

Canadian CBD

Overview

Hemp has historically been grown for two major purposes: seed and fiber. In recent years however, a new hemp derived product has been rapidly increasing in popularity, cannabidiol or CBD. This compound can be extracted from the hemp plant through a variety of techniques and can be used for a plethora of health and nutritional purposes. While demand for CBD has been growing, particularly in the United States, it is currently prohibited to extract CBD from industrial hemp in Canada despite it being legal for grain and fiber cultivation. Hemp is produced in Canada under permits issued by Health Canada which allow cultivation of stalks and grain with the remaining parts of the plant, those containing the highest concentration of CBD, prohibited from being harvested and often left to decompose in the field.

In the United States and Europe, hemp cultivators utilize these other parts of the plant to extract CBD for sale to feed the growing demand for the product. In 2016, Health Canada¹ reported 76,333 registered acres² of hemp within the country and while this figure represented officially registered acres and not planted acres, it still places Canada as one of the largest hemp producing countries in the world. Many CBD producers in the United States and Europe are looking towards Canada with interest as those 76,333 acres could potentially represent a large quantity of CBD if extraction were to become permissible. This would naturally shift supply, which would then have an impact on price and market dynamics. It is not currently clear if or when the Canadian government will legalize the extraction of CBD, with some market participants stating 2017 while other believing it will take several years. Nevertheless, it is important to analyze the potential impact that Canada could have on the CBD market by estimating the volume of CBD that could potentially hit the market if CBD extraction were to become legal.

Estimating Canadian CBD Potential

The 76,333 registered hemp acres in Canada in 2016 represent a significant source of potential CBD. In order to establish an estimate on potential quantity in grams, figures on CBD yields per acre must be estimated. An average yield of CBD in North America hemp production has yet to be reliably estimated³ but several estimates exist.

Due to its legal status in Canada, hemp can only be harvested for the grain and fiber. The remaining byproduct, which contains the highest concentration of CBD, is left in the field to decompose. Estimates place this byproduct at around 1,000 kg of dry material per acre for Canadian cultivars. While a variety of harvesting techniques exist, with 76,333 registered acres, hemp in Canada needs industrial scale harvesting in order to timely harvest these large acreages. Combine harvesters are typically employed for grain harvest; however, this harvesting technique is unable to capture this byproduct completely with around one third of this byproduct disappearing due to losses in harvest. While other techniques would mitigate this loss, currently in Canada these would be unfeasible due to the large acreage. This results in 666 kg of dry byproduct per acre. Canadian hemp varieties are bred exclusively for their grain and as a result have a low concentration of CBD at around only 1%-2% on a dry weight basis with certain varieties having slightly more. Using this range of concentrations results in a yield of 6.66 -13.32 kg of CBD per acre presently in Canada.

Of the 76,333 registered acres, fewer acres will likely be harvested because there can be instances of crop failure and not all registered allotments are actually even planted. Assuming around two-thirds of registered acres are harvested produces an acreage estimate of 50,888.

¹ Health Canada acts as the administrative and regulatory body of the industrial hemp program under the Industrial Hemp Regulations provision of the Controlled Drugs and Substances Act.

² Official acreage reported by Health Canada. Accessed through Canadian Hemp Trade Alliance. <http://www.hemptrade.ca/>

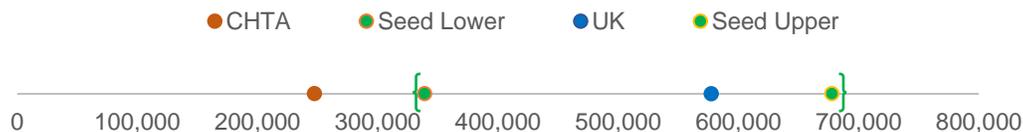
³ The University of Kentucky is currently conducting agronomic research trials to establish baseline CBD yields as well the impacts of several variables on these yields. Reports on the initial stages are expected to be published in early 2017 with replication studies the following growing season.

Using this acreage figure in conjunction with the range of CBD yields can give an estimate for the production potential of Canada if CBD extract were permitted immediately and gives a range of 338,914 – 677,828 kg of CBD.

