HempTrain™ for CBD: Drastic Capital and Operating Cost Reduction by Processing Fresh/Green Hemp

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1. Executive Summary

While the hemp industry in North America is poised for significant growth, the enormous world-wide hemp marketplace will remain highly competitive in light of growing supplies from countries with low labor costs. For a North American hemp industry to succeed it must be equipped for higher productivity.

One of the main multi-billion-dollar business segments of the overall hemp industry is CBD – a high-value, fast growing business, which is yet quickly becoming crowded and fragmented. CBD-producing businesses must become productive to succeed domestically and world-wide. This whitepaper highlights a currently-available technological advance in hemp processing – HempTrain™ – as a means to attain multi-million-dollar reduction in installed capital and very significant reduction in CBD losses.

Figure 1 *– HempTrain™ Advanced Processing Plant (engineered, designed, and manufactured by Canadian Greenfield Technologies Corp.) – sidelong image (top) and end-on image (bottom).*

2. Overview

Current CBD market projections predict the CBD market to be worth USD$22B by 2022.[1,2] With the introduction of the Agriculture Improvement Act of 2018 (2018 US Farm Bill), the market price of CBD is predicted to decrease dramatically, as supply will surge, transitioning from marijuana-derived to industrial hemp-derived feedstocks.[3,4] While the current high price of CBD allows enough room in profit margin to allow for inefficient CBD production methods, the eventual decrease in CBD market price will erode these margins until only the most efficient producers will see significant profitability. The greatest overall efficiencies will be found in changes to feedstock preparation aimed at un-delayed processing of fresh/green feedstock, which has the maximum CBD retention capacity.

For the hemp industry to grow, there must substantial value-add to using hemp materials. These value-add materials must be reproducible, high-quality, high-performance, and high-value. While farmers concentrate on feedstock production, it is processors that will create these high-value products. The technologies to produce these high-value products will need to be advanced, producing new materials that cannot be produced through conventional technologies.

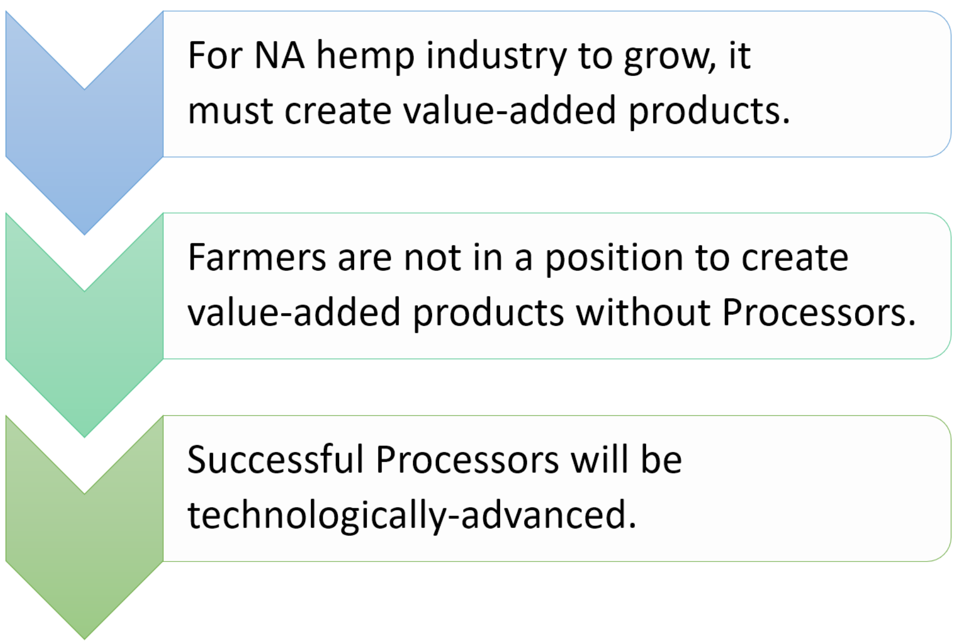

Figure 2 *– Hemp industry criteria for growth and success.*

Demonstrated herein, using an innovative and advanced processing technology called a HempTrain™ Advanced Processing Plant, substantial efficiencies can be instilled in the CBD production chain, through the separation of the most CBD-extraction suitable material from the lower CBD material in fresh/green mass. The efficiencies gained using a HempTrain™ for processing lead to a) significant capital and operational savings on extraction and drying facilities (millions of dollars), b) increase in CBD retention, and c) the realization of additional high-value streams (green microfiber, hurd fiber, bast fiber, and seeds).[5]

3. Industry Assumptions of Mass Availability of Feedstock

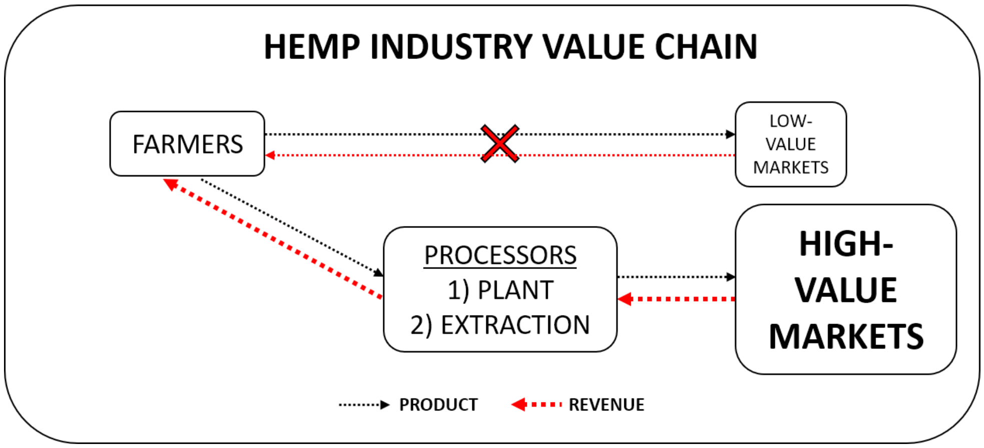

Figure 3 *- Hemp Industry Value Chain*

For the purposes of this whitepaper, three important assumptions have been made about the mass availability of feedstock. They are:

1) Farmers will be reluctant to invest heavily in specialty hemp harvesting machinery;
2) Hemp processing will therefore be shifted downstream to hemp processing entities;
3) Hemp processors may produce CBD-feedstock or CBD products, but in either case will be motivated to produce the highest-efficiency feedstock to either command higher price feedstock or attain lowest production cost CBD manufacturing.

