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# Quality of western Canadian solin 2001

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## Introduction

This report presents quality data and information based on the CGC 2001 harvest survey of western Canadian solin. Quality data presented includes oil content, protein content, and fatty acid composition of solin harvest survey samples. Quality data are based on analyses of solin samples forwarded to the CGC Grain Research Laboratory (GRL).

Solin is the name adopted by the Flax Council of Canada to distinguish yellow seeded, low linolenic acid flaxseed from conventional brown flaxseed.

*See* (http://www.flaxcouncil.ca/38.htm).

## Summary

The 2001 Canadian Grain Commission (CGC) harvest survey of western Canadian solin shows only slight changes in the mean oil and protein contents. The 2001 oil content, 44.8%, is 0.2% higher while the protein content, 22.3%, is 0.2% lower than in 2000. However, the linoleic acid content, 69.7%, is significantly lower than the 72.0% in 2000. While the 2001 oil and protein contents were similar to the long-term (1993-2000) means for the solin survey, the linoleic acid content is 1.8% below the long-term mean of 71.5%.

## Weather and production review

### Weather review

The weather and growing conditions for the 2001 solin harvest survey were similar to those for the flaxseed survey. The Weather and Crop Surveillance department of the Canadian Wheat Board provided the weather review for the 2001 harvest survey.

### Seeding

Overall, 2001 seeding progress was ahead of normal for the prairie crop, although not as rapid as what was experienced in 2000.

Dry conditions in Alberta and a large portion of Saskatchewan during the fall and winter of 2000 resulted in very poor soil moisture levels going into the 2001 planting season. Exceptions to this were Manitoba and southeastern Saskatchewan where above normal precipitation during the fall of 2000 provided ample soil moisture reserves for spring planting. Dry, warm conditions during late April and May resulted in rapid seeding of most crops in the western Prairies.

However, planting of some smaller seeded crops such as solin was delayed in some areas due to the lack of soil moisture. In the driest areas, plant populations were reduced markedly by the extreme conditions as germination was quite uneven. Planting in the western Prairies was over 50 percent complete by the middle of May and was wrapped up by the end of the month. The excess soil moisture and persistent precipitation in eastern areas slowed planting until late May and into June in parts of southeastern Saskatchewan and Manitoba.

### Growing conditions

Cooler temperatures through most of the month of June kept crop stress to a minimum, despite the very dry conditions. Rains during the month of June were isolated to the eastern Prairies with only scattered rainfall reported in western areas. June precipitation ranged from significantly above normal in the eastern Prairies to well below normal in southern Alberta. Central and northern Alberta, including the Peace River region, received

moderate amounts of precipitation during the last half of the month which provided much needed moisture for crops. The rainfall caused some problems as ungerminated seeds started to grow and many fields had two to three different growth stages for the remainder of the season. Other than the southeast, Saskatchewan remained extremely dry and crop conditions began to deteriorate rapidly by the end of the month.

Above normal temperatures during the first two weeks of July caused severe stress to all crops and yield potentials declined in the western areas of the Prairies. Most locations in Saskatchewan and southern Alberta received less than fifty percent of normal precipitation for the month. Northern Alberta received frequent moderate amounts of precipitation during the month, which helped improve the condition of the crop in that region. Moderate to heavy rainfall events covered parts of Manitoba and eastern Saskatchewan during July which resulted in increased disease pressure and caused some losses due to flooding.

### Harvest conditions

The harvest began in many regions during the first two weeks in August, although activity was not general until the third week in August. Harvest weather was ideal with most locations in the prairie region receiving minimal amounts of precipitation (less than half of normal) and warmer than normal temperatures. The harvest was over one-third complete by the end of August and essentially finished by the third week of September. The uneven growth in central and northern Alberta slowed harvest activity in those regions, with harvesting essentially complete by the first week of October.

### Production and grade

Although Statistics Canada does not publish official production statistics for solin, the industry consensus is that solin acres were similar to those planted in 2000. As in 2000, a small percentage of the solin survey samples contained damaged seeds such as green and discoloured seeds.

## Harvest survey samples

The 2001 harvest survey data are based on 46 samples of solin provided by United Grain Growers Limited, including 26 samples originating from Manitoba, 19 from Saskatchewan, and 1 from Alberta. The CGC's Industry Services Division graded 40 samples as No. 1 Canada Western solin, two as No. 2 CW, one as No. 3 CW, and three as Sample Grade CW. The majority of the 2001 solin survey samples were identified as variety 1084. In total, 36 samples were identified as variety 1084, two samples as 989, and eight were not identified to variety. By comparison, 25 out of 49, or 51%, of the 2000 survey samples were identified as variety 989 while in 1999 variety 989 made up 88% of the 45 samples received.

