

A SHORT HISTORY AND USE OF HEMP

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Abstract. The possibilities of using the hemp plant are endless. A wide range of products can be obtained from this plant, from clothing to paper, from crockery to automotive components and from musical instruments to bird feed. It is known that this plant fits well in almost any climatic conditions, grows quickly and needs very little maintenance. It requires no chemicals and is resistant to pests and diseases. Hemp uses very little water per kilogram of fiber compared to cotton and stores CO₂ during growth, which increases its photosynthetic efficiency. In addition, it improves the soil, being ideal for crop rotation.

Keywords: cannabis, cannabinoids, psychoactive effect.

INTRODUCTION

Cannabis is the only plant genus that contains a unique class of molecular compounds, cannabinoids, a family of complex chemicals that act on cannabinoid receptors, which are protein molecules located on the surface of cells (Andre *et al.*, 2016) so called nutraceuticals (Hartsel *et al.*, 2016).

Researchers have discovered several types of cannabinoids, the most important of which are delta-9 tetrahydrocannabinol (THC), a psychoactive compound and cannabidiol (CBD) (Grotenhermen, 2003), an anti-psychoactive compound (Clarke and Merlin, 2016; Baron, 2015).

It is known that humans have two types of cannabinoid receptors, CB1 and CB2, which are found in different places and have different functions. CB1 receptors are found in cells in the nervous system, and CB2 receptors are in the immune system (Svíženská *et al.*, 2008). Because they are located in the brain, CB1 receptors are responsible for the psychoactive effect of the cannabis plant. In contrast, CB2 receptors are responsible for the long-term beneficial effects that marijuana has on inflammatory diseases (Naftali *et al.*, 2014).

The carbon sequestration and storage by hemp crop through photosynthesis was estimated by quantifying dry biomass of fibers of a value of 325 kg carbon per metric ton (Pervaiz and Sain, 2003).

THE HISTORY OF CANNABIS USE

Cannabis has a long history not only in terms of its euphoric properties, but also with regard to many uses in the textile industry, in the food and papermaking (Green *et al.*, 2003).

There is some evidence that demonstrated the use of hemp in Asian and Eastern European area since 10,000 years ago. The oldest findings are from Taiwan Area and certify fiber cannabis use in the textile industry.

China. The medical uses of cannabis have been recorded in China since the third millennium BC. Therefore, the Chinese natural medical tradition has its roots in ancient times. Each part of this plant has been medically exploited by the ancient Chinese, being recorded dozens of medical properties, from cauterizing to anesthetic (Svoboda and Lade, 1995).

India. Cannabis was used thousands of years before our era, from the mountainous regions of the Himalayas to the Indus Valley. The plant played an important role in the local Hindu religion, but also in medicine. Ancient texts revealed in India register the diseases for which the plant was used: insomnia, headaches and gastric disorders. The use of the plant as an anesthetic is also confirmed (Vogel, 2013).

Ancient Egypt. The earliest evidence of the use of this plant for medical purposes is confirmed as early as 1700 BC. A total of 4 papyri were discovered that acted as prescriptions. After studying the papyri, it was found that the ancient inhabitants of the Nile used cannabis to treat eye pain, but also to treat hemorrhoids (Abdoli *et al.*, 2019).

Middle East. Herodotus relates in his notes the Scythian populations who used cannabis for recreational purposes during steam baths. In the Assyrian area, the plant was adopted in religious ceremonies. In antiquity is recorded the existence in the Scythian, Thracian and Dacian space of shamans called kapnobatai (in translation - "those who walk on clouds of smoke"). These shamans used the psychotropic properties of the plant, by burning hemp flowers, to induce a trance state (West, 2002).

Muslim civilization. At the end of antiquity, the Islamic world experienced a period of economic, cultural and scientific flourishing. Muslim doctors widely used this plant between the VIII and XVIII centuries for its antiepileptic, anti-inflammatory and analgesic properties (Zuardi, 2006).

The New World. Cannabis was brought to the New World shortly after its discovery. The vastness of the discovered land allowed the settlers to grow tobacco, cotton, and hemp recently brought from the European continent. Ever since the establishment of the first English colony in Virginia, King James I decreed in 1619 that every settler was obliged to grow 100 cannabis plants exclusively for export (Deetz, 1995). Until the middle of the XIX century, cultivated hemp was used in the manufacture of textiles and rope (Skoglund *et al.*, 2013).