CBD processing from the industrial hemp arena can come from three categories of producer: farmers, farmer/processors, and processors with contracted farmers.

- Farmers are the most upstream component and are the least likely to extend activities into more downstream processing;

- Farmer/Processors are therefore those growing, harvesting, and processing for CBD with most acres grown on their own lands (the minority situation);

- Processors with contracted farmers are more capable of supporting the greatest capital outlay (the majority situation). This group is the most likely to invest in processing equipment. This group will be most competitive when a) producing and selling high-CBD feedstock to extractors, and/or b) producing high-CBD feedstock to extract themselves, as well as c) profiting from additional high-value streams.

4. Terms of Reference

The CBD production industry is moving into the contracted cultivation and harvesting of industrial hemp biomass by farmers, with the farmers selling the “tops” biomass. These tops are currently harvested as this is the most practical method for conventional farm equipment, resulting in the removal of a maximum of hemp flower material, while minimizing attached hemp stalk. The stalk is minimized when harvesting hemp for CBD as there is no appreciable amount of CBD in the stalk material. Stalk material negatively affects CBD production, by:

1) Increasing handling
2) Increasing water retention
3) Decreasing CBD concentration (dilution) in feedstock

Conventionally, using “tops” as a feedstock material to be processed through extraction facilities is more efficient than processing whole stalks, which is way more capital intensive, without any increase in CBD production. Furthermore, feedstock should remain fresh/green for the best CBD retention, but prior to CBD-extraction requires substantial drying and/or requires an increase in extraction processing capacity.

Of all fractions attainable from industrial hemp tops, the most suitable CBD-bearing fraction constitutes ~25% of the feedstock. Separation of this fraction from fresh/green tops is not possible using any conventional means and can only be accomplished using a HempTrain™ Advanced Processing Plant. Un-delayed fresh/green processing is a must in order to retain a maximum of attainable CBD.

5. Attainable Hemp Fraction/Streams

Note: Calculated values will utilize fraction values taken from Western Canadian Katani and CFX-1 hemp (2019 harvest).

The fractional breakdown of two common industrial hemp varieties grown for CBD are depicted (**Figure 4**), per unit of whole plant material. While there is indeed some variation, the relative proportions are similar. **Figure 5** demonstrates the attainable fractions using different processing methods and how HempTrain™ separation can lead to a more efficient extraction-ready fraction, while lack of separation in conventional methods leads to dilution of available CBD.

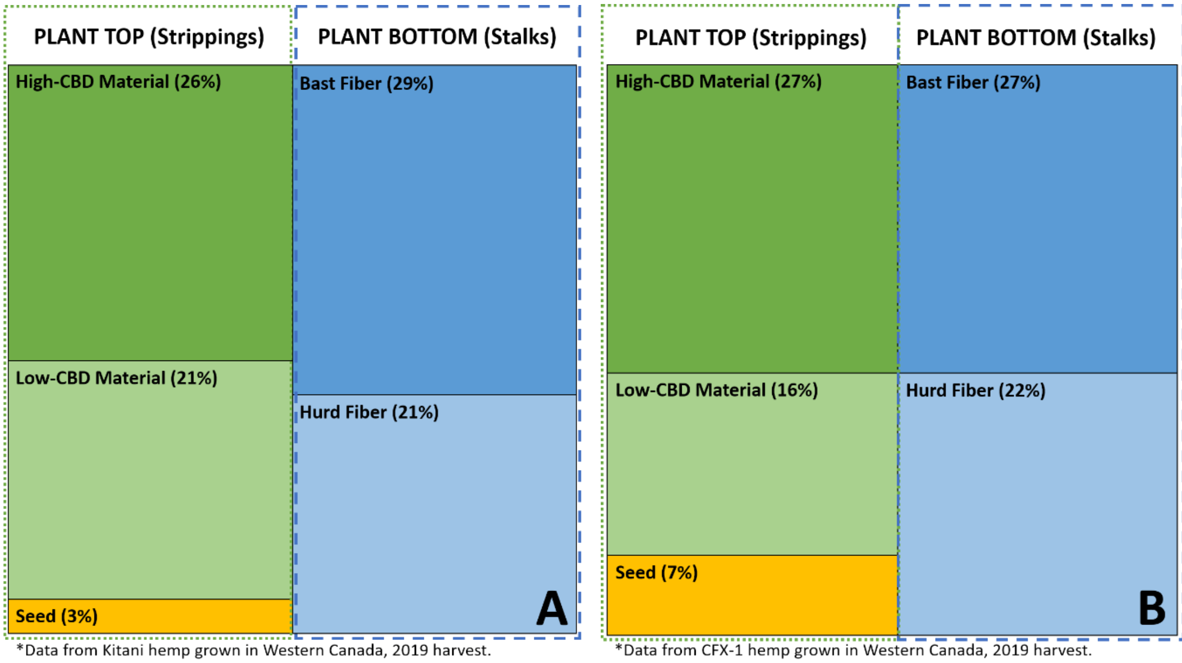

Figure 4 *– Whole Plant Hemp Fractions/Streams and their representative percentage quantities for A) Katani (Western Canada, 2019 harvest) and B) CFX-1 (Western Canada, 2019 harvest).*

