

Hemp Seed Contract Addendum

In this addendum, the Seed CX economic team provides an overview of the cash market practices in the hemp seed market and how they are tied to the specific contract specs that will trade on our platform. While the following standards do not encompass all aspects of the market, they represent the overall standards displayed by producers and processors. There may be additional standards and requirements in more specialized aspects of the market that may have been overlooked. Although we have already spoken to 40 participants in the hemp seed industry to define our contract specification, we are always eager to hear thoughts, comments or questions from everyone in the hemp industry in order for us to continually improve our offering to the market. We want to hear your feedback!

Minimum standards

The hemp seed market has established minimum standards for hemp seed, specifically:

- (a) **The origin of the hemp seed must be from a plant with less than 0.3% THC** and grown in conformance with the relevant licensing or registration requirements where the hemp was grown. Some participants in the hemp industry also specify that the hemp seed itself contain less than 0.3% THC on a dry weight basis, however we decided not to include this specification. This specification is primarily to allay any legal concerns however biologically, this does not make sense, given that hemp seed does not produce or contain any THC (which is present only in the inflorescence of the plant).
- (b) **Free fatty acid (such as oleic acid) must not be greater than 2%.** Free fatty acids can first lead to spoilage of the crop in storage and also have an adverse effect on processing, particularly when dealing with seed for oil production¹. As a result, in the delivered hemp seed must be measured at no more than 2%, which represents the agreed industry standard.
- (c) **No orange/brown meats or include more than 1% green seeds.** Orange or brown meat are not acceptable for food grade processing as this inner kernel will be exposed during the dehulling process into hemp hearts and will degrading the oil quality during pressing. Green seeds are immature and may not be fit for processing or consumption. However, not all seeds mature at the same rate and immature seeds will inevitably be present during harvest. As such a 1% allowable limit has been established within the industry.
- (d) Must have at least the following tested characteristics:
 - a. The delivered hemp seed must meet the following **physical standards**:

Physical Characteristic	Standards
Moisture content	Less than or equal to 9%
Size	Greater than 5 ¼ / 64 “slotted sieve”

Moisture content is incredibly important for hemp seeds as the crop can quickly spoil if not properly dried. In order to ensure the longevity of the crop, the industry has coalesced around the standard that the freshly harvested hemp seeds be immediately dried within a few hours of harvest to a moisture level not exceeding 9%². The **size** of the hemp seed must meet certain requirements as measured by a slotted sieve since it affects the ability to process them. Specifically, when processing hemp seed into hemp hearts, the dehulling equipment needs to be calibrated to specific diameter. Consistency of the hemp seed is key since seed of varying size forces processors to have to recalibrate the processing equipment. Hemp seed that is smaller than the specified diameter may

¹ Free fatty acids must be removed during processing as they reduce the smoke point in frying fats and rapidly oxidize to give rancid flavors. The test gives a direct measure of the ability of the oil to be processed and is actually used to estimate the amount of lye required to refine oils. As this test is a reflection of seed quality, it reflects seed damage and grade. Top grade canola seed usually has less than 0.7% free fatty acids although in certain years in Eastern Canada and in 1989 in Western Canada this level was exceeded for as yet undetermined reasons. International specifications for top grade oil usually are set at 2% free fatty acids.

² <http://www.gov.mb.ca/agriculture/crops/production/print,hemp-production.html#harvesting>

not be processed and can cause impurities in the final product. For example, smaller hemp seeds that pass through the dehulling process may not have the hard-outer shell removed, exposing the seed meat. As a result, the final product may contain hard, intact seeds. Processors looking for seed to dehull into hemp hearts also prefer larger seeds as it is believed that it results in higher yields of the inner kernel in the final product. Size is not so critical when pressing for oil and meal.

- b. The delivered hemp seed must pass the following **quality assurance tests**:

Quality Assurance	Concentration
Gluten	< 20 ppm
Peroxide	< 4.0 meq/kg
Phenoxy/Neutral (Herbicide Screen)	Non Detectable
Sulfonylurea (Pesticide Screen)	Non Detectable
Organo-Phosphorus (Pesticide Screen)	Non Detectable
Organo-Chlorine (Pesticide Screen)	Non Detectable

While hemp seed do not contain any **gluten**, this test is used as proxy for cross contamination with other grains that do contain gluten, including wheat, barley, and oats. The **peroxide value**³ is a widely used test in the oilseeds industry and measures the level of rancidity within the seed. Rancidity marks spoilage and is characterized by unpleasant smells or tastes.