The XIX century. As early as the first half of the XIX century, the first trends in the use of cannabis in medicine emerged in the Western world. The most important pioneer of this current was the Irishman William Brooke O'Shaughnessy - a physician, physicist and inventor, who during his stay in India, discovered local traditional medicine. He began researching cannabis, which was used by the local population for medical purposes. Following his research, he discovered the anesthetic potential of the plant, but also to treat muscle spasms and many other medical problems. In the second half of the XIX century, cannabis was widely used in the pharmaceutical field as an

extract (Chandra *et al.*, 2017). At the time, it was not uncommon for cannabis bottles to be available in pharmacies. The first laws and regulations on the sale of these drugs in the United States appeared in the XIX century. Cannabis is included in a national list of "poisons". Substances or plants on the list of "poisons", due to their psychotropic properties and other side effects they produced, had to be regulated for human consumption (Brown, 2002).

The XX century. Towards the end of the XIX century, organizations advocating for the banning of substances considered taboo in American society are making their voices heard louder and louder. Formed largely by members of Protestant and neo-Protestant denominations, these organizations campaigned for a ban on alcohol and cannabis. The Puritan philosophy of these organizations contradicted the fashion of the opioid circles characteristic of those times.

In the last years of the XIX century, the first initiatives to regulate cannabis use appeared. Their consumption will be limited to medical, and to buy the necessary substance you needed a prescription issued by a doctor. The American legislature wanted a gradual withdrawal of cannabis from the American society, by gradually limiting the legal dose to the population. Under the International Opium Convention of 1925, a decision was made, supported by the American state, to ban the export of Indian hemp to the United States. Soon the first brochures appeared that warned about the dangers caused by the use of this plant (Tennyson, 1953).

The first criminal laws in the United States punishing cannabis possession with imprisonment from 2 to 10 years and a fine of up to \$ 20,000 appeared in 1950.

Year 1970. American anti-drug campaigns continued throughout the Cold War. In 1971, US President Richard Nixon publicly declared the start of a war on drugs, a war that continues to this day. Internally, the anti-drug department (DEA) has a duty to annihilate drug distribution networks, and internationally it is trying to observe drug distribution routes and support the anti-drug war in countries like Mexico or Colombia (Hornik and Yanovitzky, 2003).

The XXI century. In the 1990s, legislation was developed at the level of various states (Vantreese, 2002), thus allowing the use of cannabis for medicinal purposes (Crişan *et al.*, 2018). In this context, organizations advocating for the legalization of cannabis have received increasing support from the population. Young generations are increasingly supporting the legalization of the consumption of this plant, as evidenced by the recent legalization of cannabis in two US states, Washington and Colorado (Carnevale *et al.*, 2017). Although no EU Member State allows cannabis to be grown at home for medical purposes, the rules on permitted products and their use vary widely. Although the World Health Organization (WHO) has officially recommended that cannabidiol (CBD) not be classified as a controlled substance, there is no harmonization at EU level on the medical or recreational use of cannabis (Hazekamp, 2018).

HOW TO USE HEMP

This plant can be fully exploited and is the perfect concept of circular economy. Hemp is one of the oldest plants cultivated in our country, being used mainly to obtain fibers used in the manufacture of clothing. Hemp stems from local populations and wild hemp contain 10-12% fiber, and improved varieties 26-32% (Chandra *et al.*, 2017).

The importance of the hemp plant can be captured by looking at its uses by categories of organs (Small and Marcus, 2002).

Leaves and flowers of hemp for fiber. From these compartments (figure 1, A) containing very useful substances, such as cannabinoids and terpenes, is extracted the valuable CBD (cannabidiol) which has excellent health-promoting properties. It reduces stress, ensures a restful sleep, provides energy and increases endurance in the body. In particular, the leaves and flowers at the top of the plant are used to obtain nutraceuticals that are recommended for people with certain health problems (Gratton and Chen, 2004).

