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Quality of western Canadian flaxseed 2022

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Summary

The 2022 western Canadian flaxseed samples received by Harvest Sample Program contained higher oil content, lower protein content and higher iodine values than the 2021 harvest samples.

Tables 1 and 2 contain data for the 2022 brown flaxseed graded Flaxseed, No. 1 Canada Western. Mean oil content was 44.7%, which is slightly higher than the 2021 mean (44.3%) and lower than the 10-year mean (45.6%). Mean protein content was 24.4%, which is lower than the 2021 mean (26.4%) and higher than the 10-year mean (22.8%). Iodine value was 186.8 units, which is slightly higher than the 2021 mean value (186.3 units) and lower than the 10-year mean (191.0 units). Oil and protein values are reported on a dry matter basis.

Table 1 Quality data for brown Flaxseed, No. 1 Canada Western from 2022 harvest samples

Quality parameter	2022	2021	2012 to 2021 mean
Number of Samples	174	235	NA ¹
Oil content ² , %	44.7	44.3	45.6
Protein content ³ , %	24.4	26.4	22.8
Free fatty acids, %	0.27	0.24	0.20
Iodine value	186.8	186.3	191.0

Table 2 Main fatty acid composition brown Flaxseed, No. 1 Canada Western from 2022 harvest samples

Fatty acid, % in oil	2022	2021	2012 to 2021 mean
Palmitic acid (C16:0)	5.2	5.2	5.1
Stearic acid (C18:0)	3.7	3.6	3.5
Oleic acid (C18:1)	20.0	20.3	18.6
Linoleic acid (C18:2)	15.4	15.6	15.0
α-Linolenic acid(C18:3)	54.6	54.1	56.8

¹ NA = not applicable

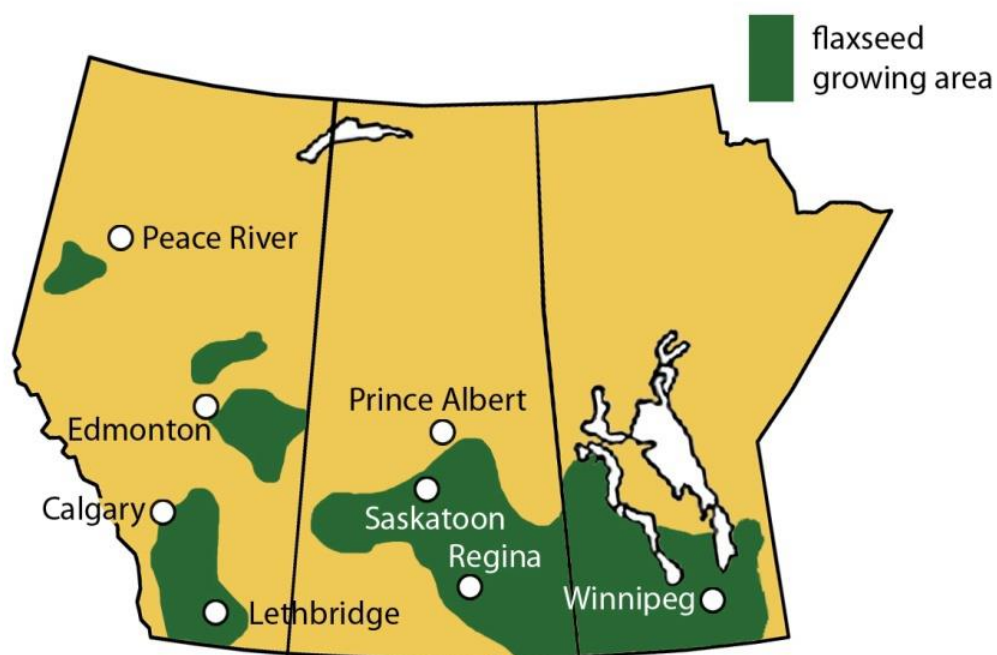
² calculated on a dry matter basis

³ protein content calculated from nitrogen (N) content using N x 6.25 on a dry matter basis

Introduction

This report presents data and information on the quality of flaxseed grown in western Canada in 2022. Samples of flaxseed submitted to the Canadian Grain Commission's Harvest Sample Program by producers and grain companies were analysed by the Oilseeds Program. Data was collected on quality parameters, including oil, protein, free fatty acids, fatty acid composition and iodine values. Figure 1 illustrates the traditional growing areas of flaxseed in the prairie provinces of western Canada.

