September 2020

# Flax on the Farm

## Marketing, Grading and Seed Quality

## A. MARKETING FLAX

Several factors from pre-harvest environmental conditions, to combine settings, to seed storage environment can affect seed quality and consequently the marketing options for flax seed. While the industrial sector continues to be the largest market for flax, the food and feed markets continue to grow.

**Market Considerations**

- Commercial flax seed is typically 10% or less moisture.
- Brown seeded flax can enter the food, feed or industrial markets, while yellow seeded flax is predominantly produced for the food market due to its appealing colour.
- Many food flax buyers are looking for very high-quality flax that has tight specifications for visual appearance. Milling quality flax seed typically has low dockage, uniform seed colour and size, is not damaged or diseased, is shiny and comes from the high end of No. 1 quality seed. Buyers typically process and clean flax seed further to remove foreign material and damaged seeds. The presence of chaff, especially boll membranes, is an issue when flax seed is packaged for human consumption.
- High dockage and/or heated seed may be acceptable for the feed market.
- Black coloured seeds (e.g. due to frost, disease, heating, variety) may darken the colour and increase the bitterness of flaxseed oil.

To find a list of flax seed buyers go to:

- SaskFlax
- Manitoba Crop Alliance
- Flax Council of Canada (FCC)

**Don't forget to check on your stored flax seed!** Flax seed will continue to respire after harvest for several weeks and therefore requires regular monitoring of temperature and moisture content at the bottom, middle and top of the bin during the first couple of months to detect the first signs of spoilage (e.g. heating, moisture pockets, insect activity). More frequent monitoring is critical if the seed was binned at higher moisture and/or temperature. Refer to the August edition of Flax on the Farm for more advice on flax seed storage.

## B. GRAIN GRADING

- The Canadian Grain Commission (CGC) is responsible for establishing and maintaining Canada's **grain** grading system, whereas the Canadian Food Inspection Agency (CFIA) is responsible for maintaining the **seed** grading system.



MANITOBA CROP ALLIANCE SaskFlax FLAX COUNCIL OF CANADA

- Current designated classes of flax are: brown flaxseed (varieties with brown seed coats) and yellow flaxseed (varieties with yellow seed coats).
- A grade of No. 1 CW (Canada Western) or No. 2 CW can only be assigned to registered varieties of flax in Canada that appear on the official variety designation list.
- The highest grade that grain of an unregistered variety can be assigned is No. 3 CW.
- Grain grading factors are visual characteristics used as indicators of the degree of soundness of a lot of grain. For flax these include: broken seeds, contaminated seeds, damaged seeds, earth pellets, ergot, excreta, extraneous material, fertilizer pellets, fireburnt seed, heated seed, inseparable seeds, odour, other classes of flaxseed, *Sclerotinia sclerotiorum*, soft earth pellets, stones, chemically treated seed and seed with a chemical residue.
- Grain grades are assigned based on an assessment of an official sample for test weight, dockage and the grading factors associated with that commodity. Grades are defined by limits associated with each grading factor, such that the highest grade has the least grading factor issues.

**Table 1. Export grade determinants table for flax seed**

| Grade name | Total removable material % | Foreign material included in dockage | | | | Brown seeded flax | Yellow seeded flax | Damage | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Ergot % | Sclerotinia % | Stones % | Total including inseparable seeds % | Yellow seeded flaxseed % | Brown seeded flaxseed % | Broken % | Heated % | Total % |
| No. 1 CW | 2.5 | 0.05 | 0.1 | 0.05 | 1 | 2 | 2 | 13 | 0.1 | 13 |
| No. 2 CW | 2.5 | 0.05 | 0.2 | 0.05 | 1.5 | 3 | 2 | 25 | 0.2 | 25 |
| No. 3 CW | 2.5 | 0.05 | 0.25 | 0.05 | 2 | 4 | 2 | 35 | 10 | No limit within broken and heated tolerances |

Adapted from the Canadian Grain Commission Official Grain Grading (https://www.grainscanada.gc.ca/en/grain-quality/official-grain-grading-guide/oggg-aug-1-2020-english.pdf)

### Harvest Sample Program

- The Canadian Grain Commission's Harvest Sample Program generates harvest and export quality data on the Canadian grain crop.
- Growers who submit samples of flax seed will receive an unofficial grade in addition to the oil and protein content and the iodine value (IV) for the flax seed lot.
- This process serves to provide quality data that is used to promote the high quality of Canadian grain and to aid in the marketing of Canadian grain.
- Samples will be accepted until November 30, 2020.

