

ISSN 1700-2087

Quality of western Canadian flaxseed 2024

Véronique J. Barthet
Program Manager, Oilseeds

Ann Puvirajah
Chemist, Oilseeds

Tel.: 204-983-3354

Fax: 204-983-0724

Email: ann.puvirajah@grainscanada.gc.ca

Grain Research Laboratory
Canadian Grain Commission
1404-303 Main Street
Winnipeg, MB R3C 3G8
grainscanada.gc.ca



Canadian Grain
Commission

Commission canadienne
des grains

Canada

Table of Contents

Introduction.....	3
Summary.....	3
Weather and production review	5
Seeding and growing conditions	5
Production and grade distribution	5
Harvest samples	7
Quality data by province	7
Oil content.....	9
Protein content.....	9
Free fatty acid content	9
Fatty acid composition	9

Tables

Table 1 Quality data for 2024 harvest samples of brown flaxseed graded No. 1 CW	4
Table 2 Main fatty acid composition in 2024 harvest samples of brown flaxseed graded No. 1 CW	4
Table 3 Seeded area and production of western Canadian flaxseed in 2024	6
Table 4 Quality data for 2024 harvest samples of brown flaxseed from western Canada.	8
Table 5 Fatty acid composition and free fatty acid content in 2024 harvest samples of brown flaxseed from western Canada.....	8

Figures

Figure 1 Traditional flaxseed growing areas in the Prairie provinces of Canada	3
Figure 2 Oil content (% , dry basis) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.	10
Figure 3 Protein content (% , dry basis) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024..	11
Figure 4 Free fatty acid content (% in oil) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.	12
Figure 5 Alpha-linolenic acid content (% in oil) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.....	13
Figure 6 Iodine value (units) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.	14

Introduction

This report presents harvest quality data for western Canadian flaxseed grown in 2024. Flaxseed samples were submitted to the Canadian Grain Commission's Harvest Sample Program by producers and grain companies. Quality data is compiled from the results of [analytical tests](#) performed in the Grain Research Laboratory.

Summary

Samples of Canadian flaxseed received by the Harvest Sample Program in 2024 had an oil and protein content similar to the 2023 harvest samples, but iodine values were higher than in 2023.

Table 1 and Table 2 contain the 2024 quality data for brown flaxseed graded No. 1 Canada Western (CW). The mean oil content was 44.5%, which is similar to the 2023 mean (44.8%) and lower than the 10-year mean (45.5%). The mean protein content was 24.7%, which is similar to the 2023 mean (24.5%) and higher than the 10-year mean (23.3%). Oil and protein values are reported on a dry matter basis. The mean iodine value was 192.0 units, which is higher than the 2023 mean (189.3 units) and the 10-year mean (190.5 units).

Figure 1 Traditional flaxseed growing areas in the Prairie provinces of Canada.