Figure 1 Traditional flaxseed growing areas within the three Prairie provinces of Canada



Weather and production review

Seeding and growing conditions

In Manitoba, heavy rains and an extremely wet spring delayed seeding by up to 4 weeks. By May 31, 2022, only 41% of the crop had been seeded, whereas 91% of the crop had been seeded in 2021. The majority of flaxseed was seeded by June 14. Harvest was extended due to late seeding and rain delays in the fall. By late October, 96% of the flax had been harvested.

In Saskatchewan, a late snow melt and cool temperatures delayed much of the seeding. Only 52% of the crop was seeded by mid-May and seeding was not complete until early June. Significant widespread rain helped with crop progression. By mid-July, most of the flaxseed crops were rated as being in fair to good condition and some were rated as excellent. Dry weather in September and October allowed producers to harvest without much delay. By mid-October, 95% of the crop was harvested.

Alberta experienced extremely dry conditions, with low surface moisture and cold temperatures, during seeding. Most of the crop was seeded by mid-May and seeding was completed by the end of May. Due to precipitation in June, 74% of the flaxseed crops were rated to be in good to excellent condition by mid-July. A very dry fall allowed harvest to proceed without any delays. Most of the crops were harvested by the second week of October.

Sources:

[Manitoba crop reports](#)

[Saskatchewan crop reports](#)

[Alberta crop reports](#)

Production and grade distribution

Western Canadian farmers seeded 314,400 hectares (ha) of flaxseed in 2022 (Table 3), which is lower than the area seeded in 2021 (415,100 ha). The 2022 yield was estimated to be 1,517 kilograms per hectare (kg/ha). Flaxseed production in 2022 was 472,600 metric tonnes, which is an increase from 2021 (346,000 metric tonnes). Average flax production in metric tonnes in Manitoba, Saskatchewan and Alberta was 41,700 (39,500 in 2021), 347,700 (246,000 in 2021) and 83,200 (59,600 in 2021), respectively.

Flaxseed samples were graded by Canadian Grain Commission grain inspectors according to [the Official Grain Grading Guide](#). In 2022, 99.4% of the submitted samples from western Canada were graded No. 1 flaxseed, while the remaining 0.6% were graded No. 2 flaxseed.

Table 3 Area seeded and production for western Canadian flaxseed¹

Province	Seeded area (thousand hectares)		Production (thousand tonnes)		Average production (thousand tonnes)
	2022	2021	2022	2021	2012 to 2021
Manitoba	20.7	37.8	41.7	39.5	54.5
Saskatchewan	241.7	320.0	347.7	246.0	484.3
Alberta	52.0	57.3	83.2	59.6	70.3
Western Canada	314.4	415.1	472.6	346.0	609.0

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 analysed for oil content, protein content and iodine values using a Foss NIR Systems 6500 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. Composites were prepared by combining samples of brown flaxseed graded No. 1 from each province.

The 2022 harvest report includes 174 brown flax samples compared to 235 in 2021. For brown flaxseed graded No. 1, Manitoba contributed 15 samples, Saskatchewan 128 samples and Alberta 30 samples. There was only one flaxseed sample that graded No. 2.

In 2022, the Harvest Sample Program received 8 samples of yellow flaxseed, compared to 11 samples in 2021. All 8 samples of yellow flaxseed were graded No. 1. In yellow flaxseed, oil and protein content were 45.9% and 24.9%, respectively. The average free fatty acid content in this year's yellow flax composite was 0.23%, while average α -linolenic acid (C18:3) content and iodine value were 58.7% and 193.7 units, respectively.

Quality data by province

Tables 4 and 5 contain detailed information on the quality of No. 1 brown flaxseed from western Canada in 2022. The number of harvest samples collected from each province may not represent the actual production or grade distribution. There were, however, a sufficient number of samples to provide good quality information for each province. Samples followed the historical trends in provincial production.

Flaxseed is used as a source of oil. Alpha-linolenic acid, an omega-3 fatty acid found in flaxseed, can play an important 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. For example, flaxseed incorporated into chicken feed can result in hen's producing eggs that are high in omega-3 fatty acid.