Herbicide and pesticide screenings are important as currently no herbicides, pesticides, or fungicides are approved for use on industrial hemp. The Environmental Protection Agency (EPA), the body that regulates and permits usage of these product, evaluates new pesticides and proposed uses. Only pesticides explicitly permitted for a particular crop may be used on that crop and to date, no such permission has been given for any of these products to be used on industrial hemp. This is also true of Canada. Currently, there are no in-crop registered pesticides, herbicides, insecticides or fungicides in Canada for the production of hemp for food. Thus, to ensure compliance with this regulation, hemp seeds must be tested for the presence of these products.

- c. The delivered Industrial Hemp Seed must pass the following **microbiological tests**:

Microbiological Test	Concentration
Aerobic Colony Count (ACC)	≤ 100,000 CFU/g ⁴
Coliforms	≤ 1000 CFU/g
Yeasts and Mold	≤ 1000 CFU/g
E. Coli	Non Detectable (<10)
Salmonella	Non Detectable (<10)

Microbial tests are standards within many agricultural commodities and ensure the safety of ready-made foods. These standards fall in line with those set by Health Canada in their microbial guidelines for ready-to-eat foods⁵ and also apply to flax and canola. The tests include: (i) the Aerobic colony count⁶, (ii) coliforms, which measure the general microbial levels, (iii) yeasts and mold, (iv) e.coli, and (v) salmonella.

³ One of the most widely used tests for oxidative rancidity, peroxide value is a measure of the concentration of peroxides and hydroperoxides formed in the initial stages of lipid oxidation. Milliequivalents of peroxide per kg of fat are measured by titration with iodide ion. Peroxide values are not static and care must be taken in handling and testing samples. It is difficult to provide a specific guideline relating peroxide value to rancidity. High peroxide values are a definite indication of a rancid fat, but moderate values may be the result of depletion of peroxides after reaching high concentrations.

⁴ This level applies specifically to hulled seed as standards for seed being pressed into oil may be more relaxed

⁵ http://publications.gc.ca/collections/collection_2014/sc-hc/H164-167-2013-eng.pdf

⁶ The Aerobic Colony Count (ACC), also referred to as the standard plate count or the total viable count, is one of the most common tests applied to indicate the microbiological quality of food. The significance of ACCs, however, varies markedly according to the type of food product and the processing it has received.

Grade

- (a) Based on interviews with cultivators and processors of hemp seed, the industry has coalesced around a system of premiums and discounts around three main quality features (damaged kernels, inner kernel color, and purity), that have been combined to form two grades. Various terms for the grades are used including 'no. 1' and 'no. 2', 'grade a' and 'grade b', 'seed for dehulling' and 'seed for pressing'.

Grade	Damaged Kernels	Inner Kernel Color	Purity
No. 1	≤ 1.00%	White ≤ 2% yellow	99.9%
No. 2	≤ 2.00%	White ≤ 4% yellow	99.5%

The grades define the quality of the hemp seed and determine how the crop will be used: whether the crop is destined for dehulling into “hemp nut” or “hemp hearts” or pressed into oil and meal⁷. Grade No. 1 requires no greater than 1% **damaged kernels** and 2% **yellow inner kernels**. The inner kernel of the seed is the white, fleshy center of the seed, that when exposed through dehulling is referred to as the hemp heart. Since the inner kernels will be exposed during the dehulling process, producers want to ensure that the white kernels that consumers are accustomed to seeing are the predominate color within the product. Conversely, hemp seed destined for pressing into oil does not require this visual aesthetic as the inner kernel will never be shown to the consumer. Additionally, purity standards, which measure the cleanliness of a crop and the presence of additional plant material are much higher for grade No. 1 as these seeds will be consumed directly by the customer with grade No. 2 being pressed into oil and meal.

⁷ While larger producers and processors may use these standards, they may not be as readily adopted by middle sized or smaller market participants. In fact, several smaller producers and processors did not know of the existence of this grading standard.