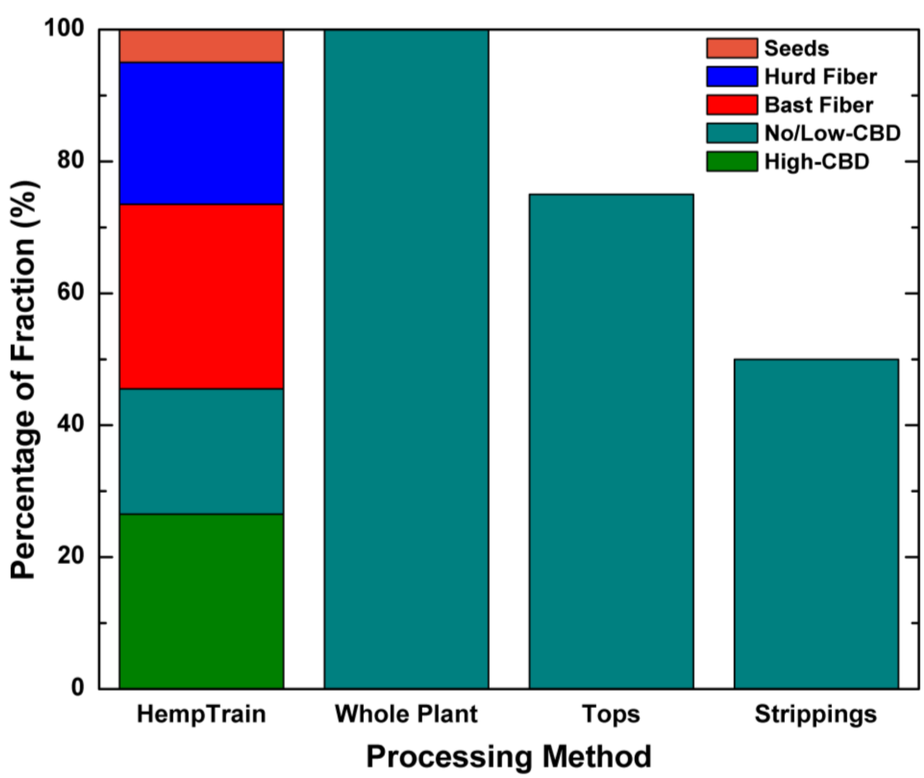

Figure 5 *– Comparison of extraction attainable fractions via different processing methods (including High-CBD fraction in green and no/low-CBD fraction in cyan).*

5.1 Hemp Fractions via HempTrain™ Advanced Processing Plant

The HempTrain™ Advanced Processing Plant can separate both fresh/green and dry hemp material, of any form, into high-value fractions. Though this whitepaper will concentrate on green/wet separation for CBD, please read "Increasing Total Attainable CBD at Lower Production Cost Using Innovative Hemp Processing" for more information on dry processing of hemp for bast fiber, hurd, and green microfiber.[5]

By using HempTrain™ for processing fresh/green hemp plant material, the feedstock can be added as stripped flower/leaf, tops, or whole plants. Dependent on the fractions of interest, a HempTrain™ can separate up to 5 separate streams from a single feedstock; a high-CBD fraction and seeds when hemp is processed in a fresh/green state, and bast fiber, hurd, green microfiber, and seeds after drying.

5.1.1 High-CBD Fraction

This material consists of the bud/flower leaves and contains ~200% more CBD than larger "sugar" leaves, and ~900% more CBD than fan leaves.[6] This material can be separated using a HempTrain™, from either wet or dry hemp (whole plant, tops, or stripped). This fraction represents ~26-27% of the hemp plant biomass (see **Figure 6**).

Key Points:

- Immediately available for priority CBD extraction;
- Maximum CBD retention;
- Easier to dry/extract CBD.

5.1.2 Bast Fiber Fraction

This material consists of the exterior structural fiber of the hemp plant.[7] This material can be separated using a HempTrain™, from dry hemp (whole plant or bottom part), in order to obtain long, strong structural bast fiber.[5] This fraction represents ~ 27-29% of the hemp plant biomass (see **Figure 7**).

Key Points:

- Fiber is long, strong, undamaged, and intact;
- Ideal for high-value/high-performance structural reinforcement or high-end textile applications.

5.1.3 Green Microfiber Fraction

This material consists of all remaining material outside of the high-CBD material stream, after separation of wet hemp using a HempTrain™ (whole plant, tops, or stripped). This stream can be further separated when dry into a secondary priority CBD feedstock, bast fiber, and hurd fiber. This fraction represents ~16-21% of the hemp plant biomass (see **Figure 6** and **Figure 7**).

5.1.4 Hurd Fiber Fraction

This material consists of the woody interior structure of the hemp plant.[7] This material can be separated using a HempTrain™, from dry hemp (whole plant or bottom part), in order to clean, absorbent hemp hurd.[5] This fraction represents ~21-22% of the hemp plant biomass (see **Figure 7**).

Key Point:

- Cleanliness and size-specificity derived by the HempTrain™ leads to hurd particles ideal for cat litter, food preservation, building materials, and garden products, amongst others.

5.1.5 Seed Fraction

A substantial quantity of seeds can be separated from both wet and dry feedstocks, when using a HempTrain™. Removing these seeds reduces contamination in all other streams, as well as decreasing or eliminating the need to use acreage for next season's seeding. This fraction represents ~ 3-7% of the hemp plant biomass (see **Figure 6**).

Figure 6 *– Fresh/Green processing separation of High-CBD Fraction (left) from seeds (center) and Low-CBD Green Microfiber Fraction (right)*

Figure 7 *- Dry processing separation of bast fiber (left), hurd fiber (center), and green microfiber (right).*

5.2 Top Cutting Method

The "Top Cutting Method" is a harvesting methodology whereby the top portion of the hemp plant, containing the green/wet hemp flowers and leaves and a significant portion of the stalk, are removed via commercial combine harvester. The top material is typically captured by a chaff collector system, which then transports the CBD-bearing material to processing for drying and/or extraction. This method is capable of separation of industrial hemp into two fractions: plant stalk tops with flower and leaves attached, and plant stalk bottoms.

5.2.1 "Tops"

This material consists of ~25% high-CBD bud/flower leaves diluted by ~75% low or non-CBD bearing material.