## C. SEED QUALITY

Flax seed lots are typically associated with dockage, but several other visual characteristics may also impact the ability to market the seed and the quality of the next flax crop if seeded. Refer to Table 2 for more information on the marketing and agronomy implications of the visual quality of your harvested flax seed, and read the report on page 4 for a summary of the disease present on seed harvested from the 2019 crop.

## Table 2. Impact of flax seed quality on marketing and agronomy

| Visual characteristic | Cause(s) | Grading factor? | Marketing impact and remediation | Impact on agronomy | Comments |
|---|---|---|---|---|---|
| cracked | improper combine settings, seed very dry when combined | Yes | no market impact unless cracks highly visible | seed more prone to microbial attack, may result in oil degradation during storage, may have reduced germination and vigour if planted | large seeded and yellow seeded varieties can be more susceptible, damage not always visible to the naked eye |
| broken | improper combine settings, seed very dry when combined | Yes | undesireable for food market but easily removed through cleaning | seed will not germinate because embryo damaged | large seeded and yellow seeded varieties can be more susceptible |
| split | unknown (environmental conditions?) | Yes | no market impact | seed more prone to microbial attack, may result in oil degradation during storage, may have reduced germination and vigour if planted | characterized by the rolling back of the seed coat at the narrow end of the seed such that it looks like a fish's mouth, occurs during maturation of seed, typically only a problem with yellow seed in some years |
| shrivelled | prematurely aborted or ripened, or colonized by saprophytic fungi | Yes | undesireable for food market but easily removed through cleaning | seed will not germinate because embryo not properly formed | often due to drought or disease (rust, pasmo, Fusarium, root rots, Sclerotinia, stem break and browning), commonly colonized by saprophytic fungi |
| frosted/scabbed/blistered appearance | high moisture conditions at harvest | No | undesirable for food market, boll tissue may fall off seed once seed begins to dry down in storage, presence of loose membranes in a seed lot can cause issues for packaging for human consumption, a polisher may be able to remove boll tissue | | boll membrane (septae) tissue may be attached, rough appearance of seed coat is due to mucilage in seed coat absorbing moisture and causing boll tissue to stick to the seed which removes the shine on the seed coat, no impact on oil quality |
| grey coloured | Pasmo infection | No | undesirable for the food market, may be able to use colour sorter to remove | may reduce germination and/or vigour or cause seedling blight, boll blight or premature ripening if seeded | |
| dull black coloured | Alternaria infection | No | undesirable for the food market, can use colour sorter to remove | may reduce germination and/or vigour or cause boll blight or premature ripening if seeded | |
| moderately shiny black coloured | frost damage to immature seeds | Yes | undesirable for food market, may produce a darker oil with a more bitter taste, can use a colour sorter to remove | may have reduced germination and vigour if planted or may not germinate at all due to damage to the embryo | immature seeds can be damaged by temperatures of -1°C but are more commonly damaged when temperatures dip below -3 to -5°C. Immature seeds may be green or light yellow or light brown in colour and are still soft due to their high moisture content of (>30%). |
| bluish black coloured | Pasmo infection | No | undesirable for food market, can use a colour sorter to remove | may reduce germination and/or vigour or cause seedling blight, boll blight or premature ripening if seeded | |
| very shiny dark brown to black coloured | heated during storage | Yes | undesirable for food market but fine for the feed market in limited quantities, will produce a darker oil with a bitter taste | seed will not germinate when seeded | cotyledons inside the seed have an orange to dark brown colour, and seed may have a heated odour to it |
| dull seed coat | unknown (genetic?, environmental?) | No | may not be desirable for the food market, may be able to restore shine by using a polisher | | may be due to mucilage in seed coat absorbing moisture |
| germinated | high moisture conditions at harvest, genetics | Yes | undesirable for food market | seed will not germinate when seeded | radicle (embryonic root) is visible outside of the seed |
| bicoloured seeds | unknown (genetic?, environmental?) | No | undesirable for food market, can use a colour sorter to remove | | typically only present in low quantities |
| brown seeds in a yellow seeded lot | improper cleaning of equipment between different coloured seed lots, off-coloured seeds are damaged yellow seeds, genetics, environment | Yes | undesirable for food market, can use a colour sorter to remove | if mixture seeded, the amount of off-type seed will increase significantly with every generation of production | a type of admixture, food market often requires 1.5% or less brown seeds in yellow seeded lots |
| yellow seeds in brown seeded lot | improper cleaning of equipment between different coloured seed lots, off-coloured seeds are immature brown seeds, genetics, environment | Yes | undesirable for food market, can use a colour sorter to remove | if mixture seeded, the amount of off-type seed will increase significantly with every generation of production | a type of admixture |
| chaff | improper combine settings | Yes | low levels suitable for the food market, high dockage seed lots can be used for the crush or feed markets, easily removed through cleaning | chaff may act as a source of inoculum for a number of diseases (rust, pasmo, Fusarium, Alternaria, powdery mildew, stem break and browning) if planted with seed | can contribute moisture to seed that was dry when binned, chaff in a seed lot can cause issues for packaging for human consumption |
| weed seeds | ineffective weed control, herbicide resistant weeds, improper combine settings | Yes | low levels may be suitable for the food market, high dockage seed lots can be used for the crush or feed markets, some weed seeds are easier to remove through sieving than others | if seed lot planted, will contribute to the weed seedbank | common weed seeds in flax seed lots are canola, mustard, cereals, wild buckwheat, cleavers, lady's thumb and wild oats, can contribute moisture to seed that was dry when binned, can be a source of seed storage insect pests |