The GRL received the solin samples representing the 2001 crop during the period September to December 2001. For the harvest survey, individual samples are cleaned to remove dockage and graded by CGC Industry Services prior to testing. Solin samples are analyzed for oil content, protein content, linolenic acid, linoleic acid, and iodine value using a NIRSystems 6500 scanning near infrared spectrometer, calibrated to and verified against the appropriate reference method. Composite samples are used for measuring complete fatty acid profiles by gas liquid chromatography. Composite samples are prepared by combining No. 1 CW samples by province and variety.

## Quality of 2001 solin

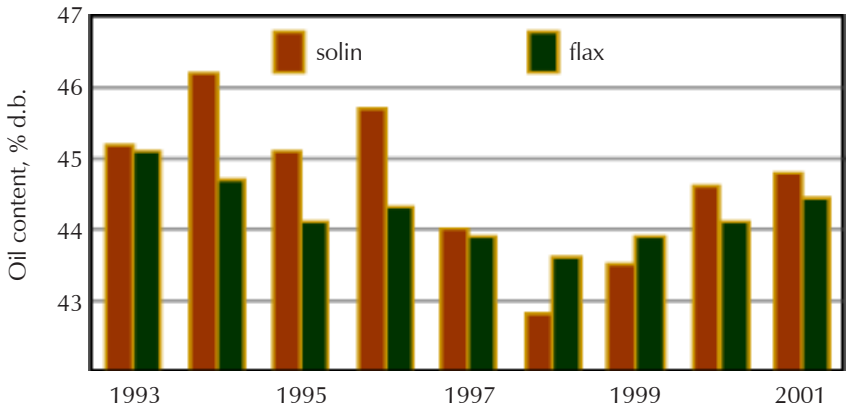
Quality data for No. 1 CW solin 2001 harvest survey samples are shown in Table 1, including oil content, protein content, fatty acid composition and iodine value. Data for No. 1 CW solin are also summarized by province in Table 2 and by variety in Table 3. The quality of solin and conventional flaxseed from 2001 and 2000 is compared to the long-term means in Table 4. Trends in the solin and flaxseed quality data since the start of the solin survey in 1993 are shown in graphical form in Figures 1 to 4. The means and standard deviations of the 2001 NIR survey data can be found at http://www.cgc.ca/Quality/qualmenu-e.htm#Solin.

## Oil content

Oil content of No. 1 CW solin 2001 survey samples is 44.8%, an increase of 0.2% compared to 2000. The mean oil content of Manitoba samples was 0.7% lower than in Saskatchewan. The oil content of No. 1 CW solin samples from producers across western Canada varied from 41.5% to 47.8%. Figure 1 shows both solin and conventional flaxseed had slightly higher oil contents for the 2001 surveys.

Reasonable growing conditions in the solin growing regions of the prairies contributed to overall high oil contents in 2001. However, the introduction of variety 1084 in 2000 is most likely the stronger influence. In 2000, survey samples of the variety 1084 tested 3.1 % higher in oil content than the variety 989. For 2001, the single 1CW sample of 989 had an oil content of 41.5% compared to 45.8% for the 1084 samples (Table 3). While not statistically valid, the data does support the higher oil content potential of the 1084 variety.

**Figure 1 • No. 1 Canada Western solin and flaxseed**
**Oil content of harvest survey samples, 1993–2001**



## Protein content

The protein content of No. 1 CW solin from the 2001 survey was 22.3%, a decrease of 0.2% from 2000. On average, Manitoba solin contained 1.3% more protein than the Saskatchewan samples. The protein content of No. 1CW solin samples from producers across western Canada varied from 19.0% to 24.9%. Solin did not show the large increase in protein content that conventional flaxseed did in 2001 (Figure 2).

In the 2000 survey, samples of the variety 1084 had a protein content of 21.5% compared to 23.5% in samples of the variety 989. The variety 1084 samples contained 22.2% protein in 2001 compared to 24.1% for the single sample of 989 (Table 3).