Key Points:

- This fraction is unseparated and difficult to condition (i.e. separate high-CBD material from low or non-CBD bearing material);
- More expensive to dry, as including significant portion of material that does not contain CBD (and will incur additional CBD loss);
- More expensive to extract, as including significant portion of material that does not contain CBD (dilute extraction feedstock);
- All additional handling steps result in CBD losses;
- Loss of high-value additional fractions.

5.2.2 Lower Part of Plant

This material consists of all remaining material outside of the top fraction. Depending on harvesting equipment, this may be cut concurrently with the top cutting action or be performed at a later time with more traditional harvesting equipment.

Key Point:

- Low value without further separation, but with separation can then be converted into valuable fiber and hurd;

6. Extraction-Ready Feedstock Efficiency

As extraction overhead and capital is costly, feedstock should contain the greatest concentration of CBD. By the un-delayed separation of a concentrated CBD-rich feedstock from fresh/green biomass, significant processing efficiencies can be attained.

The below graphs were determined using the following data:

1) CBD concentrations in the bud leaves are ~3x higher (i.e. 200x higher) than those on the sugar leaves - the concentrations can then be conservatively calculated using 3% CBD for bud leaves, 1% for sugar leaves, and 0% for bast fiber and hurd fiber.[6]

2) Mass fraction when “Tops” have been processed using HempTrain™ separation was determined that actual quantity is 50% flower/leaves (itself is 50%/50% high-CBD/low-CBD material) and 50% hurd/bast fiber. Calculations using these values are available in Appendix B.

6.1 Feedstock Use Efficiency

Figure 8 depicts the efficiency of HempTrain™-separation to process feedstock for CBD extraction. A HempTrain™ will separate the high-CBD fraction from fresh/green material, creating an extraction-ready stream. When compared to conventional feedstock, this fraction contains 203% (~3x) more CBD per tonne of feedstock material.

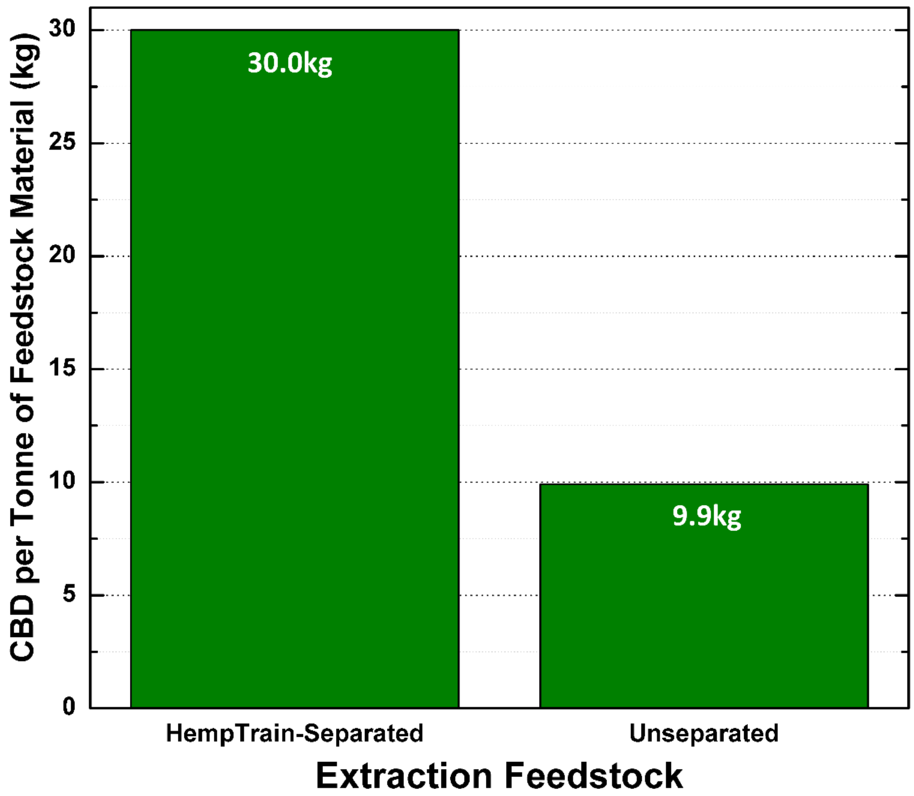

Figure 8 *- Graph of CBD per tonne of processed feedstock material when feedstock is separated using a HempTrain™ vs. conventionally processed*

6.2 Extraction Efficiency

Figure 9 depicts the efficiency of the HempTrain™-separated high-CBD fraction used for extraction relative to conventionally used cut top feedstock material. When used as a feedstock for extraction, 1kg of CBD can be extracted from only 33% of the material that would conventionally be used. This upgrading leads to a significant reduction in required extraction capacity, operational, and capital costs.

