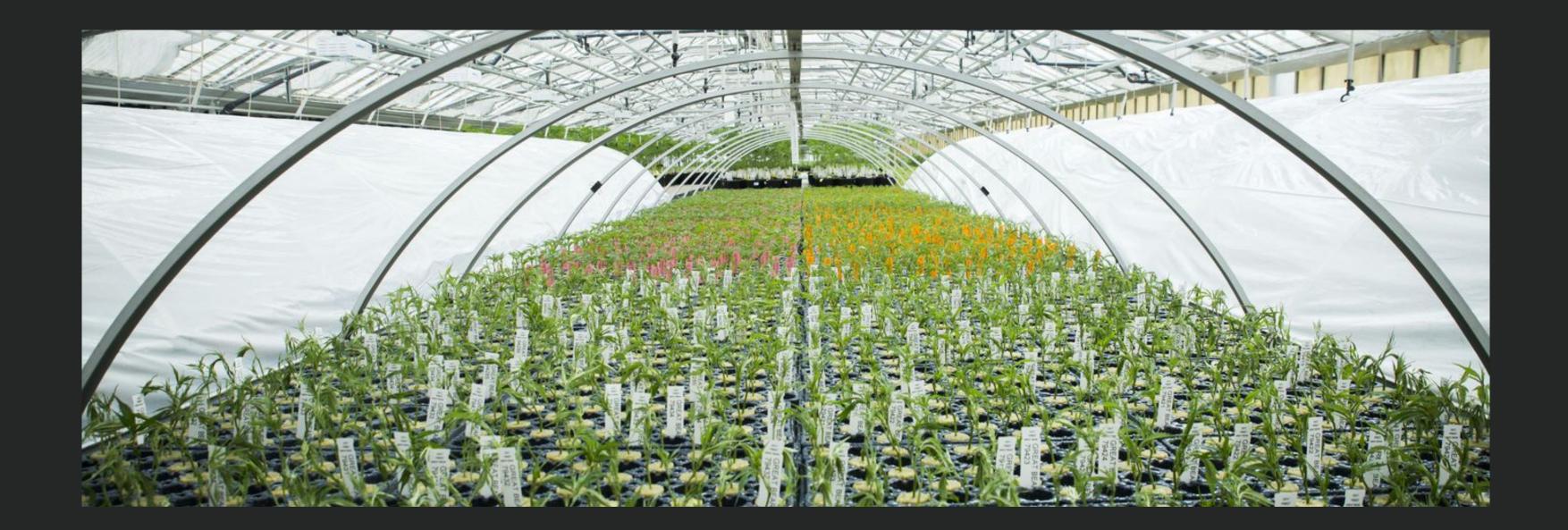
AN INTRODUCTION TO THE BASICS OF CANNABIS



What is cannabis?

The cannabis plant (Cannabis sativa L.) has been used as medicine, food, or fiber for thousands of years. Flowers and leaves from the cannabis plants are covered with tiny crystal-like structures, and it is these structures which are responsible for producing cannabis' active ingredients:

Cannabinoids (THC and CBD) and terpenes 1,2 .

THC also known as delta-9-tetrahydrocannabinol is what gives cannabis its intoxicating effects, while CBD also known as cannabidiol is purported to modulate some of the effects of THC3. Additionally, both THC and CBD have other properties, that may be beneficial, when consumed on their own, together, or in conjunction with other chemicals found in cannabis such as terpenes (also