The seeds. Hemp seeds (figure 1, B) are among the most nutritious foods. They contain all the essential fatty acids (omega 3, 6 and 9), essential amino acids and dietary fiber necessary for health. Hemp oil obtained by pressing seeds has very different uses. Oil and seeds are used for human consumption in food and food supplements, but are also processed to obtain feed for birds and some animals (Soetan and Oyewole, 2009). Hemp oil is also very suitable for cosmetics and health products, as well as for the maintenance of leather goods. In addition, the seeds are also used for cultivation, propagation and crop improvement.

Hemp wood fiber core. The woody inner part of the hemp stem has a high absorption capacity, which ensures good adhesion to materials such as lime and water. In addition, it absorbs odors well (Small and Marcus, 2002).

The wood core of the hemp stem (figure 1, C) is particularly complex. It is very suitable as a bedding material for small animal shelters, as garden mulch, insulating material, but also as hemp concrete.

Liberian fiber of hemp. From the bark, respectively from the outer part of the stem, the fibers are obtained. Hemp fibers (figure 1, D) have excellent properties for regulating humidity and temperature. They are also very resistant, very flexible and very light, which is an advantage for the construction sphere (Ip and Miller, 2012).

It should also be mentioned their strong antibacterial effect, which makes them perfect, for example, for hospital clothing.

The hemp root is also valuable for obtaining treatments for different affections. The root is also colonized with arbuscular mycorrhizal fungi and the occurrence is higher when the hemp crop is fertilized (Zielonka *et al.*, 2019; Stoian *et al.*, 2015).



Fig. 1. Visual characteristics of different hemp plant parts

CONCLUSIONS

Marijuana is the product of drying the flowers and leaves of the cannabis plant. Compared to other legal drugs, such as alcohol or tobacco, marijuana is less dangerous. If tobacco causes cancer and excessive alcohol consumption can lead to cirrhosis, there is no causal relationship between marijuana and a deadly disease. However, research shows that it poses certain health risks to the elderly or people with heart problems.

Marijuana is effective against stress, reducing anxiety and increasing euphoria among users. Marijuana can also help people who are underweight to eat more because it stimulates the appetite. For this reason, it is useful for cancer patients.

Preliminary evidence suggests that marijuana may also be useful in people with Parkinson's, Alzheimer's, and multiple sclerosis. In addition, researchers have discovered a method by which marijuana users can prevent temporary memory loss that occurs after consumption. The method uses anti-inflammatory drugs, namely ibuprofen or aspirin.

REFERENCES

1. Abdoli, J., Motamedi, S. A., & Zargar, A. (2019). A Short Review on the History of Anesthesia in Ancient Civilizations. *Journal of Research on History of Medicine*, 8(3), 147-156.
2. Andre, C. M., Hausman, J. F., & Guerriero, G. (2016). Cannabis sativa: the plant of the thousand and one molecules. *Frontiers in plant science*, 7, 19.
3. Baron, E. P. (2015). Comprehensive review of medicinal marijuana, cannabinoids, and therapeutic implications in medicine and headache: what a long strange trip it's been.... *Headache: The Journal of Head and Face Pain*, 55(6), 885-916.

