



## **Phytoconstituents and Medicinal Importance of *Cannabis sativa***

**Anjali Thakur <sup>a\*</sup>, Sushma <sup>a</sup> and Reena Sharma <sup>a</sup>**

<sup>a</sup> Department of Biosciences, University Institute of Biotechnology, Chandigarh University, Gharuan,  
Punjab, 140413, India.

### **Authors' contributions**

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JPRI/2021/v33i60B34857

### **Open Peer Review History:**

This journal follows the Advanced Open Peer Review policy. Identity of the Reviewers, Editor(s) and additional Reviewers, peer review comments, different versions of the manuscript, comments of the editors, etc are available here:  
<https://www.sdiarticle5.com/review-history/77477>

**Mini-review Article**

**Received 19 October 2021**

**Accepted 22 December 2021**

**Published 25 December 2021**

### **ABSTRACT**

*Cannabis sativa* has been reported that it is a widely spread species all over the world. It has been receiving more attention due to its therapeutic potential. Popularly, it is also known as marijuana. The phytoconstituents and characteristics of *Cannabis sativa*, stem, leaves and seeds were provided with more information in feed materials for its utilization and nourishment. Positive biological activities and pharmacological aspects provided from *Cannabis sativa*. *Cannabis* played a key role as a medicinal plant in the lives of tribal people mostly living in the Himalaya, providing products for both food as well as their medicinal purposes. The role of *cannabis* for treating several medicinal conditions increased day by day. The present paper is reviewed on phytoconstituents and medicinal importance of *Cannabis sativa* which is mainly aimed at researching the state of the art, and enhancing the knowledge of this versatile plant. *Cannabis sativa* is from the Cannabaceae family, which is mostly able to live in temperate as well as tropical regions. It is the most commonly used psycho-active drug all over the world and the only one most popular illegal drug. This review mainly analyzes the botanical, descriptive and diversity along with the medicinal importance of marijuana among the human being which is found throughout the worldwide.

**Keywords:** *Cannabis sativa*; medicinal marijuana; hemp fibers; phytochemicals and medicinal plant.

\*Corresponding author: E-mail: [anjali18091999@gmail.com](mailto:anjali18091999@gmail.com);

## 1. INTRODUCTION

*Cannabis sativa* or hemp is a plant having herbaceous type of flowering, belonging to the family Cannabaceae. It is a very common plant which is used as marijuana. Hemp is a medicinal plant and has several different types of medicinal importance, and such plants also known as fiber plants. *Cannabis* plants have a great role in the source of food, seed oils as well as religious and spirituals. It is an evergreen plant mostly seen all over the world. This plant has a great role in various types of medicinal importance, also having a very long history as it is a medicinal plant. *Cannabis* is also having a lot of ailment healing properties. In the present Scenario the demand of this plant increases due to its medicinal properties [1]. Medicinal plants play a great role in our life. *Cannabis sativa* has a great role in human health and is also beneficial in our life as well. There are many different types of utilizations for hemp essential oil which are mostly known. There are several products of *Cannabis* aroma such as and buds of the hemp plant which is commonly known as marijuana. *Cannabis sativa* has been used for hemp fibers, seeds, oils, medical purposes and is found to be a recreational drug.

Two essential hemp oils having components such as limonene and alpha-pinene also have a repellent effect against several insects [2]. The type of bacteriostatic activity of hemp essential oil has also been reported. Although first trials of hemp essential oil used against potato late blight or *Phytophthora Infestans* were not promising Krebs 1996, cannabinoid antifungal activity cannot be discounted [3]. Marijuana mostly used all over the world as medicinal plants. There are several health benefits of hemp such as pain, inflammatory as well as chronic diseases. Some evidence also suggests that more use of marijuana increased risk of social anxiety. It also suggests cannabinoids which are more effective against vomiting as well as nausea commonly caused by chemotherapy [4]. It is also found that smoked marijuana helpful to alleviate these types of symptoms. Medical marijuana mostly useful in the United state for several pain controls. This is helpful for weight loss because it regulates insulin while managing caloric intake efficiently.