**Figure 2 • No. 1 Canada Western solin and flaxseed**
**Protein content of harvest survey samples, 1993–2001**

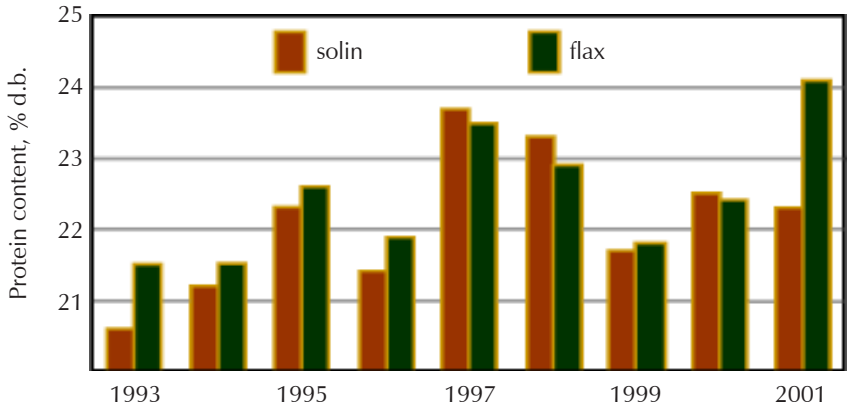
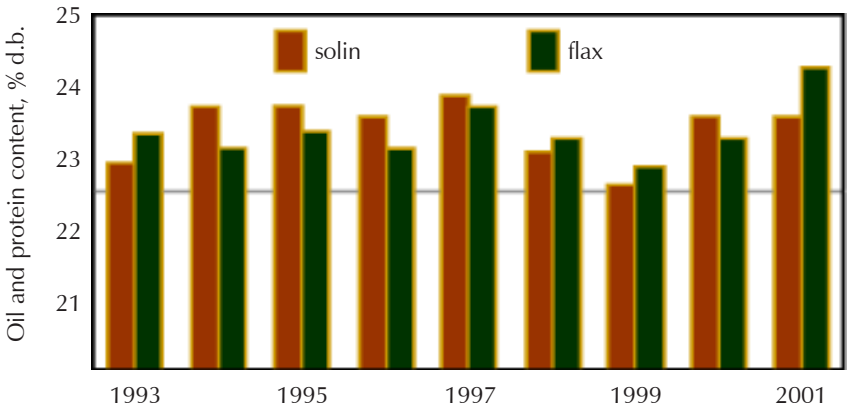



**Figure 3 • No. 1 Canada Western solin and flaxseed**
**Sum of oil and protein contents of harvest survey samples, 1993–2001**



## Fatty acid composition

The mean linolenic acid (C18:3) content of the 2001 solin samples was 2.0%, slightly lower than the 2.1% in 2000. This is well below the maximum 5% linolenic acid specified for solin. Figure 4 illustrates how the lower levels of linolenic acid in solin oil results in a lower iodine value compared to conventional flaxseed oil.

The mean linoleic acid (C18:2) content of the 2001 solin survey samples decreased to 69.7% from 72.0% in 2000. The linoleic acid of No. 1 CW solin samples from producers across western Canada varied from 67.1% to 71.6%. In the 2000 survey, the varieties 1084 and 989 contained similar amounts of linoleic acid. This suggests the decrease in linoleic acid was largely a result of the overall warmer temperatures in the major solin growing areas.