Estimates from other sources have begun circulating as CBD popularity has increased in recent years. A recent paper published by the Canadian Hemp Trade Alliance⁴ (CHTA) regarding the legal status of CBD extraction in Canada stated that “a field of hemp is estimated to produce over 12 kg CBD per hectare”⁵ (4.86 kg per acre). Using this yield estimate along with the number of harvested acreages produces a potential CBD production of 247,315 kg of CBD if current crops were extracted for their CBD contents.

Considering that CBD extraction is currently prohibited in Canada, little research is conducted on CBD yields within the country. However, research institutes within the United States are beginning to conduct these trials. As one of the first institutions in the United States to launch hemp agronomic research projects, the University of Kentucky is one of the leaders when it comes to industrial hemp. While the growing conditions in Kentucky are different to those in Canada these scientific studies can help provide another estimate on potential CBD yields. David Williams, professor of plant and soils at the University of Kentucky and lead researcher in their industrial hemp program, noted that early, non-replicated information indicates yields of around 500 lbs⁶ of dry, high CBD plant material per acre with an average CBD concentration of 5%.⁷ This figure equates to 227 kg per acre of dry plant material which results in a yield of 11.35 kg of CBD per acre. While these results are early and need time for replication, they can give another estimation of potential CBD yields in North America. Applying this estimation to the Canadian hemp acreage gives a potential Canadian CBD harvest of 577,579 kg.

Figure 1: Estimates of Canadian CBD Potential (Kg of CBD)



Impact of Canada

These estimates also represent potential CBD production if Canadian growing patterns remained unchanged. In reality many producers would likely switch over to high CBD cultivars which would substantially increase Canadian CBD production from these lower bound estimates. This potential supply shock could have a significant effect on the CBD industry.

While these estimates represent potential CBD production if every harvested acre was extracted with a CBD concentration of 1%-2%, in reality far fewer acres will likely be extracted. This would likely reduce the potential impact of this CBD supply shock. However, growers could choose to plant cultivars with higher concentrations of CBD which would bolster the supply shock. Table 1 provides a sensitivity analysis looking at the potential CBD production in kilograms for various acreage figures as well as CBD concentrations.

⁴ The CHTA is a national organization that promotes Canadian hemp and hemp products globally. Established in 2003 the Alliance represents those involved in Canada’s hemp industry. Members include; farmers, processors, manufacturers, researchers, entrepreneurs and marketers.

⁵ Canadian Hemp Trade Alliance (2016). *Modernizing the Industrial Hemp Regime*. Retrieved from <http://www.hemptrade.ca/>.

⁶ This figure represents a conservative lower bound as other growers have report yields of 2000 lbs of dry hemp material per acre.

⁷ Seed CX communication with David Williams, professor of plant and soil sciences at University of Kentucky, July 2016.

Table 1: Canadian CBD production sensitivity analysis (Kg of CBD)

	CBD Concentration									
	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%
1,000	6,660	13,320	19,980	26,640	33,300	39,960	46,620	53,280	59,940	66,600
5,000	33,300	66,600	99,900	133,200	166,500	199,800	233,100	266,400	299,700	333,000
10,000	66,600	133,200	199,800	266,400	333,000	399,600	466,200	532,800	599,400	666,000
20,000	133,200	266,400	399,600	532,800	666,000	799,200	932,400	1,065,600	1,198,800	1,332,000
30,000	199,800	399,600	599,400	799,200	999,000	1,198,800	1,398,600	1,598,400	1,798,200	1,998,000
40,000	266,400	532,800	799,200	1,065,600	1,332,000	1,598,400	1,864,800	2,131,200	2,397,600	2,664,000
50,000	333,000	666,000	999,000	1,332,000	1,665,000	1,998,000	2,331,000	2,664,000	2,997,000	3,330,000
60,000	399,600	799,200	1,198,800	1,598,400	1,998,000	2,397,600	2,797,200	3,196,800	3,596,400	3,996,000
76,333	508,378	1,016,756	1,525,133	2,033,511	2,541,889	3,050,267	3,558,644	4,067,022	4,575,400	5,083,778

Assumptions

Yield 6.66 kg per acre for every 1% concentration