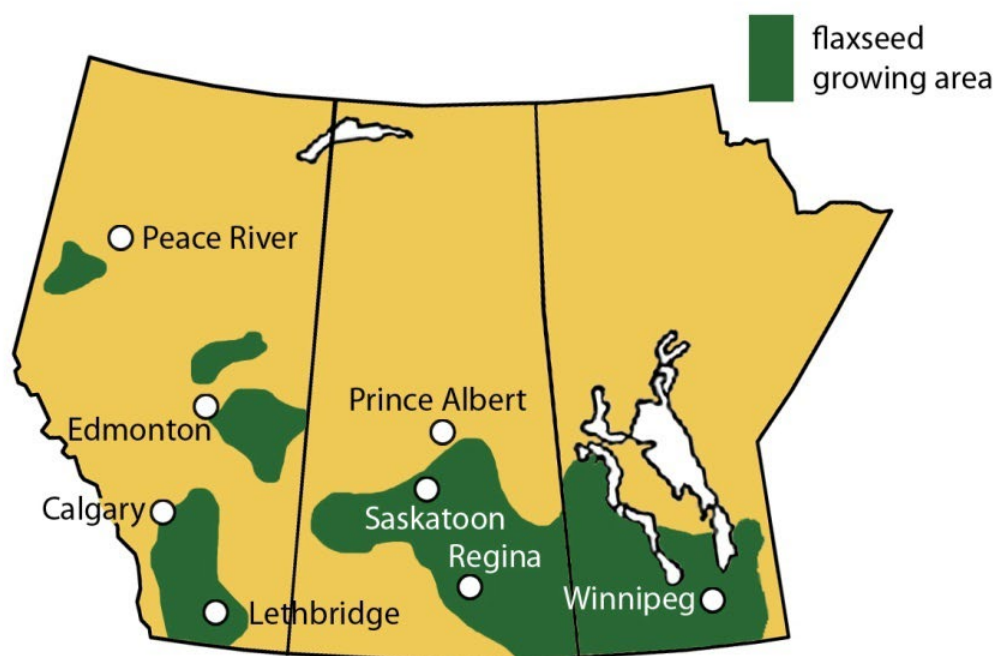


Table 1 Quality data for 2024 harvest samples of brown flaxseed graded No. 1 CW

Quality parameter	2024	2023	2014 to 2023 mean
Number of samples	78	107	n/a ¹
Oil content ² , %	44.5	44.8	45.5
Protein content ³ , %	24.7	24.5	23.3
Free fatty acids, %	0.2	0.3	0.2
Iodine value, units in oil	192.0	189.3	190.5

Table 2 Main fatty acid composition in 2024 harvest samples of brown flaxseed graded No. 1 CW

Fatty acid ⁴ , % in oil	2024	2023	2014 to 2023 mean
Palmitic acid (C16:0)	5.0	5.0	5.1
Stearic acid (C18:0)	3.2	3.4	3.5
Oleic acid (C18:1)	18.2	19.2	18.6
Linoleic acid (C18:2)	15.2	15.4	15.2
Alpha-linolenic acid(C18:3)	57.2	55.8	56.6

¹ n/a = not available.

² Calculated on a dry matter basis.

³ Protein content is calculated from nitrogen (N) content using N x 6.25, on a dry matter basis.

⁴ Relative fatty acid composition of the oil.

Weather and production review

Seeding and growing conditions

The 2024 spring seeding season in Manitoba was marked by abundant precipitation. Between May 1 and June 2, all regions of the province received more than 100% of the normal accumulated precipitation. Although this caused some delays in seeding, soil moisture conditions were overall improved. By early June, 64% of the flaxseed crop was seeded, and by mid-June, seeding was completed. The first half of the growing season was characterized by cooler temperatures and abundant rain. However, temperatures increased drastically later in the growing season. The majority of flaxseed was harvested by mid-October.

In Saskatchewan, spring seeding began in early May but was delayed due to precipitation. The rainfall helped improve soil moisture conditions across the province. By early June, 92% of the flaxseed crop had been seeded. There was a lack of moisture during the remainder of the growing season, coupled with hot temperatures. These conditions resulted in a lower yield potential for the flaxseed crop. Due to the hot weather, harvest began early, with 42% of the crop harvested by the end of August. Most flaxseed was harvested by October.

Precipitation delayed seeding in Alberta, but improved soil moisture conditions. By mid-June, most of the flaxseed crop had been seeded. July brought extremely high temperatures and limited precipitation, which caused heat stress in crops. In August, rainfall provided much-needed relief to the crops and heat stress was eased. The heat accelerated crop development, leading to an earlier-than-usual maturation. Like the other provinces, the majority of flaxseed was harvested by mid-October.

Sources:

[Manitoba seasonal crop reports](#)

[Saskatchewan crop reports](#)

[Alberta crop reports](#)

Production and grade distribution

Producers in western Canada seeded 203,400 hectares (ha) of flaxseed in 2024 (Table 3), which is lower than the area seeded in 2023 (246,200 ha). The yield in 2024 was estimated to be 1,281 kilograms per hectare (kg/ha). Flaxseed production in 2024 was 257,500 metric tonnes (MT), which is a decrease from 2023 (272,200 MT). Flaxseed production in Manitoba, Saskatchewan and Alberta was 27,700 MT (26,500 MT in 2023), 196,000 MT (223,800 MT in 2023) and 33,800 MT (21,900 MT in 2023), respectively. The 2024 harvest samples followed historical trends in production for each province.

Flaxseed samples were graded by Canadian Grain Commission grain inspectors according to the [Official Grain Grading Guide](#). In 2024, 98% of the submitted flaxseed samples from western Canada were graded No. 1, and the remaining 2% were graded No. 2 and No. 3.