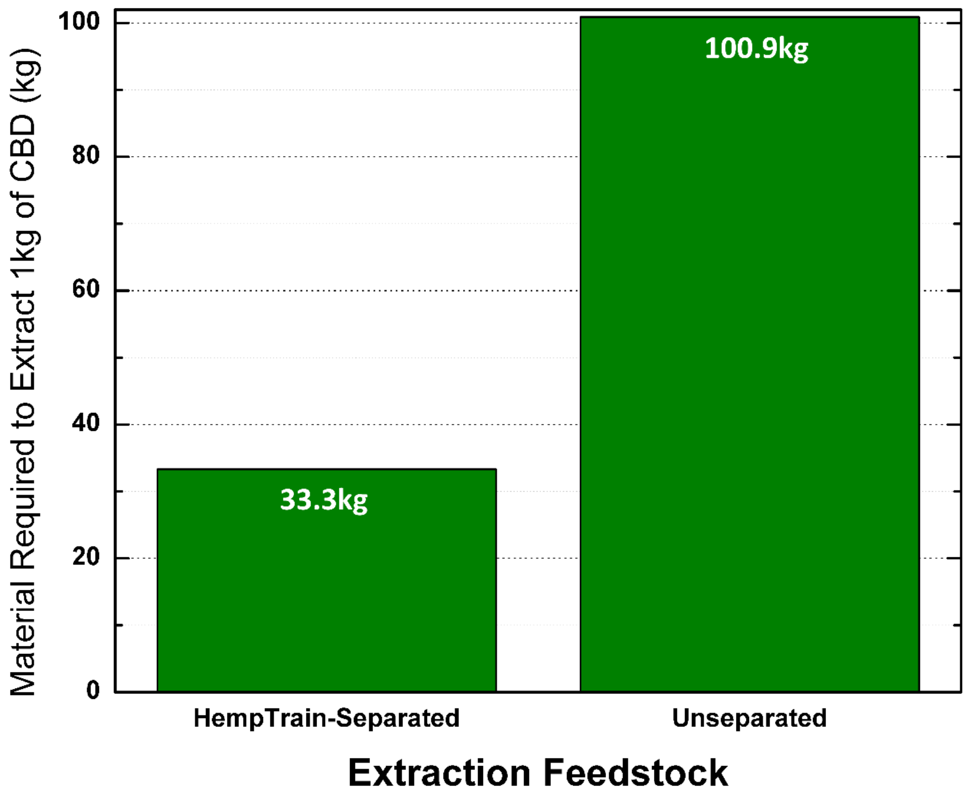

Figure 9 *– Graph of processed material required to extract 1kg of CBD when extraction feedstock is separated using a HempTrain™ vs. conventionally processed*

6.3 Loss of Attainable CBD

Each processing step reduces the amount of attainable CBD by a certain amount. The exact loss per step is dependent on a variety of factors but is conservatively estimated as 10% for the purposes of this explanation. Though this list does not incorporate all loss events, it does highlight conventional processing steps, such as:

6.3.1 Cultivation

Hemp is an agricultural crop and is therefore subject to many of the same cultivation problems present when growing other crops. Losses can be due to pests, weeds, weather conditions, crop conditions, etc.

6.3.2 Harvesting

The collection of CBD-bearing material from field-grown hemp requires handling. This handling can either be from manual harvesting (multiple, less aggressive loss activities) to combine harvesting (fewer, more aggressive loss activities). Harvesting efficiency considers both the loss of material remaining in the field, and the amount of trichomes lost during agitation of the flowers and leaves.

6.3.3 Stripping/Chaff Collection

When capturing harvested biomass, it is collected in the field as another handling step. This most often takes the form of a chaff collector but can include specialty stripping equipment, which removes most of the flowers and leaves from the stalk. This step must balance the capture of a maximum amount of material with minimal agitation.

6.3.4 Wet Processing

Wet processing incorporates any and all handling steps that are involved with the processing of fresh/green material once collected from the field. This can take many forms, but can include handling before drying, removal of stalk material, screening, granulation, etc.

6.3.5 Drying

Drying can be required for multiple reasons in conventional processing, from whole plant drying to the drying of feedstock for CBD extraction. Drying is the transfer of water to one medium away from another. Higher temperatures, surface interaction, and surface area all increase drying efficiency, but heat, agitation, and size reduction are detrimental to attainable CBD quantity. Furthermore, the inclusion of any non-CBD bearing stalk material increases your drying requirements ~2-3x, leading to increased loss then removing moisture from the additional material.

6.3.6 Dry Processing

Once dry, any classification, sieving, screening, or granulation steps result in further CBD loss. The CBD-retention capacity of the dry material is also significantly lower than that of fresh/green hemp, leading to even greater loss at these steps. Extraction feedstock preparation must minimize both the amount of handling and the quantity of non-CBD bearing material.

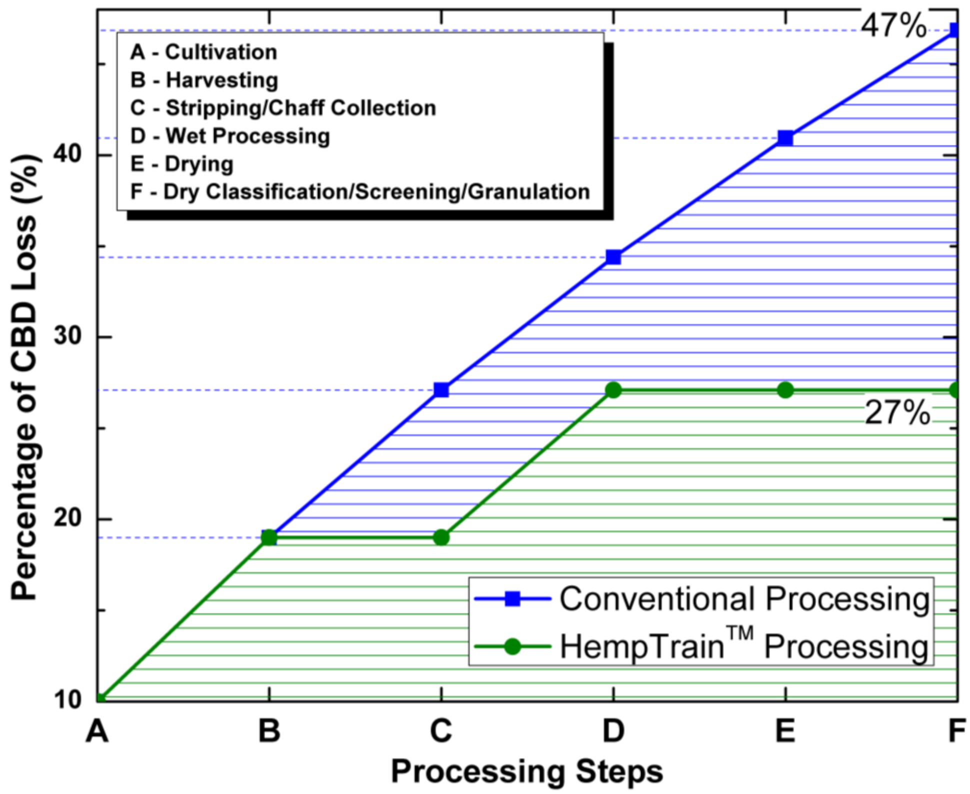

Figure 10 *– Graph of CBD loss with conventional processing vs. processing using a HempTrain™ Advanced Processing Plant (assuming 10% loss per processing step)*

