Discussing Chemical, Medicinal, and Other Significant Properties of Weed Plants

*Yogita Bhagubhai Gamit, **Prof. Dr. Pravin Bhagwat Cholke
*Research Scholar, **Research Supervisor
Department of Botany, Himalayan University,
Arunachal Pradesh, India

ABSTRACT

Weeds are plants that sprout up in the wild without any human intervention. Weeds are common in areas with human habitation or agricultural use. There is historical evidence that many different societies have used cannabis (the plant Cannabis sativa) for therapeutic purposes dating back millennia. The medicinal potential of these plants has been widely studied in recent years. Weeds are responsible for around 45 percent of all agricultural pest losses, and they may inflict as much damage to medicinal plants as any other type of pest. Because a plant or herb is not a weed when it is growing where it belongs or is desirable, the term weed in its general definition is a subjective one, without any categorization significance. Some weeds are really helpful plants or herbs because they may be eaten or used in alternative medicine. Some insect pests of crops may also be deterred by using such helpful plants.

Keywords: *Medicinal use; Pests; Crops; Chemical; Health*

INTRODUCTION

The medicinal use of the weed plant, commonly known as cannabis or marijuana, has emerged as a captivating and contentious topic in modern times. Historically revered for its therapeutic properties in ancient civilizations, cannabis has recently undergone a renaissance in medical research and practice. The increasing interest in this versatile plant lies in its complex composition of cannabinoids, terpenes, and other bioactive compounds that interact with the human body's endocannabinoid system, presenting a myriad of potential medicinal applications. From pain relief and neuroprotection to addressing mental health conditions and palliative care, cannabis-based medicines hold promise in revolutionizing modern healthcare. However, the journey towards fully embracing medicinal cannabis is not without challenges, including regulatory barriers, public perception, and the need for robust scientific evidence.

Cannabis has a rich history in human civilization, with evidence of its use dating back thousands of years. Early records suggest that ancient cultures in Asia, Africa, and the Americas utilized cannabis for a variety of purposes, including medicinal, spiritual, and industrial. In ancient China, cannabis was prescribed for various ailments in traditional medicine, while Indian Ayurvedic texts documented its use for pain relief and other therapeutic benefits. Throughout history, cannabis has held a prominent place in the pharmacopeias of various cultures, attesting to its perceived medicinal value.

The cannabis plant (Cannabis sativa) is a complex botanical specimen containing a diverse array of chemical compounds with potential medicinal effects. The two primary classes of active compounds are cannabinoids and terpenes. Cannabinoids, such as delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD), interact with the endocannabinoid system (ECS) in the human body, regulating a wide range of physiological processes. Terpenes contribute to the aroma and flavor of cannabis and are believed to work synergistically with cannabinoids, enhancing their therapeutic effects.

The medicinal potential of the weed plant stems from its interaction with the ECS and the intricate interplay between cannabinoids and other bioactive compounds. Research has shown that cannabis exhibits a wide range of medicinal properties, including analgesic, anti-inflammatory, neuroprotective, and anti-emetic effects. The therapeutic potential of cannabis extends beyond symptom relief, with promising indications for treating chronic conditions and enhancing overall well-being.

1

CHEMICAL COMPOSITION OF WEED PLANTS

The chemical composition of weed plants, particularly Cannabis sativa, is complex and diverse, with over 500 identified compounds. Among these compounds, the most notable ones are cannabinoids, terpenoids, and flavonoids. These bioactive molecules contribute to the various therapeutic effects and physiological responses associated with weed plants. Here's a brief overview of the key components:

Cannabinoids

Cannabinoids are a group of active compounds found in weed plants. The two most prominent cannabinoids are:

- **Tetrahydrocannabinol (THC):** Responsible for the psychoactive effects or "high" commonly associated with cannabis use. It also possesses various medicinal properties, such as pain relief and antiemetic effects.

- **Cannabidiol (CBD):** Non-psychoactive and has gained significant attention for its potential therapeutic benefits. CBD exhibits anti-inflammatory, analgesic, anxiolytic, and antiepileptic properties, among others.

Terpenoids (Terpenes)

Terpenoids are aromatic compounds that give weed plants their distinct aroma and flavor. They also play a vital role in the entourage effect, where the combination of cannabinoids and terpenoids enhances the overall therapeutic potential of cannabis. Some common terpenoids found in weed plants include:

- **Myrcene:** Exhibits sedative and relaxing effects and is also found in hops, giving beer its characteristic aroma.

- **Limonene:** Known for its citrus scent and potential antidepressant and anxiolytic properties.

- **Pinene:** Has a pine-like aroma and may have anti-inflammatory effects.

Flavonoids

Flavonoids are a group of polyphenolic compounds that contribute to the plant's coloration. They have antioxidant and anti-inflammatory properties and may also interact with the endocannabinoid system. Some flavonoids found in weed plants include:

- **Cannflavin A and B:** Unique to cannabis, these flavonoids have shown promise as potent anti-inflammatory agents.