The harvest samples collected from each province may not be representative of the actual production or grade distribution. There are, however, a sufficient number of samples to provide good quality information for each province.

Table 3 Seeded area and production of western Canadian flaxseed in 2024¹

Location	Seeded area (thousand hectares)		Production (thousand metric tonnes)		Average production (thousand metric tonnes)
	2024	2023	2024	2023	2014 to 2023
Manitoba	16.3	17.4	27.7	26.5	47.5
Saskatchewan	169.1	209.8	196.0	223.8	444.9
Alberta	18.0	19.0	33.8	21.9	69.0
Western Canada	203.4	246.2	257.5	272.2	561.3

¹ Source: Statistics Canada. [Estimated areas, yield, production, average farm price and total farm value of principal field crops, in metric and imperial units](#)

Harvest samples

Flaxseed samples from the Harvest Sample Program were cleaned to remove dockage prior to testing. Individual samples were analyzed for oil content, protein content and iodine values using a Foss NIR Systems DS2500 scanning near-infrared spectrometer, calibrated to and verified against the appropriate reference methods. Composite samples were used for more precise and detailed analyses of free fatty acids and fatty acid composition. A brown flaxseed composite and a yellow flaxseed composite were prepared by combining samples graded No. 1 from each province.

The 2024 flaxseed report includes 78 brown flaxseed samples compared to 107 in 2023. For brown flaxseed graded No. 1, Manitoba contributed 8 samples, Saskatchewan 55 samples and Alberta 15 samples.

In 2024, the Harvest Sample Program received 10 samples of yellow flaxseed, 8 of which were graded No. 1. With only 8 samples, it is difficult to draw significant conclusions when the quality of No. 1 yellow flaxseed and No. 1 brown flaxseed are compared.

Quality data by province

Table 4 and Table 5 contain detailed information on the quality of No. 1 brown flaxseed from western Canada in 2024.

Alpha-linolenic acid, an omega-3 fatty acid found in flaxseed, can play a role in maintaining good health in humans and animals. It is the main reason for the increased use of whole and ground flaxseed in cereals and baked goods. Flaxseed is also used as a source of oil and protein in animal feed, which can also benefit humans. For example, flaxseed incorporated into chicken feed can result in hens producing eggs that are high in omega-3 fatty acid.

Iodine value is a measure of the overall unsaturation of an oil and is calculated from the fatty acid composition. Oils with higher iodine values, an indication that they are more unsaturated, polymerize more rapidly in the presence of air. In flaxseed, iodine value is directly related to the amount of alpha-linolenic acid in the oil. Alpha-linolenic acid is one of the most important quality factors for flaxseed oil used for industrial purposes because it is responsible for most of the oil's drying properties.

Table 4 Quality data for 2024 harvest samples of brown flaxseed from western Canada

Grade	Location	Number of samples	Oil content ¹ , %			Protein content ² , %			Iodine value, units		
			Mean	Min ³	Max ⁴	Mean	Min	Max	Mean	Min	Max
Flaxseed, No. 1 CW	Western Canada	78	44.5	40.9	48.2	24.7	18.7	29.0	192.0	180.8	202.2
	Manitoba	8	46.0	44.9	47.2	23.1	21.2	25.0	193.9	190.5	195.0
	Saskatchewan	55	44.9	40.9	47.7	24.0	18.7	28.5	191.2	180.8	202.2
	Alberta	15	44.8	43.1	48.2	25.5	18.8	29.0	192.6	187.2	196.3

Table 5 Fatty acid composition and free fatty acid content in 2024 harvest samples of brown flaxseed from western Canada

Grade	Location	Number of samples	Fatty acid composition ⁵ , %					Free fatty acids, %
			C16:0	C18:0	C18:1	C18:2	C18:3	
Flaxseed, No. 1 CW	Western Canada	78	5.0	3.2	18.2	15.2	57.2	0.2
	Manitoba	8	5.0	2.9	18.2	14.1	58.8	0.4
	Saskatchewan	55	5.1	3.2	18.3	15.5	56.9	0.2
	Alberta	15	4.9	3.3	17.9	15.1	57.1	0.2

¹ Calculated on a dry matter basis.

² Protein content is calculated from nitrogen (N) content using N x 6.25, on a dry matter basis.