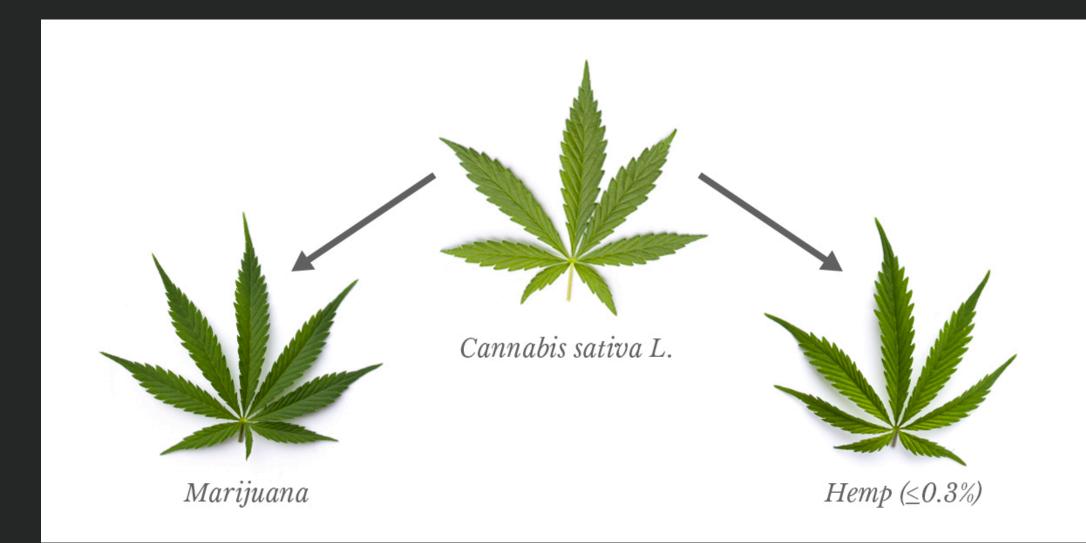
known as the entourage effect)⁴. As a result, the amount and ratio of cannabinoids and terpenes consumed when using cannabis will influence one's experience.

Cannabis: Hemp vs Marijuana

Due to the multitude of purposes cannabis serves, it has been selectively bred into two distinct forms 5,6:

• Hemp, a non-intoxicating type of cannabis plant that was traditionally bred for food or fiber. All hemp plants contain less than 0.3% THC

 Marijuana, an intoxicating plant that is used for medicinal or recreational purposes. All marijuana plants contain more than 0.3% THC.



While hemp and marijuana plants will differ in physical appearance and chemical make-up, they are not different

enough genetically to be considered separate species 5,6 For this reason, both hemp and marijuana are collectively known as cannabis. At Aphria Medical, our cannabis products are all derived from marijuana plants, not hemp. Our high CBD dried flower strains are not hemp as they contain more than 0.3% THC.

Why do so many cannabis varieties exist?

Selective breeding is a process employed in plant agriculture to develop crops with unique and desired characteristics. For example, the apples you buy from the grocery store have all been selectively bred to provide different flavour profiles (sweet, sour, tart, etc) and physical characteristics (i.e. crunchy, soft, firm, juicy). These differences will dictate the way in which apples are used. For instance, some apple varieties are better for eating (good flavor and texture profile), while others are better for cooking (tart taste and contains more starch).

Like apples, there are many different types of "hemp" or

"marijuana" varieties available in Canada ^{7,8,9}. These varieties differ in both physical appearance and chemical make-up, which in turn will impact the way in which they are used ^{7,9}. As a general rule, different varieties of hemp are referred to as cultivars 7 , while varieties of cannabis are called "strains". The reasons for this difference stems from the fact that hemp breeders have had the opportunity to officially register new hemp varieties under the Plant Breeders' Rights Act and Regulations which provides 10: "legal protection to plant breeders for new plant varieties" for up to 25 years for a variety of tree and vine (including their rootstocks), and 20 years for all other varieties of plants".

In contrast, the majority of marijuana plants sold in the marketplace today were bred illegally and as a result of prohibition marijuana breeders could not acquire the same type of protections as hemp breeders. Instead a less official system of differentiating between varieties was created which uses the term "strain" to classify chemically and physically unique varieties. Since these "strains" were named using a non-standardized approach, plants possessing the same strain name may show very different chemical and physical profiles during cultivation, while strains having different names can demonstrate very

similar physical and chemical characteristics¹¹.