Figure 10 graphs the percentage loss of CBD for each processing step, assuming only 10% loss of attainable CBD at each of these step (data in *Table 1* and *Table 2*). As a HempTrain™ Advanced Processing Plant can separate the high-CBD material from fresh/green feedstock containing hemp stalk, stripping/chaff collection is not a required step (***Figure 10*** – Processing Step C). Furthermore, as the material from a HempTrain™ is already separated and sized, no further drying of classification after drying is required (***Figure 10*** – Processing Steps C and D). Should drying be required by the extraction technique, losses are minimized over conventional feedstock due to the high surface area and minimal non-CBD bearing material. Therefore, a lower temperature, less agitation, and a lower dryer retention time is required for the same or greater throughput in comparison to conventional processing.

*Table 1 – Table of CBD loss with conventional industrial hemp processing (assuming 10% loss per processing step) – Data graphed in **Figure 10**.*

	Conventional Processing Steps	**CBD Retained (%)**	**CBD Lost (%)**
A	Cultivation	90	10
B	Harvesting	81	19
C	Stripping/Chaff Collection	73	27
D	Wet Processing	66	34
E	Drying	59	41
F	Dry Classification/Screening/Granulation	53	47

*Table 2 – Table of CBD loss using HempTrain™ Advanced Processing Plant for industrial hemp processing (assuming 10% loss per processing step) - Data graphed in **Figure 10**.*

	Conventional Processing Steps	CBD Retained (%)	CBD Lost (%)
A	Cultivation	90	10
B	Harvesting	81	19
D	HempTrain™ Processing	73	27

Note: Extraction results in a further loss to attainable CBD quantity. There are multiple extraction methods available (e.g. supercritical CO_2, ethanol, hydrocarbon, etc.), but extraction must balance the loss of CBD against the inclusion of all extractable bio-components. Typically, extraction loss is much higher than 10%.

7. Payback Through Efficiencies

7.1 Loss Reduction

To determine the profitability achievable through efficiency gains, several conservative assumptions should be made:

1. Assume the reduction in CBD value over time mentioned in the overview section of this whitepaper, conservative estimates of CBD value can be considered $0.5/g by plant processors, and $1.0/g by extractors;
2. Assume the whole plant biomass concentration of CBD is estimated at 0.5%;
3. Assume 2000 acres of hemp grown for CBD, at 2T per acre.

2000 acres of hemp at 2T per acre would produce 4000T of feedstock. At 0.5% CBD this feedstock would contain 20T of CBD. Processing with the use of a HempTrain™ reduces losses by 20% over conventional processing (see Section 6). 20% reduction of CBD loss from 20T of CBD is 4T of CBD saved. This means that the use of a HempTrain™ for CBD processing saves a plant processing company $2 million, or an extractor company $4 million.

These results demonstrate that even at low future CBD prices, and with only 2000 acres, a HempTrain™ provides enough advantage to pay for itself with solely loss reduction, due to reduction of processing steps only. Obviously, the significant efficiencies, described alone, related to CBD feedstock separation, will substantially contribute to the overall profitability.

7.2 Supercritical CO_2 Extraction Capital Savings

The impact of the high-CBD fraction as a feedstock for extraction can be emphasized by considering supercritical CO_2, though the impact on other extraction technologies is still profound.

A quote from a leading Canadian supplier of supercritical CO_2 extraction equipment stated that it would cost CAD$3.5 million for the ability to extract from 150T of feedstock per year. If only industrial hemp tops are considered conventional feedstock for extraction, a reasonable biomass yield can be considered 1T per acre.

Conventional Feedstock
2000 acres @ 1T/acre = 2000T of feedstock.
$3.5M extraction equipment x (2000T/150T) = $46.7M of extraction equipment.
Should prices of extraction systems drop to 1/3 of their current prices, it would cost **$15.6M to extract from 2000 acres of feedstock**.

HempTrain™-Separated Feedstock
Using the high-CBD fraction separated using HempTrain™ Advanced Processing Plant, 2000 acres of material would be concentrated into 520T of feedstock.
$3.5M extraction equipment x (520T/150T) = $12.1M of extraction equipment.
Should prices of extraction systems drop to 1/3 of their current prices, it would cost **$6.0M ($4.0M of extraction equipment + $1.94M for a HempTrain™) to extract from 2000 acres of feedstock.**

Therefore, even with the purchase of a HempTrain™, the extraction capital is 62% less expensive, and enables far more cost-effective expansion.