³ Min = minimum.

⁴ Max = maximum.

⁵ Percentage of the main fatty acids in the oil, including palmitic acid (C16:0), stearic acid (C18:0), oleic acid (C18:1), linoleic acid (C18:2) and alpha-linolenic acid (C18:3).

Oil content

In 2024, the mean oil content of brown flaxseed graded No. 1 was 44.5%, similar to the 2023 mean (44.8%) and lower than the 10-year mean of 45.5% (Figure 2). The mean oil content in samples from Manitoba was 46.0%, higher than Saskatchewan (44.9%) and Alberta (43.1%). The mean oil content for No. 1 brown flaxseed from western Canada ranged from 40.9% to 48.2% (Table 4).

The oil content of yellow flaxseed was 44.9%, slightly higher than the oil content of brown flaxseed. This difference is likely due to environmental growing conditions and not a varietal effect.

Protein content

In 2024, the mean protein content of brown flaxseed graded No. 1 was 24.7%, similar to the 2023 mean (24.5%), and higher than the 10-year mean of 23.3% (Figure 3). The mean protein content in samples from Manitoba was 23.1%, lower than in samples from Saskatchewan (24.0%) and Alberta (25.5%). The mean protein content for No. 1 brown flaxseed from western Canada ranged from 18.7% to 29.0% (Table 4).

The protein content of yellow flaxseed was 25.6%, approximately 1% higher than the protein content of brown flaxseed.

Free fatty acid content

In 2024, the mean free fatty acid content in brown flaxseed graded No. 1 was 0.2%. This was lower than the mean in 2023 (0.3%) but identical to the 10-year mean (Figure 4). The mean free fatty acid content in samples from Manitoba was 0.4%, higher than Alberta (0.2%) and Saskatchewan (0.2%) (Table 5).

The free fatty acid content of yellow flaxseed was identical to brown flaxseed (0.2%).

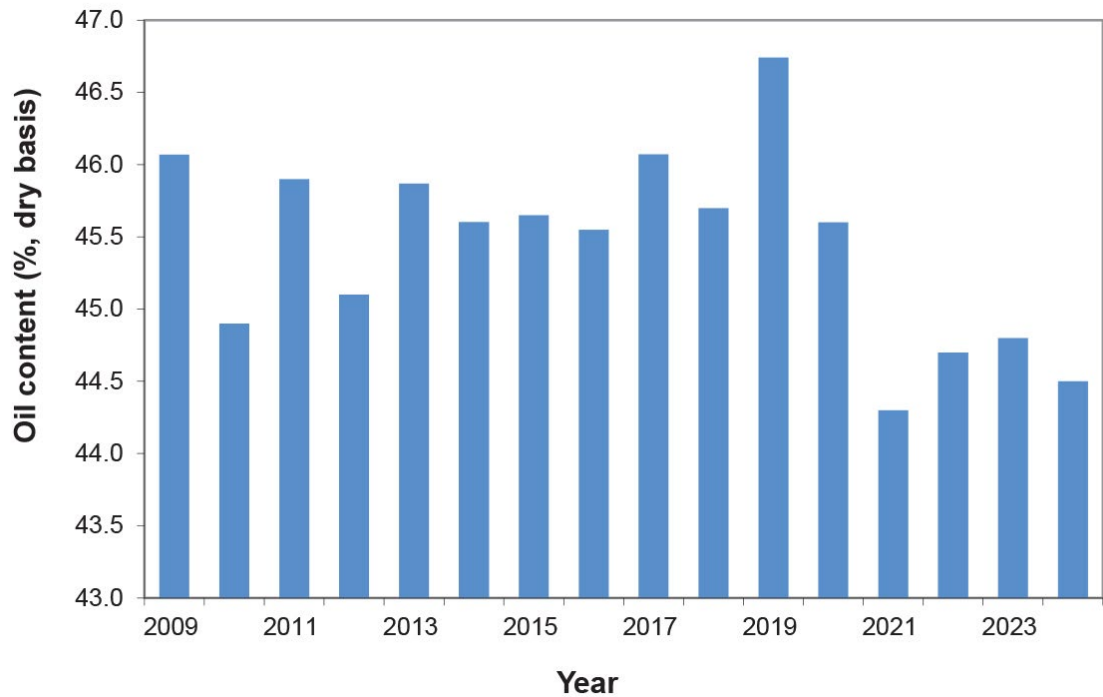
Fatty acid composition

In 2024, the mean alpha-linolenic acid (C18:3) content in brown flaxseed graded No. 1 was 57.2%. This was higher than the 2023 mean (55.8 %) and higher than the 10-year mean of 56.5% (Figure 5). The mean alpha-linolenic acid (C18:3) content in samples from Manitoba, Saskatchewan and Alberta was 58.8%, 56.9% and 57.1%, respectively.