4. Brown, R. H. (2002). The opium trade and opium policies In India, China, Britain, and the United States: historical comparisons and theoretical interpretations. *Asian Journal of Social Science*, 30(3), 623-656.
5. Carnevale, J. T., Kagan, R., Murphy, P. J., & Esrick, J. (2017). A practical framework for regulating for-profit recreational marijuana in US states: lessons from Colorado and Washington. *International Journal of Drug Policy*, 42, 71-85.
6. Chandra S., Lata H., ElSohly M. A., (2017), Cannabis sativa L. – Botany and Biotechnology, *Springer International Publishing AG*
7. Clarke R. C., Merlin M. D., (2016), Cannabis Domestication, Breeding History, Present-day Genetic Diversity, and Future Prospects, *Critical Reviews in Plant Sciences*
8. Crişan, I., Vidican, R., & Stoian, V. (2018). INDUCED MODIFICATIONS ON SECONDARY METABOLISM OF AROMATIC AND MEDICINAL PLANTS—AN ENDOMYCORRHIZAL APPROACH. *Hop and Medicinal Plants*, 26(1-2), 15-29.
9. Deetz, J. (1995). *Flowerdew Hundred: the archaeology of a Virginia plantation, 1619-1864*. University of Virginia Press.
10. Gratton, J. L., & Chen, Y. (2004). Development of a field-going unit to separate fiber from hemp (*Cannabis sativa*) stalk. *Applied Engineering in Agriculture*, 20(2), 139.
11. Green A. I., Burgess E. S., Dawson R., Zimmet S. V., Strous R. D., (2003), Alcohol and cannabis use in schizophrenia: effects of clozapine vs. risperidone, *Schizophrenia Research*
12. Grotenhermen, F. (2003). Pharmacokinetics and pharmacodynamics of cannabinoids. *Clinical pharmacokinetics*, 42(4), 327-360.
13. Hartsel, J. A., Eades, J., Hickory, B., & Makriyannis, A. (2016). Cannabis sativa and Hemp. In *Nutraceuticals* (pp. 735-754). Academic Press.
14. Hazekamp, A. (2018). The trouble with CBD oil. *Medical cannabis and cannabinoids*, 1(1), 65-72.
15. Hornik, R., & Yanovitzky, I. (2003). Using theory to design evaluations of communication campaigns: The case of the National Youth Anti-Drug Media Campaign. *Communication Theory*, 13(2), 204-224.
16. Ip, K., & Miller, A. (2012). Life cycle greenhouse gas emissions of hemp–lime wall constructions in the UK. *Resources, Conservation and Recycling*, 69, 1-9.
17. Naftali, T., Mechulam, R., Lev, L. B., & Konikoff, F. M. (2014). Cannabis for inflammatory bowel disease. *Digestive Diseases*, 32(4), 468-474.
18. Pervaiz, M., & Sain, M. M. (2003). Carbon storage potential in natural fiber composites. *Resources, conservation and Recycling*, 39(4), 325-340.
19. Skoglund, G., Nockert, M., & Holst, B. (2013). Viking and early Middle Ages northern Scandinavian textiles proven to be made with hemp. *Scientific reports*, 3(1), 1-6.
20. Small, E., & Marcus, D. (2002). Hemp: a new crop with new uses for North America. *Trends in new crops and new uses*, 284-326.
21. Soetan, K. O., & Oyewole, O. E. (2009). The need for adequate processing to reduce the anti-nutritional factors in plants used as human foods and animal feeds: A review. *African Journal of food science*, 3(9), 223-232.
22. Stoian, V., Vidican, R., & Rotar, I. (2015). Mycorrhizal Circuit in the Root of Avena Sativa. *Bulletin of University of Agricultural Sciences and Veterinary Medicine Cluj-Napoca. Agriculture*, 72(2), 597-598.
23. Svíženská, I., Dubový, P., & Šulcová, A. (2008). Cannabinoid receptors 1 and 2 (CB1 and CB2), their distribution, ligands and functional involvement in nervous system structures— a short review. *Pharmacology Biochemistry and Behavior*, 90(4), 501-511.

24. Svoboda, R., & Lade, A. (1995). *Tao and dharma: Chinese medicine and Ayurveda*. Lotus Press.
25. Tennyson, A. L. (1953). History and mechanism of international and national control of drugs of addiction. *The American journal of medicine*, 14(5), 578-585.
26. Vantreese, V. L. (2002). Hemp support: evolution in EU regulation. *Journal of Industrial Hemp*, 7(2), 17-31.
27. Vogel, V. J. (2013). *American Indian Medicine* (Vol. 95). University of Oklahoma Press.
28. West, S. (2002). Scythians. In *Brill's Companion to Herodotus* (pp. 437-456). Brill.
29. Zielonka, D., Sas-Paszt, L., Derkowska, E., Lisek, A., & Russel, S. (2019). Occurrence of arbuscular mycorrhizal fungi in Hemp (*Cannabis sativa*) plants and soil fertilized with sewage sludge and phosphogypsum. *Journal of Natural Fibers*, 1-11.
30. Zuardi, A. W. (2006). History of cannabis as a medicine: a review. *Brazilian Journal of Psychiatry*, 28(2), 153-157.