One of the major medicinal importance in cannabis as it helps to fight against cancer and diabetes as well. In the present scenario the greatest area of hemp is the production area

reported in China, Canada also production is found in South Korea. Canada is now the world's largest grown area of hemp, it is seed hemp not a fiber hemp. The various aspects related to use of hemp biomass is more extensively linked to a wide variety of phytochemicals. *Cannabis* products are mainly determined by designation of raw material, cultivation and harvest time. It also has great importance in economic value used as a source of industrial fibers, food, seed oil and medicines etc. Cannabinoids mostly represent studied groups of compounds due to their wide range of effects in humans as well as pharmaceutical activities [5,6].

Scientific Classification of *Cannabis sativa* [6]

Kingdom: Plantae  
Class: Magnoliopsida  
Order: Rosales  
Family: Cannabaceae  
Genus: Cannabis  
Species: *Cannabis sativa*

## 2. PHYTOCONSTITUENTS OF *Cannabis sativa*

*Cannabis* is a composite herbal medicinal plant containing different classes of secondary metabolites which include at least 120 terpenoids (61 monoterpenes, 52 sesquiterpenoids and 5 triterpenoids and some other terpenoids), 104 cannabinoids, 11 steroids and 26 flavonoids among other 545 identified compounds [7-14]. Largest group of phytochemicals formed from terpenes in which more than 100 molecules identified in *cannabis* [15]. Terpenes are liable for flavor and order of the various strains produced by *cannabis*. Monoterpenes and sesquiterpenoids have been detected in the root, leaves and flowers of cannabis, in which secretory glandular hairs as the main known production site [16,17]. Monoterpene mainly include D-limonene, Terpinolene and linalool. Triterpenes have been detected in hemp roots, hemp fibers and hemp seeds, oils. Cannabinoids along with terpenes have been used as chemotaxonomic markers in versatile *cannabis* as these are mainly considered as physiologically active and secondary metabolites [18-21]. About 26 flavonoids have been identified, mainly belonging to the flavone and flavonol sub classes. Recently, some interesting amounts of lignans were found in the hydrophilic extract from the hemp seed [22].

### 3. MEDICINAL IMPORTANCE OF *Cannabis sativa*

Medicinal *Cannabis* is reported mainly to help the patients suffering from severe pain such as chronic pain. It can be used to manage weight loss, nausea and also helpful to treat glaucoma. *Cannabis sativa* is also helpful to slow and stop cancer cells from spreading, marijuana works to slow down the activity of tumor growth in the brain, breast and in lungs also [23]. It is helpful to decrease anxiety and stress levels in human beings, and improve the smokers mood and stimulate the appetite. The most common use of medicinal marijuana through chemotherapy. The patients of cancer going through chemo commonly suffer from severe pains, nausea, vomiting etc. The patients of cancer can lead to further various types of health complications. Marijuana protects the brain after a stroke also reducing the size of the area which was affected by the stroke. *Cannabis sativa* is mainly helpful to treat inflammatory bowel diseases, patients suffering from inflammatory disease could benefit from marijuana use. It also helps eliminate nightmares [24,25].

Various health benefits from hemp seed as it lowers the cholesterol level, also helpful to lower the blood pressure. Medicinal *Cannabis* is grown worldwide under field conditions whereas these fields are grown of *cannabis* for industrial purposes. *Cannabis sativa* reduces the side effect linked to hepatitis C and it also increases the effectiveness of treatment. The other medical conditions for which patients are given *cannabis* in different forms and concentration are muscle spasms, seizures also in HIV and AIDS. *Cannabis* plants having unique medicinal properties are used in the treatment and control of severe disease and in particular chronic diseases [26,27]. Medicinal plants should have bushy growth with a large number of shoots, leaves and inflorescence. Marijuana is known to have anti-inflammatory properties, treating inflammatory bowel conditions such as Crohn's disease. Principal uses of this hemp plant such as mainly pain-killer, sleep-inducer and reliever of the nausea caused by chemotherapy [28-31]. As a long history of regular usage of *cannabis* as a medicinal plant it also reduces the pressure in the eye to relieve the glaucoma symptoms. The active principle of cannabis is located in the whole body of the plant, mainly the part of blooming buds [30]. On the other hand, seed and fruit have low concentration but the part of

blooming and leaves have higher concentration in *cannabis*.