Iodine value is a measure of the overall unsaturation of oil and is calculated from the fatty acid composition. Oils with higher iodine values (with more unsaturation), polymerize more rapidly in the presence of air. In flaxseed, iodine value is directly related to the amount of α -linolenic acid present in the oil. Alpha-linolenic acid is one of the most important quality factors for industrial use as it is responsible for most of the flaxseed oil's drying properties.

Table 4 Quality data for 2022 western Canadian brown flaxseed according to grade and province

Grade	Province	Number of samples	Oil content ⁴ , %			Protein content ⁵ , %			Iodine value		
			Mean	Min ⁶	Max ⁷	Mean	Min	Max	Mean	Min	Max
Flaxseed, No. 1 CW	Western Canada	173	44.7	39.8	48.6	24.4	18.5	29.6	186.3	178.6	200.8
	Manitoba	15	44.6	41.5	46.2	23.7	21.2	25.2	191.7	186.0	200.8
	Saskatchewan	128	44.9	40.8	48.6	24.3	18.5	29.6	186.3	178.6	196.4
	Alberta	30	43.8	39.8	48.0	25.7	20.9	28.1	186.7	180.1	199.9

Table 5 Fatty acid composition and free fatty acid content of brown Flaxseed, No. 1 Canada Western from 2022 harvest samples

Grade	Province	Number of samples	Fatty acid composition ⁸ , %					Free fatty acids
			C16:0	C18:0	C18:1	C18:2	C18:3	
Flaxseed, No. 1 CW	Western Canada	173	5.2	3.7	20.0	15.4	54.6	0.27
	Manitoba	15	5.1	3.6	18.3	13.8	58.1	0.53
	Saskatchewan	128	5.2	3.7	20.2	15.6	54.2	0.24
	Alberta	30	5.2	3.8	20.0	15.1	54.7	0.27

⁴ calculated on a dry matter basis

⁵ protein content calculated from nitrogen (N) content using N x 6.25 on a dry matter basis

⁶ Min = minimum

⁷ Max = maximum

⁸ Percentage of total fatty acids in the oil including palmitic (C16:0), stearic (C18:0), oleic (C18:1), linoleic (C18:2) and linolenic (C18:3)

Oil content

In 2022, the mean oil content of brown flaxseed graded No. 1 was 44.7%, slightly higher than the 2021 mean (44.3%) and lower than the 10-year mean of 45.6% (Figure 2). Mean oil content in flaxseed samples from Manitoba was 44.6%, similar to Saskatchewan (44.9%) but higher than Alberta (43.8%) (Table 4). Oil content for No. 1 brown flaxseed samples from producers across western Canada ranged from 39.8% to 48.6% (Table 4).

Protein content

In 2022, the mean protein content of brown flaxseed graded No. 1 was 24.4%, lower than the 2021 mean (26.4%), and higher than the 10-year mean of 22.8% (Figure 3). The mean protein content in samples from Manitoba was 23.7%, lower than both Saskatchewan (24.3%) and Alberta (25.7%). Protein content for No. 1 brown flaxseed samples from producers across western Canada ranged from 18.5% to 29.6% (Table 4).