With cannabis legalization, there is now a huge push to better understand the genetic relationship between strains, which in turn will likely lead to consolidation and the use of more standardized terminology.

and hemp 5,6.

Domestication of cannabis is believed to have started over 10,000 years ago in China12 and since this time unique populations of hemp and marijuana have appeared around the world. Since cannabis has so many unique chemical and physical characteristics, it was originally thought that different species existed which lead to certain plants being called Cannabis sativa and others being called Cannabis

indica ^{5,13}. Sometimes other names were used i.e. Cannabis ruderalis. The way in which these names were used was never consistent and changed over time as

different philosophies and political interests emerged ^{5,13}.

Although there is still some debate amongst scientists, today, all cannabis is generally recognized as the species

Cannabis sativa 6 . However, the terms Indica and Sativa still persist and are used differently by different groups of people. To breeders, Indica plants are defined as having moderate levels of THC and once originating from Afghanistan, Pakistan, and Northwest India. Sativa plants have high THC and once originated in ancient southern Asia, more recently distributed throughout the world (see below)⁶.

SATIVA	INDICA
Localized in ancient southern Asia, more recently distributed throughout the world.	Localized in Afghanistan, Pakistan, and Northwest India.
Tall, well branched and narrow leaflets	Short (1 m high), compact, large leaves and wide leaflets.
Later flowering	Earlier flowering
Hard to grow inside due to height	Not adapted to high humidity environments can easily mould
High THC, no or small amounts of CBD (most intoxicating)	Moderate levels of THC and CBD (less intoxicating)

Nowadays, most if not all cannabis strains sold commercially are hybrids of Sativa and Indica populations that once existed in distinct parts of the world. Isolated populations of ancient Sativa or Indica type plants are believed to no longer exist or be almost extinct in the wild as a result of mass efforts to breed cannabis strains over the last 100 years 5.

Are Indica plants more sedating than sativa plants?

The origins of the belief that Indica plants are sedating and Sativa plants are uplifting is not quite clear. However, recent studies suggest that Indica and Sativa are not reliable predictors of effect. This largely has to do with the fact that cannabis strains sold today are all hybrids, possessing both Indica and Sativa-like characteristics to varying extents 5, 14 (See above).

To highlight this point, consider how many apple varieties exist in the supermarket. Now imagine if we only relied on apple color (red, green, or yellow) to predict taste, would you expect all red apples to taste the same? Instead, when selecting an apple, other factors such as sugar content, tartness, acidity, or texture need to be considered.

For this reason, we recommend that patients consider factors such as cannabinoid content, product format, and terpene content when selecting, as this method will help provide a more consistent experience.

Cannabinoid Content: The ratio of THC to CBD can help determine the therapeutic effect of each medical cannabis product, as well as the associated side effects 15,16

Product Format: The product format will contribute 2. towards how overall effects from cannabinoids and terpenes are felt. If a patient needs fast relief, inhaling cannabis through smoking or vaporizing will lead to a faster onset of effects, whereas ingesting cannabis oil products can provide longer-lasting effects for managing chronic ailments ³.

Terpene Content: (dried flower products only): 3. Terpenes are thought to contribute to the individual effects patients can feel when inhaling dried cannabis. For example, some terpenes are believed to promote relaxation and stress-relief, while others can yield

energizing and uplifting effects 4, 17

It is also important to keep in mind that other factors such as previous exposure to cannabis, food intake, genetics, or medical condition will also impact the way in which you experience cannabis. For this reason, it is always best to start low and go slow, and remember that cannabis is an individualized type of medicine that requires some trial and error before getting started.