In 2024, the mean iodine value for brown flaxseed graded No. 1 was 192.0 units. This was higher than in 2023 (189.3 units) and higher than the 10-year mean (190.5 units) (Figure 6).

For yellow flaxseed, the mean alpha-linolenic acid (C18:3) content and iodine value were 58.7% and 194.3 units, respectively.

Figure 2 Oil content (% dry basis) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.

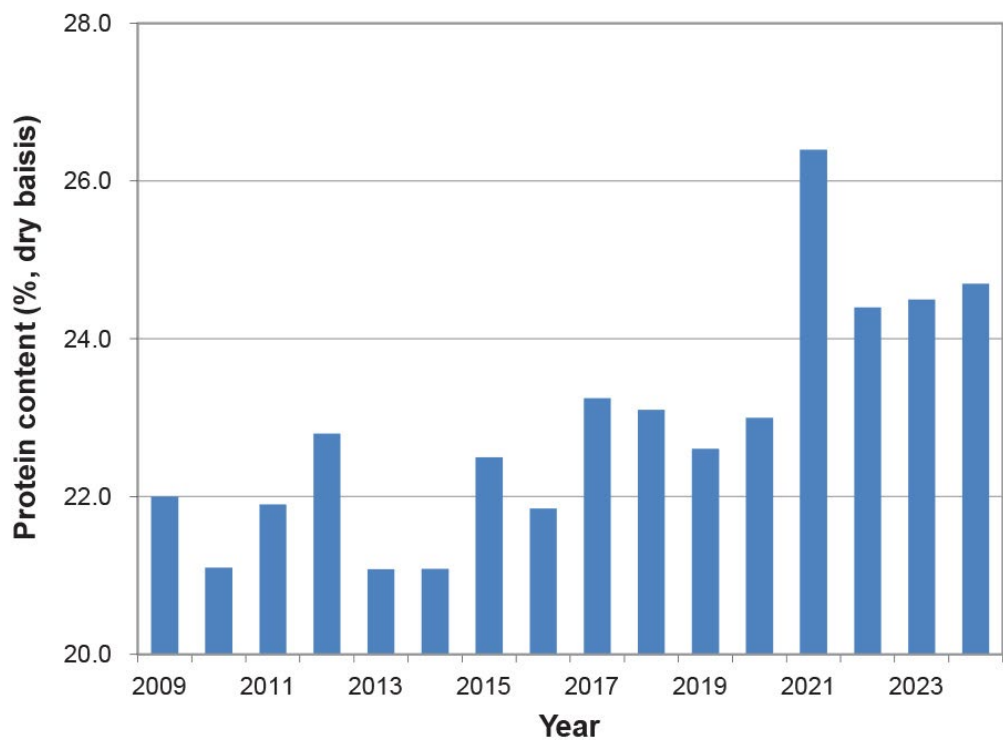


2024 mean 44.5%

2023 mean 44.8%

2014 to 2023 mean 45.6%

Figure 3 Protein content (% dry basis) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.