Free fatty acid content

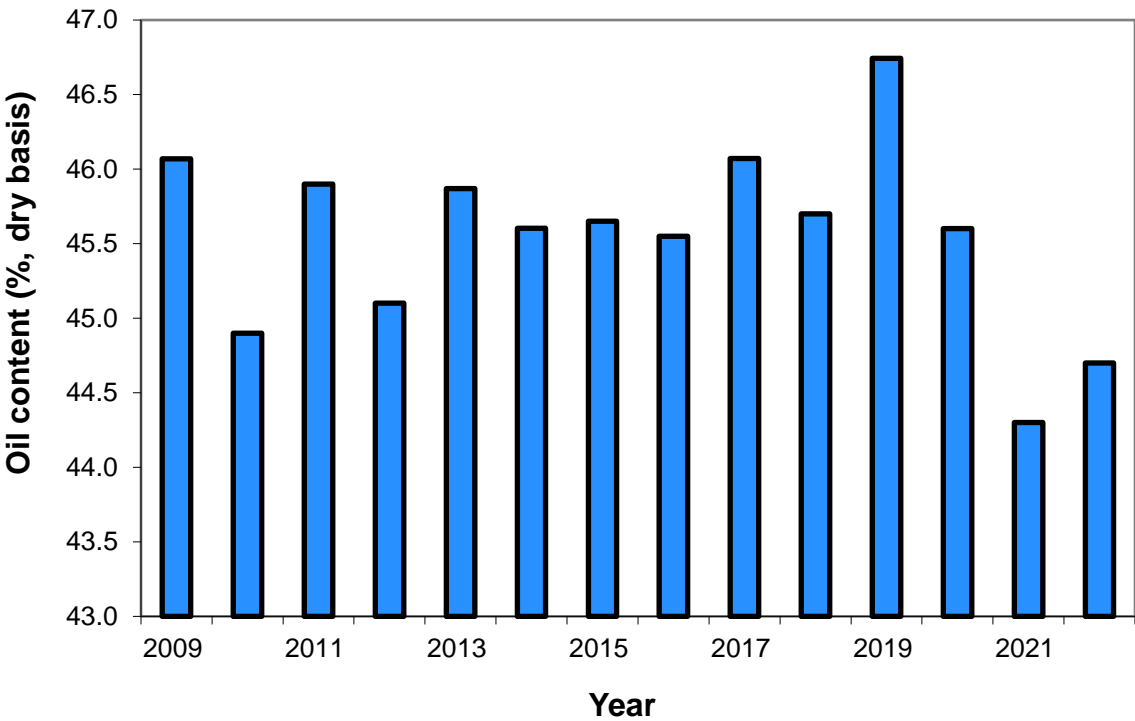
In 2022, the mean free fatty acid content in brown flaxseed graded No. 1 was 0.27%. This was higher than the mean in 2021 (0.24%) and the 10-year mean of 0.17% (Figure 4). The mean free fatty acid content in samples from Manitoba was 0.53%, higher than the mean in both Alberta (0.27%) and Saskatchewan (0.24%) (Table 5).

Fatty acid composition

In 2022, the mean α -linolenic acid (C18:3) content in brown flaxseed graded No. 1 was 54.6%. This was slightly higher than the 2021 mean (54.1 %) but lower than the 10-year mean of 56.8% (Figure 5). Mean α -linolenic acid (C18:3) content in samples from Manitoba, Saskatchewan and Alberta were 58.1%, 54.2% and 54.7%, respectively.

In 2022, the mean iodine value of oil for brown flaxseed graded No. 1 was 186.8 units. This was slightly higher than in 2021 (186.3 units) but lower than 10-year mean (191.0 units; Figure 6).

Figure 2 Oil content (% dry basis) of brown Flaxseed, No. 1 Canada Western from 2009 to 2022 harvest samples

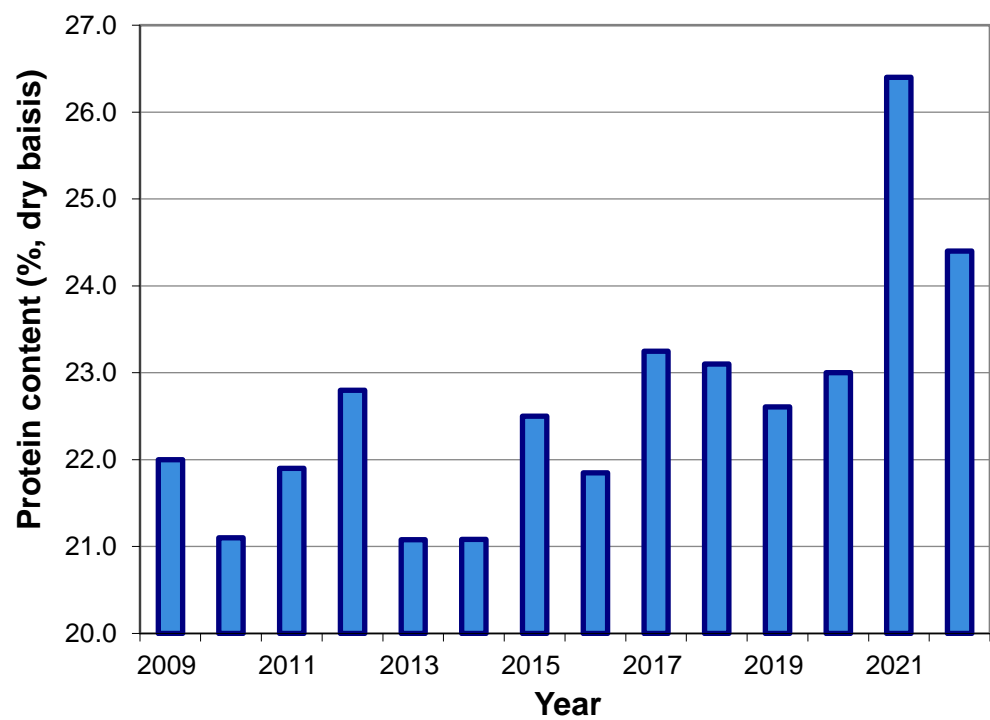


2022 mean 44.7%

2021 mean 44.3%

2012 to 2021 mean 45.6%

Figure 3 Protein content (% dry basis) of brown Flaxseed, No. 1 Canada Western from 2009 to 2022 harvest samples