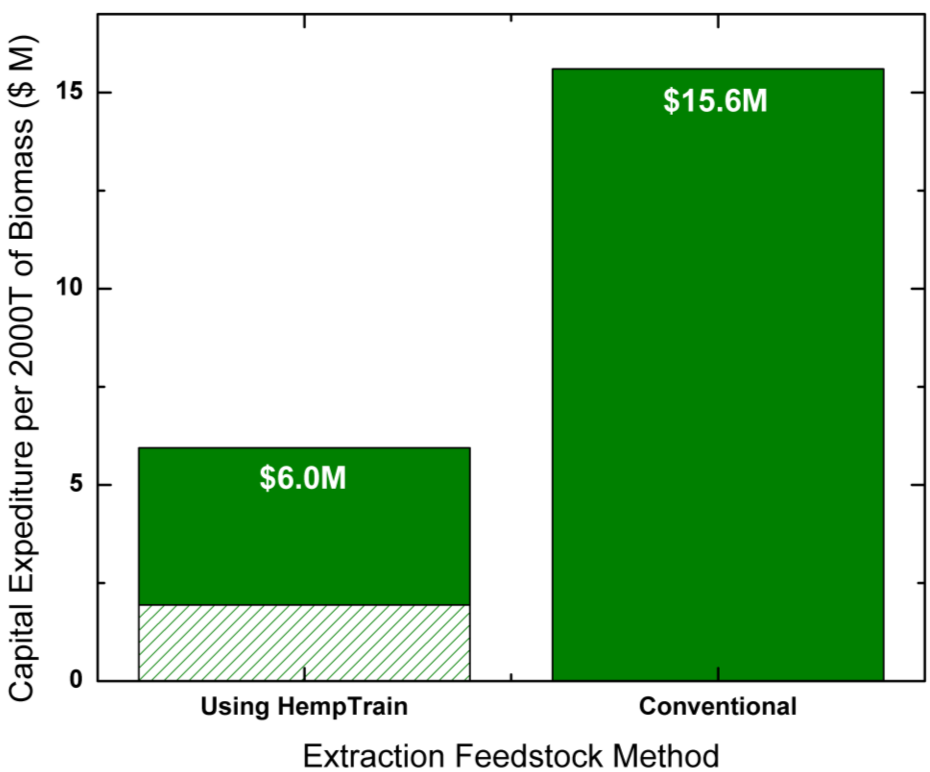

Figure 11 *- Comparison of capital expenditure for 2000T of biomass using a HempTrain™ and prepared conventionally.*

8. Conclusions

It is evident that, while the potentially multi-billion-dollar hemp industry in North America is poised for significant growth, value-added products, efficiency and productivity will be the key for successful businesses in the hemp space. As mentioned in **Figure 2**, these criteria are:

a) For the North American hemp industry to grow, it must create value-added products;
b) Farmers are not in a position to create these value-added products without Processors; and
c) Successful Processors will be technologically advanced.

As CBD is one of the main multi-billion-dollar business segments of the overall hemp industry, competition amongst domestic and world-wide CBD-producing businesses will force technological advancement. The information contained in this whitepaper highlights a currently-available technological advance in hemp processing – HempTrain™ – as a means to attain multi-million-dollar reduction in installed capital, very significant reduction in CBD losses, and the means to realize additional high-value streams (green-microfiber, hurd fiber, bast fiber, and seeds).

9. Acknowledgements

Special thanks to Jan Slaski, Ph.D., P.Ag (Dist) of Innotech Alberta, and Rod Lanier of NeverIdle Farms Ltd, for their insights, and for continuously being on the leading edge of the hemp industry.

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Appendix A - Supporting Calculations

HempTrain™

Processing of whole hemp plants (Kitani and CFX-1, Western Canada, 2019 harvest) material yielded 26-27% high-CBD material and 16-21% low-CBD material (as well as 3-7% seed, 21-22% hurd fiber, and 27-29% bast fiber). As bud leaves contain ~3x the quantity of CBD that "sugar leaves" do, it can be assumed that there is 3% CBD in the high-CBD material and 1% in the low-CBD material (see Figure B1 in Appendix B). HempTrain™ manages to separate out the fraction which contains ~75-76% of the total available CBD.

For Katani (Western Canada, 2019 harvest)
26% x 1kg = 0.260kg high-CBD material per 1kg total material
74% x 1kg = 0.740kg low-CBD material per 1kg total material

0.260kg of high-CBD material x 3% extractable CBD = 0.008kg CBD per 0.260kg of material = **0.031kg of CBD per 1kg of material**

For CFX-1 (Western Canada, 2019 harvest)
27% x 1kg = 0.270kg high-CBD material per 1kg total material
73% x 1kg = 0.730kg low-CBD material per 1kg total material

0.270kg of high-CBD material x 3% extractable CBD = 0.008kg CBD per 0.270kg of material = **0.030kg of CBD per 1kg of material**

Conventional 3:1

For Katani (Western Canada, 2019 harvest)
(0.260kg of high-CBD material x 3% extractable CBD) + (0.740kg of low-CBD material x 0.3% extractable CBD = 0.008kg + 0.0021kg = **0.010kg of CBD per 1kg of material**

For CFX-1 (Western Canada, 2019 harvest)
(0.270kg of high-CBD material x 3% extractable CBD) + (0.730kg of low-CBD material x 0.3% extractable CBD = 0.008kg + 0.002kg = = **0.010kg of CBD per 1kg of material**

Percentage of CBD in high-CBD material (Katani, Western Canada, 2019 Harvest)
0.031kg CBD / (0.031kg CBD in high-CBD material + 0.010kg CBD in low-CBD material) = **76%**

Percentage of CBD in high-CBD material (CFX-1, Western Canada, 2019 Harvest)
0.030kg CBD / (0.030kg CBD in high-CBD material + 0.010kg CBD in low-CBD material) = **75%**

Appendix B - Supporting Independent Test Results

KEYSTONE LABS

TESTING REPORT

Keystone Labs Inc.
7225 Roper Road SW
Edmonton, Alberta
T6B 3J4 CANADA
Tel: (587) 458-8411
Email: key@keystonelabs.ca

Client Name:
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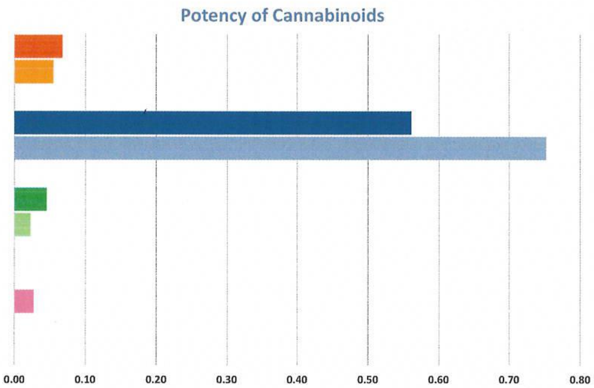
Date Complete: 19-Sep-19
Keystone Job #: 996-190908B
Keystone Assay#: 4033-273
Keystone Sample#: 19-4463
Invoice#: 191095