References ~	
1. Small, E. (2016). Cannabis: a complete guide. CRC Press. https://www.crcpress.com/Cannabis-A-Complete-Guide/Small/p/book/9781498761635	
 Solymosi, K., & Koefalvi, A. (2017). Cannabis: a treasure trove or pandora's box?. Mini reviews in medicinal chemistry, 17(13), 1223-1291. https://www.ncbi.nlm.nih.gov/ pubmed/27719666 	
3. Health Canada (2019) What you need to know if you choose to consume cannabis. Electronic document, https://www.canada.ca/en/health-canada/services/drugs- medication/cannabis/resources/what-you-need-to-know-if-you-choose-to-consume-cannabis.html, accessed February 2020.	
4. Russo, E. B. (2011). Taming THC: potential cannabis synergy and phytocannabinoid-terpenoid entourage effects. British journal of pharmacology, 163(7), 1344-1364. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3165946/	
5. McPartland, J. M. (2018). Cannabis systematics at the levels of family, genus, and species. Cannabis and cannabinoid research, 3(1), 203-212. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6225593/	
6. Small, E. (2018). Dwarf germplasm: the key to giant Cannabis hempseed and cannabinoid crops. Genetic resources and crop evolution, 65(4), 1071-1107. https://link.springer.com/article/10.1007/s10722-017-0597-y	
 Cherney, J. H., & Small, E. (2016). Industrial hemp in North America: production, politics and potential. Agronomy, 6(4), 58. https://www.mdpi.com/2073-4395/6/4/58 	
8. Government of Canada (2020) List of Approved Cultivars for the 2019 Growing Season: Industrial Hemp Varieties Approved for Commercial Production. https://www.canada.ca/en/health-canada/services/drugs-medication/cannabis/producing-selling-hemp/commercial-licence/list-approved-cultivars-cannabis-sativa.html	
9. Clarke, R. C., & Merlin, M. D. (2016). Cannabis domestication, breeding history, present-day genetic diversity, and future prospects. Critical reviews in plant sciences, 35(5-6), 293-327. https://www.tandfonline.com/doi/abs/10.1080/07352689.2016.1267498	
10. Canadian Food Inspection Agency (2020) Plant Breeders Rights. https://www.inspection.gc.ca/plant-health/plant-breeders-rights/eng/1299169386050/1299169455265	
11. Schwabe, A. L., & McGlaughlin, M. E. (2019). Genetic tools weed out misconceptions of strain reliability in Cannabis sativa: Implications for a budding industry. Journal of Cannabis Research, 1(1), 3. https://jcannabisresearch.biomedcentral.com/articles/10.1186/s42238-019-0001-1	
12. Russo, E. B. (2007). History of cannabis and its preparations in saga, science, and sobriquet. Chemistry & biodiversity, 4(8), 1614-1648. https://onlinelibrary.wiley.com/doi/ abs/10.1002/cbdv.200790144	
13. McPartland, J. M., & Guy, G. W. (2017). Models of cannabis taxonomy, cultural bias, and conflicts between scientific and vernacular names. The botanical review, 83(4), 327-381. https://link.springer.com/article/10.1007/s12229-017-9187-0	
14. Piomelli, D., & Russo, E. B. (2016). The Cannabis sativa versus Cannabis indica debate: an interview with Ethan Russo, MD. Cannabis and cannabinoid research, 1(1), 44-46. https://www.liebertpub.com/doi/full/10.1089/can.2015.29003.ebr	
15. National Academies of Sciences, Engineering, and Medicine. (2017). The health effects of cannabis and cannabinoids: The current state of evidence and recommendations for research. National Academies Press. http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx	
16. MacCallum, C. A., & Russo, E. B. (2018). Practical considerations in medical cannabis administration and dosing. European journal of internal medicine, 49, 12-19. http://nationalacademies.org/hmd/reports/2017/health-effects-of-cannabis-and-cannabinoids.aspx	
17. Lewis, M. A., Russo, E. B., & Smith, K. M. (2018). Pharmacological foundations of cannabis chemovars. Planta medica, 84(04), 225-23	