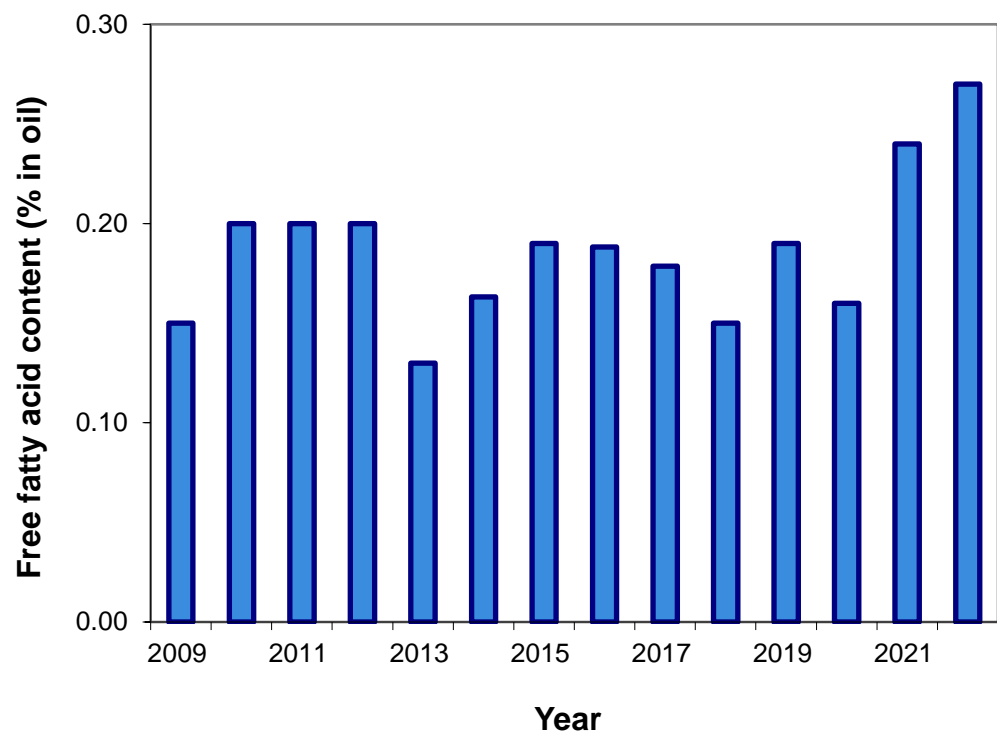


2022 mean 24.4%

2021 mean 26.4%

2012 to 2021 mean22.8%

Figure 4 Free fatty acid content (% in oil) of brown Flaxseed, No. 1 Canada Western from 2009 to 2022 harvest samples

