rapeseed—Determination of glucosinolate content—Part 1: Method using high performance liquid chromatography. Results are total seed glucosinolates expressed as micromoles per gram (µmol/g), calculated to an 8.5% moisture basis for canola and on a dry matter basis for all mustard seeds.

Iodine value

Iodine value is a measure of unsaturation calculated from the fatty acid composition according to AOCS Recommended Practice Cd 1c-85 as re-approved 1993 and updated 1995, Calculated Iodine Value.

Oil content

Oil content is determined by nuclear magnetic resonance (NMR) according to the International Organization for Standardization, reference number ISO 10565:1992(E) Oilseeds—Simultaneous determination of oil and moisture contents—Method using pulsed nuclear magnetic resonance spectroscopy. A Bruker NMS 110 Minispec NMR Analyzer calibrated with the appropriate oilseed samples extracted with petroleum ether is used. Results are reported as percentage, calculated to a specified moisture basis. Canola is calculated to an 8.5% moisture basis, and flaxseed, solin, soybean and all mustard seeds are calculated on a dry matter basis.

Protein content

Protein content is determined by the AOCS Official Method Ba 4e-93, revised 1995, Combustion method for determination of crude protein, using a LECO FP-428 Nitrogen and Food Protein Determinator. Results are reported as percentage, N x 6.25, calculated to specified moisture basis. Canola is calculated to an 8.5% moisture basis, and flaxseed, solin, soybean and all mustard seeds are calculated on a dry matter basis.