### 4. ECONOMIC IMPORTANCE OF *Cannabis sativa*

China and Canada are the main producers of hemp, mainly oil exporter from seed of this plant. *Cannabis sativa* is a great source of food products, seed oil, industrial fiber etc. It is the versatile plant species which is present all over the world, having a major role in religious, spiritual moods also in recreational value [21,23]. *Cannabis sativa* is an eco-friendly crop which specifically does not require any pesticide treatment. The medicinal marijuana also generates high environmental values as well as economic values. The role of industrial hemp is mainly for seeds and fiber, whereas medicinal marijuana mainly cultivated for its leaves and flowers. Moreover, the utilization of this hemp plant creates its high economic value. From textiles to cosmetics and building materials, medicinal treatment, hygiene products all of them produced from hemp. Industrial hemp plays a key resource in economic value. *Cannabis sativa* also delivers a great role in the environmental benefits by increasing the value of soil, also lowering greenhouse gas emission [30].

### 5. CONCLUSION

*Cannabis sativa* is a versatile plant which can provide high biomass quantities in a very short time. Hemp stem is used as a source of wood and fiber for the construction purposes as well as automotive industries. Its seed, leaves and flowers played a key role as a source of bioactive components. *Cannabis sativa* or marijuana have various positive biological activities and pharmacological activities. It also concluded that marijuana and its constituents cannabidiol (CBD) and tetrahydrocannabinol (THC) offers a wide range of variety options to study. Cannabinoids may aid the treatment and various controls of common diseases such as anxiety, reduce stress, boost appetite and immunity etc. It was possible to consolidate the knowledge on the bases of medicinal importance and various benefits to human health of *cannabis sativa*. In India, marijuana or hemp is used commonly as preparation for bhang (seeds and leaves), ganja (flowers) and also some Indian drinks such as bhang thandai and bhang lassi made from bhang. It is one of the most common and legal uses of marijuana or *Cannabis sativa*. In

Uttarakhand, marijuana or hemp may be used as a source of raising the economic value in rural areas by cultivation on a large scale.

## CONSENT

It is not applicable.

## ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

## REFERENCES

1. Angulo-Cuenta G, Ramírez-Vergara J, Charris-Polo M. Cannabis: Innovation Opportunities for its Medical Use. *Recent Patents on Engineering*. 2019:212-223.
2. Comeau ZJ, Boileau NT, Lee T, Melville OA, Rice NA, Troung Y, Harris CS, Lessard BH, Shuhendler AJ. On-the-Spot Detection and Speciation of Cannabinoids Using Organic Thin-Film Transistors. *ACS Sensors*. 2019:2706-2715.
3. Teske JA, Deiters A. A Cyclotrimerization Route to Cannabinoids. *Organic Letters*. 2008:2195-2198.
4. ElSohly MA, Radwan MM, Gul W, Chandra S, Galal A. Phytochemistry of *Cannabis sativa*. 2017:1-36.
5. Bag D, Tabassum A, Arora N, Verma PK, Sawant SD. Medicinal Applications of Cannabidiol from the Genus *Cannabis* L. 2020:201-241.
6. Richter G, Hazzah T, Hartsel JA, Eades A, Hickory B, Makriyannis A. *Cannabis sativa*: an overview. 2021:603-624.
7. David. F. Soma in Yoga and Ayurveda : The Power of Rejuvenation and Immortality. Lotus Press. 2012:156.
8. Sander LG. Smoke: A Global History of Smoking: ReaktionBooks. 2004:74.
9. Mikuriya T. Experts from the Indian hemp Commission Report. *Last Gasp*. 1994:38.
10. Conard C. Hemp for Health. *Inner Traditions*. 1997:43-44.
11. Turner CE, Elsohly MA, Boeren EG. Constituents of *Cannabis sativa* L. XVII. A review of the natural constituents. *Journal of Natural Products*. 1980:169-234.
12. Ross SA. Flavonoid glycosides and cannabinoids from the pollen of *Cannabis sativa* L. *Phytochemical Analysis: An International. Journal of Plant Chemical and Biochemical Techniques*. 2005:45-48.
13. Elsohly MA, Slade D. Chemical constituents of marijuana: the complex mixture of natural cannabinoids. *Life sciences*. 2005:539-548.
14. Elsohly MA, Gul W. Constituents of *Cannabis Sativa* in *Handbook of Cannabis*, Oxford University Press. 2014:3-32.
15. Russo EB, Marcu J. Cannabis Pharmacology: The usual Suspects and a Few Promising Leads. In *Cannabinoid Pharmacology*. 2017:67-134.
16. Pollastro F, Minassi A, Fersu LG. Cannabis Phenolics and their Bioactivities. *Current Medicinal Chemistry*. 2018:1160-1185.
17. Mudge EM, Murch SJ, Brown PN. Leaner and greener analysis of cannabinoids. *Anal. Bioanal. Chem*. 2017:3153–3163.
18. Lucas P. Cannabis as an adjunct to or substitute for opiates in the treatment of chronic pain. *Journal of psychoactive drugs*. 2012:125-133.
19. Rothschild M, Bergstrom G, Wangberg S. *Cannabis sativa*: volatile compounds from pollen and entire male and female plants of two variants, Northern Lights and Hawaiian Indica. *Bot J Linn Soc*. 2005:387-397.
20. Small E. Evolution and classification of *Cannabis sativa* (marijuana, hemp) in relation to human utilization. *Bot Rev*. 2015:189-294.
21. Slatkin DJ, Doorenbos NJ, Harris LS, Masou AN, Quimby MW. Chemical constituents of *Cannabis sativa* L. *Root J PharmaceutSci*. 1971:1891-1892.
22. Flores-Sanchez IJ, Verpoorte R. Secondary metabolism in Cannabis. *Phytochem Rev*. 2008:615-639.
23. Peng H, Shahidi F. Cannabis and Cannabis Edibles: A Review. *Journal of Agricultural and Food Chemistry*. 2021:1751-1774.
24. Teske JA, Deiters A. A Cyclotrimerization Route to Cannabinoids. *Organic Letters*. 2008:2195-2198.
25. Ross SA, ElSohly MA. The Volatile Oil Composition of Fresh and Air-Dried Buds of *Cannabis sativa*. *Journal of Natural Products*. 1996:49-51.
26. Tahir MN, Shahbazi F, Rondeau-Gagné S, John F. Trant. The biosynthesis of the Cannabinoids. *Journal of Cannabis Research*; 2021

27. Jin D, Dai K, Xie Z, Chen J. Secondary Metabolites Profiled in Cannabis Inflorescences, Leaves, Stem Barks, and Roots for Medical Purposes. Scientific Reports; 2020.
28. Schofs L, Sparo MD, Bruni SFS. The antimicrobial effect behind *Cannabis sativa*. Pharmacology Research & Perspectives; 2021
29. Echeverry C, Reyes-Parada M, Scorza C. Constituents of *Cannabis sativa*. 2021
30. Sommano SR, Chittasupho C, Ruksirwanich W, Lantraeut P. The Cannabis Terpenes. Molecules; 2020
31. Nguyen G, Kayser O. Biosynthesis and Chemical Modifications of Minor Cannabinoids. 2020:1-9.

---

© 2021 Thakur et al.; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

*Peer-review history:*

*The peer review history for this paper can be accessed here:*  
<https://www.sdiarticle5.com/review-history/77477>