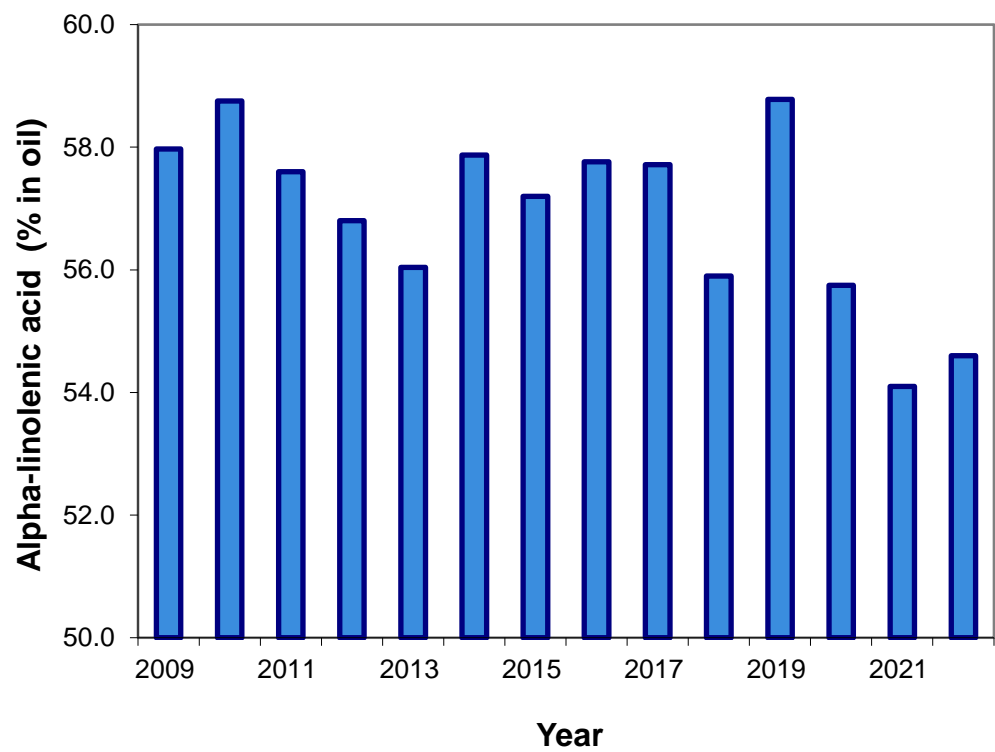


2022 mean 0.27%

2021 mean 0.24%

2012 to 2021 mean0.18%

Figure 5 Alpha-linolenic acid content (% in oil) of brown Flaxseed, No. 1 Canada Western from 2009 to 2022 harvest samples

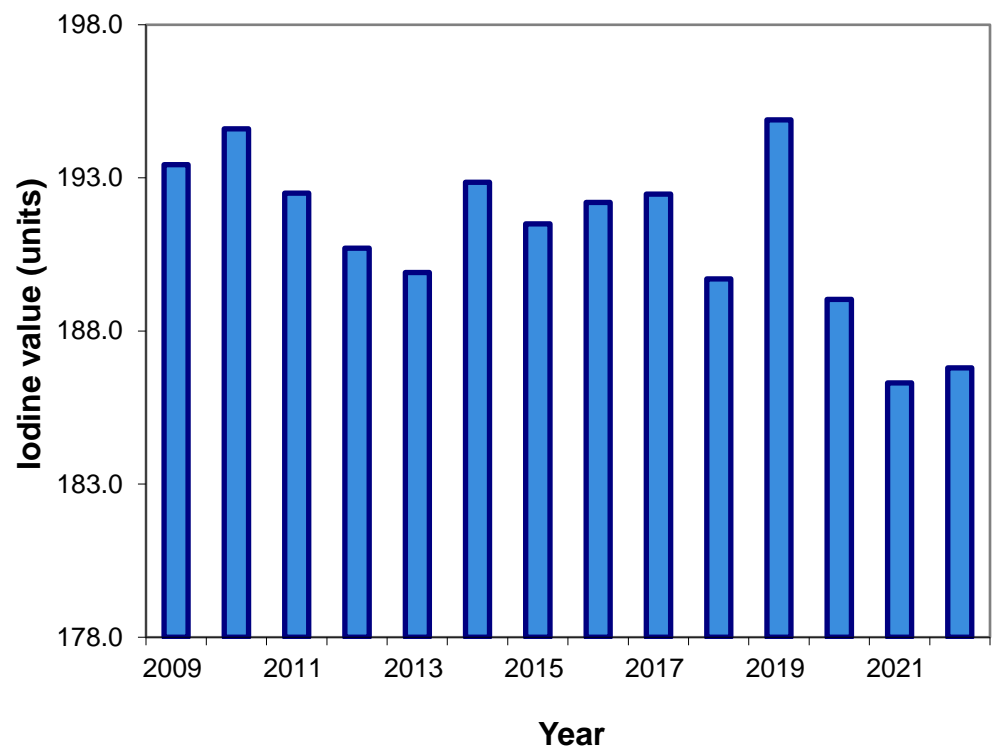


2022 mean54.6%

2021 mean54.1%

2012 to 2021 mean56.8%

Figure 6 Iodine value (units) of brown Flaxseed, No. 1 Canada Western from 2009 to 2022 harvest samples



2022 mean	186.8
2021 mean	186.3
2012 to 2021 mean	191.0