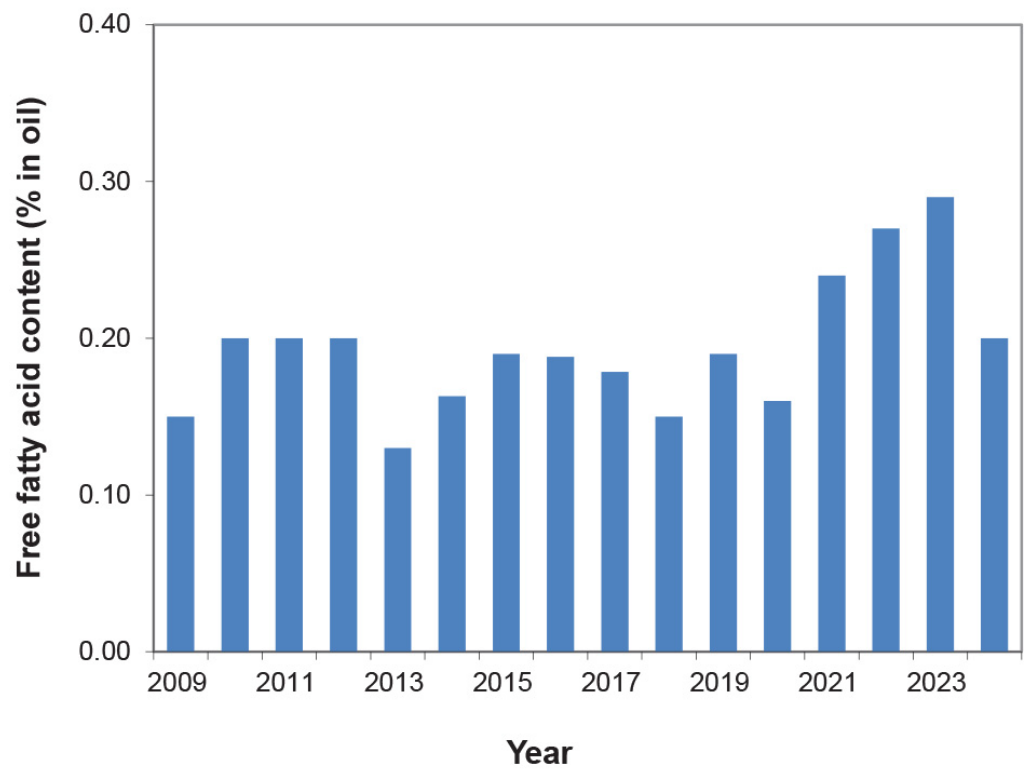


2024 mean 24.7%

2023 mean 24.5%

2014 to 2023 mean23.3%

Figure 4 Free fatty acid content (% in oil) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.

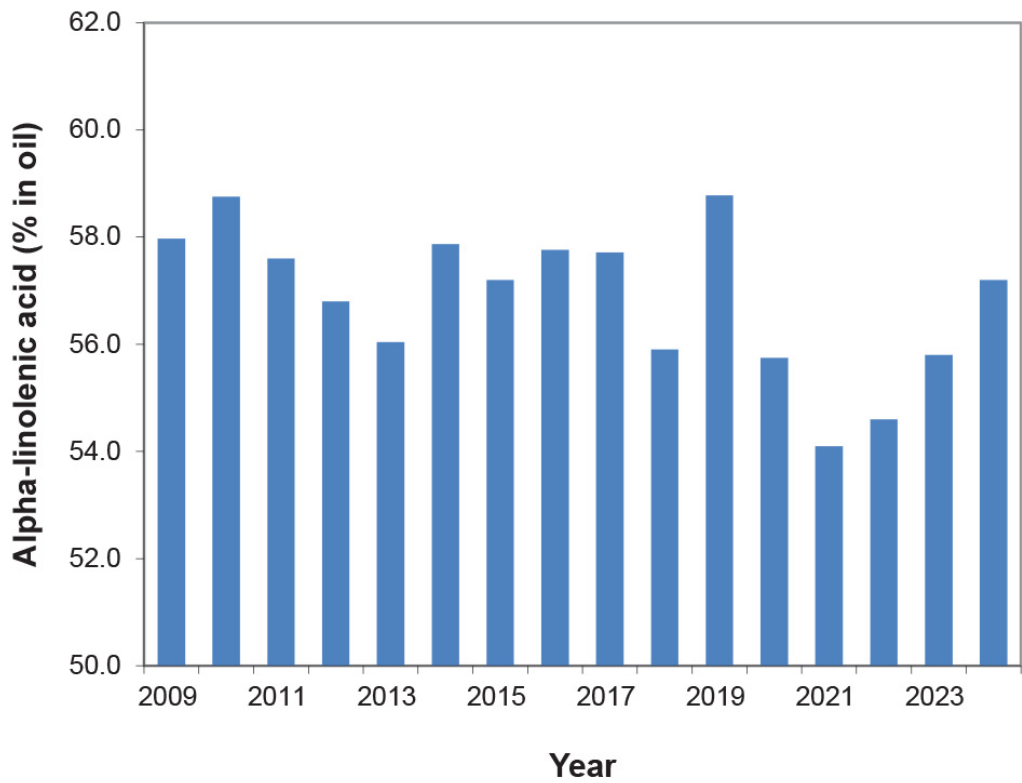


2024 mean 0.2%

2023 mean 0.3%

2014 to 2023 mean0.2%

Figure 5 Alpha-linolenic acid content (% in oil) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.