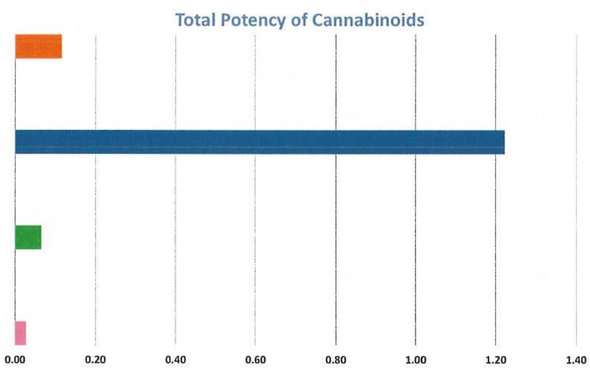
METHOD: DETERMINATION OF PHYTOCANNABINOIDS IN CANNABIS BY HIGH PRESSURE LIQUID CHROMATOGRAPHY (HPLC)

Sample Description: CGT-20190904_W_GMF

Potency Profile	Percentage (%) (w/w)
Δ9-THC	0.07
THC-A	0.05
CBD	0.56
CBD-A	0.75
CBG	0.05 **BQL**
CBG-A	0.02 **BQL**
CBN	0.00
CBC	0.03 **BQL**
THCV	0.00
CBDV	0.00



Potency Profile	Total Percentage (%) (w/w)
THC - Total	0.12
THCV - Total	0.00
CBD - Total	1.22
CBDV-Total	0.00
CBG - Total	0.06 **BQL**
CBN - Total	0.00
CBC - Total:	0.03



THC : CBD RATIO: 1 : 10

Quantitation: A conversion factor of 0.877 is used for adjustment of the molar mass of THC-A and CBD-A; a conversion factor of 0.878 is used for CBG-A; both after decarboxylation. These conversion factors were not applied to other cannabinoids.

BQL = Below Quantitation Limit, for information purposes only.

ACTIVATED Total: **0.70**

Activated Total: Cannabinoids that have been activated through decarboxylation (curing/storage of flowers, or heating/cooking of edibles and concentrates).

Δ9-THC + CBN + CBD + CBG + CBC

Prepared by: Rod Szarka, Vice President

Reviewed by: Jodi McDonald, President

PRODUCT TESTED ASSURED
KEYSTONE LABS

Figure B1 *– Fresh/green processed high-CBD fraction (CRS-1, Western Canada, 2019).*

KEYSTONE LABS

TESTING REPORT

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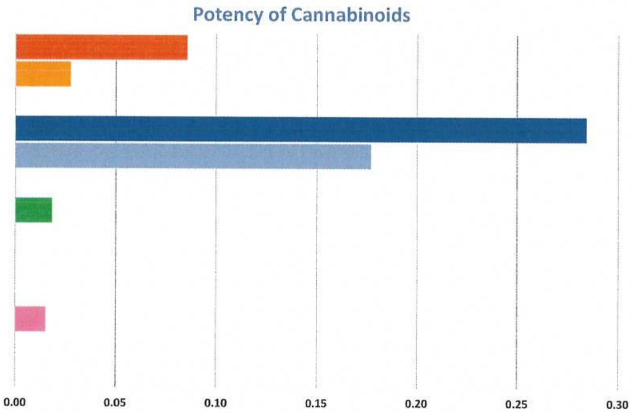
Date Complete: 19-Sep-19
Keystone Job #: 996-190908B
Keystone Assay#: 4033-273
Keystone Sample#: 19-4464
Invoice#: 191095

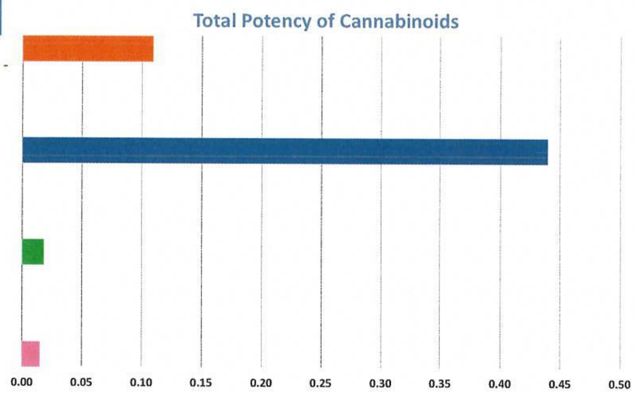
METHOD: DETERMINATION OF PHYTOCANNABINOIDS IN CANNABIS BY HIGH PRESSURE LIQUID CHROMATOGRAPHY (HPLC)

Sample Description: CGT-20190904_W_L

Potency Profile	Percentage (%) (w/w)
Δ9-THC	0.09
THC-A	0.03 **BQL**
CBD	0.28
CBD-A	0.18
CBG	0.02 **BQL**
CBG-A	0.00
CBN	0.00
CBC	0.01 **BQL**
THCV	0.00
CBDV	0.00



Potency Profile	Total Percentage (%) (w/w)
THC - Total	0.11
THCV - Total	0.00
CBD - Total	0.44
CBDV-Total	0.00
CBG - Total	0.02 **BQL**
CBN - Total	0.00
CBC - Total:	0.01 **BQL**



THC : CBD RATIO: 1 : 4

Quantitation: A conversion factor of 0.877 is used for adjustment of the molar mass of THC-A and CBD-A; a conversion factor of 0.878 is used for CBG-A; both after decarboxylation. These conversion factors were not applied to other cannabinoids.

BQL = Below Quantitation Limit, for information purposes only.

ACTIVATED Total: **0.40**

Activated Total: Cannabinoids that have been activated through decarboxylation (curing/storage of flowers, or heating/cooking of edibles and concentrates).

Δ9-THC + CBN + CBD + CBG + CBC

Prepared by: Rod Szarka, Vice President

Reviewed by: Jodi McDonald, President

PRODUCT TESTED ASSURED
KEYSTONE LABS

Figure B2 *– Fresh/green processed low-CBD green microfiber fraction (CRS-1, Western Canada, 2019).*