## 2019 Flax Seed Testing Results – Discovery Seed Labs

Seed testing can offer insight into the levels of certain diseases that were in the field and the potential impact on next year's crop. Each year Discovery Seed Labs tests flax seed samples from across Saskatchewan. Sandy Junek, the Molecular Lab Manager, provided a summary of their findings for the 2019 flax crop.

A total of 335 samples were tested for germination. The average germination was 86% and ranged from 18 to 99%. The average vigour for the 107 samples tested was 79% and ranged from 16 to 95%. No pasmo was detected on any samples but the incidence of *Alternaria* was very high with only 3 samples out of 107 being *Alternaria*-free. The average *Alternaria* spp. infection was 23.5% and samples ranged from 0 to 75% infection. Discovery Seed Labs also tests for the presence of anthracnose on flaxseed but none was found on samples from the 2019 crop.

Discovery SEED LABS

**For more information about flax harvest preparation contact the following:**


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**Useful links:**

1. Seed Quality:

- Photos of seed quality issues (Flax Council of Canada)
- Canadian Food Grade Flax (Flax Council of Canada)
- Effect of Fall Frost on Seed Quality (Saskatchewan Ministry of Agriculture)
- Seed Smart Alberta

2. Grain Storage:

- Manage Stored Grain (Canadian Grain Commission)
- Grain Storage (Alberta Agriculture & Forestry)
- Grain Storage Considerations (Alberta Agriculture & Forestry)
- Crop Storage (PAMI)
- Grain Drying and Storage (NDSU)
- Drying and Storage of Damp Grain (Manitoba Agriculture)
- The Process of Grain Aeration (Ron Palmer)
- Grain Drying Calculator (Ron Palmer)
- Grain Drying (NDSU)
- Fan Selection for Grain Bins (University of Minnesota)
- Moisture Content of Canadian Grains (Canadian Grain Commission)
- Flax Moisture Meter Conversion Table (Canadian Grain Commission)

3. Grain Grading

- Official Grain Grading Guide-Flaxseed Chapter (Canadian Grain Commission)
- Variety Designation List for Canada Western Flaxseed (Canadian Grain Commission)
- Harvest Sample Program information (Canadian Grain Commission)