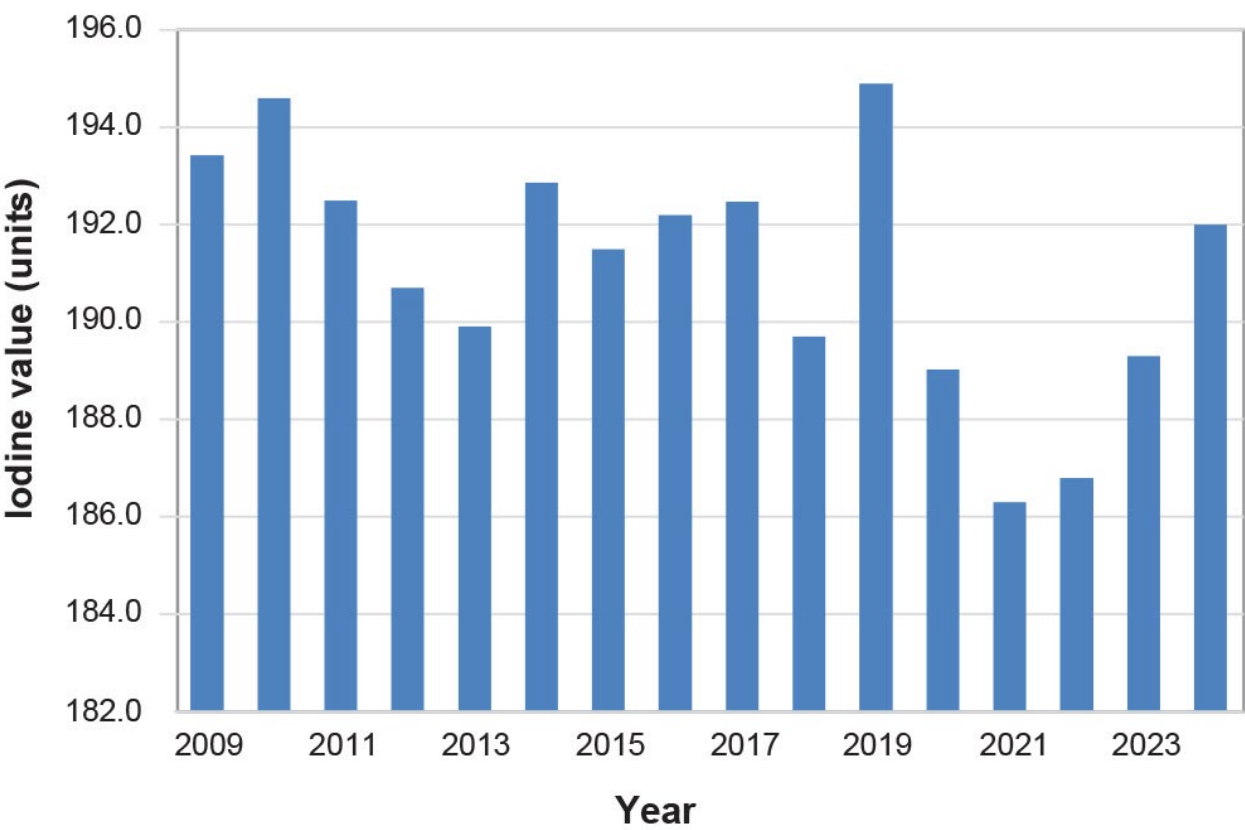


2024 mean57.2%

2023 mean55.8%

2014 to 2023 mean56.6%

Figure 6 Iodine value (units) in harvest samples of brown flaxseed graded No. 1 CW, 2009 to 2024.



2024 mean	192.0
2023 mean	189.3
2014 to 2023 mean	190.5