**Figure 4 • No. 1 Canada Western solin and flaxseed Iodine value of harvest survey samples, 1993–2001**

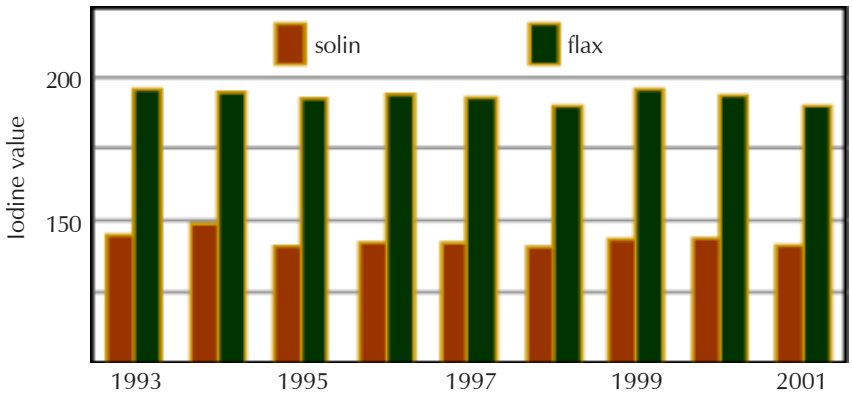


**Table 1 • No. 1 Canada Western solin**
**Quality data for 2001 harvest survey**

| Quality parameter | Mean | Std. Dev. | Minimum | Maximum | Range |
|---|---|---|---|---|---|
| Oil content[1],% | 44.8 | 1.4 | 41.5 | 47.8 | 6.3 |
| Protein content[2],% | 22.3 | 1.4 | 19.0 | 24.9 | 5.9 |
| Palmitic acid[3],% | 5.5 | 0.3 | 5.2 | 6.5 | 1.3 |
| Stearic acid[3],% | 4.2 | 0.3 | 3.5 | 4.6 | 1.1 |
| Oleic acid[3],% | 17.5 | 1.3 | 15.4 | 19.8 | 4.4 |
| Linoleic acid[3],% | 69.7 | 1.1 | 67.1 | 71.6 | 4.5 |
| Linolenic acid[3],% | 2.0 | 0.1 | 1.8 | 2.4 | 0.6 |
| Iodine value | 141.1 | 1.3 | 138.6 | 143.6 | 5.0 |

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)

**Table 2 • No. 1 Canada Western solin**
**Quality data for 2001 harvest survey by province**

| Province | Number of samples | Mean oil content[1] | Mean protein content[2] | Mean linolenic content[3] | Mean linoleic content[3] | Mean iodine value |
|---|---|---|---|---|---|---|
| | | % | % | % | % | |
| Manitoba | 23 | 44.4 | 22.9 | 1.9 | 69.7 | 141.2 |
| Saskatchewan | 16 | 45.1 | 21.6 | 2.0 | 69.5 | 140.9 |
| Alberta | 1 | 46.0 | 21.4 | 1.9 | 70.9 | 142.5 |
| **Western Canada** | **40** | **44.8** | **22.3** | **2.0** | **69.7** | **141.1** |

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids in oil for linolenic (C18:3) and linoleic (C18:2) acid

**Table 3 • No. 1 Canada Western solin**
**Quality data for 2001 harvest survey by variety**

| Variety: | 989 | 1084 | All |
|---|---|---|---|
| Number of samples | 1 | 33 | 40 |
| Oil content[1],% | 41.5 | 45.8 | 44.8 |
| Protein content[2],% | 24.1 | 22.2 | 22.3 |
| Palmitic acid[3], % | 5.8 | 5.5 | 5.5 |
| Stearic acid[3],% | 4.6 | 4.2 | 4.2 |
| Oleic acid[3],% | 19.8 | 17.7 | 17.5 |
| Linoleic acid[3],% | 66.9 | 69.3 | 69.7 |
| Linolenic acid[3],% | 2.0 | 2.0 | 2.0 |
| Iodine value | 138 | 141 | 141 |

[1] Dry matter basis
[2] N x 6.25; dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)

**Table 4 • No. 1 Canada Western solin and conventional flaxseed**
**Quality data for 2001 and 2000 harvest surveys and long-term means**

| | 2001 | | 2000 | | 1993-2000 | |
|---|---|---|---|---|---|---|
| Parameter | Solin | Flaxseed | Solin | Flaxseed | Solin | Flaxseed |
| Oil content[1],% | 44.8 | 44.4 | 44.6 | 44.1 | 44.6 | 44.2 |
| Protein content[2],% | 22.3 | 24.1 | 22.5 | 22.4 | 22.1 | 22.3 |
| Palmitic acid[3], % | 5.5 | 5.2 | 5.7 | 5.4 | 6.2 | 5.3 |
| Stearic acid[3],% | 4.2 | 3.7 | 3.6 | 3.2 | 3.8 | 3.2 |
| Oleic acid[3],% | 17.5 | 19.5 | 15.4 | 17.9 | 15.3 | 17.7 |
| Linoleic acid[3],% | 69.7 | 15.1 | 72.0 | 14.2 | 71.5 | 14.6 |
| Linolenic acid[3],% | 2.0 | 56.3 | 2.1 | 58.9 | 2.0 | 58.7 |
| Iodine value | 141 | 190 | 143 | 194 | 143 | 194 |

[1] Dry matter basis
[2] N x 6.25;dry matter basis
[3] Percentage of total fatty acids including: palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2), and linolenic (C18:3)