Other Constituents

- **Fatty Acids:** Cannabis seeds are a rich source of essential fatty acids, such as omega-3 and omega-6, which have various health benefits.

- **Chlorophyll:** The green pigment involved in photosynthesis.

The chemical composition of weed plants can vary significantly depending on the strain, growing conditions, and methods of extraction and processing. The specific combination and concentration of these compounds contribute to the diverse effects and potential medicinal applications of weed plants. Researchers continue to explore and better understand these compounds to optimize their therapeutic use and minimize potential risks.

MEDICINAL PROPERTIES AND POTENTIAL APPLICATIONS

Medicinal properties and potential applications of the cannabis plant species have been a subject of growing interest among researchers and healthcare professionals. Here are some of the key medicinal properties and potential therapeutic applications of cannabis:

Pain Management and Analgesic Effects

Cannabis has shown promise in alleviating various types of pain, including chronic pain, neuropathic pain, and pain associated with certain medical conditions. Both THC and CBD, the two major cannabinoids found in cannabis, interact with the endocannabinoid system and other pain-related pathways, leading to pain relief.

Anti-inflammatory and Immunomodulatory Properties

Cannabinoids, particularly CBD, have demonstrated anti-inflammatory effects in preclinical studies. These properties suggest potential applications in conditions associated with inflammation and immune system dysregulation, such as autoimmune diseases and inflammatory disorders.

Neuroprotective Effects in Neurological Disorders

CBD has shown neuroprotective properties, which may be beneficial in various neurological conditions, including multiple sclerosis (MS), Alzheimer's disease, Parkinson's disease, and traumatic brain injury. These effects are believed to be mediated through antioxidant and anti-inflammatory mechanisms.

Antioxidant and Anti-cancer Potential

Cannabis contains various antioxidants and cannabinoids that have been shown to have anti-cancer properties in preclinical studies. While more research is needed, there is a growing interest in using cannabis-based products in cancer treatment and supportive care.

Potential Applications in Mental Health Conditions

Cannabis, particularly CBD, has shown potential in managing symptoms of certain mental health conditions, such as anxiety disorders, post-traumatic stress disorder (PTSD), and depression. However, the effects of THC on mental health are more complex and may exacerbate certain psychiatric conditions.

Treatment of Epilepsy and Seizure Disorders

Epidiolex, a CBD-based medication, has been approved by the U.S. Food and Drug Administration (FDA) for the treatment of severe forms of epilepsy, such as Dravet syndrome and Lennox-Gastaut syndrome. Clinical trials have shown promising results in reducing seizure frequency and improving quality of life.

Cannabis in Palliative Care

Cannabis-based products have been explored in palliative care to manage symptoms associated with terminal illnesses, including pain, nausea, loss of appetite, and insomnia. These products may provide relief and improve the quality of life for patients in palliative care settings.

Potential Anti-bacterial and Anti-fungal Properties

Some studies have suggested that cannabis extracts and cannabinoids may have antibacterial and antifungal effects, which could potentially be utilized in treating certain infections. However, more research is needed to understand their full potential in this area.

WEEDS AS A SOURCE OF BIO PESTICIDES

As a common evolutionary reaction to pressure from herbivores like insects, plant life often produces bioactive secondary metabolites. Therefore, it should come as no surprise that several of these chemicals have been

demonstrated to have insecticidal properties. It is estimated that chemicals in over 2,000 plant species have pest control characteristics. Compounds with proven efficacy as insecticides in agriculture and domestic usage include nicotine, derris, and pyrethrum. Many others have a long history of usage in Africa, although their use is often regional. For example, certain regions of Africa utilize certain plants as insect repellents while others do not. Extracts from these plants may not be as effective as commercial synthetic pesticides, but they may make a significant contribution to pest control when used in conjunction with other methods, and they frequently have the added benefit of being less hazardous to humans. It has been shown that several plant extracts with anti-insect activity also have anti-fungal and antibacterial properties. The use of Datura stramonium has been linked to a reduction in cotton's susceptibility to bacterial blight (Xanthomonas campestris pv. malvacearum) and Alternaria leaf spot (Alternaria macrospora). A widespread weed in both the Old and New Worlds, Nicandra physaloides is infamous for the presence of the antifeedant chemical nicandrenone. It is commonly used in Peru as a domestic insect repellent, and its usage for this purpose has also been documented in Africa. Datura spp. are also utilized as rat poison in stored grain, whereas most of the known applications for these weeds (including N. physaloides) were as repellents against insects attacking the human body. The water hyacinth (Eichornia crassipes L), which reduces populations of plant parasitic nematodes when mixed into soil, and Lantana camara, which generates an antibacterial chemical, are two examples of noxious weeds that generate a lot of biomass and might be used for pest management.

LOSSES CAUSED BY WEED

Weeds are the most destructive agricultural pests, costing farmers more money than insects, nematodes, and even rodents combined. As can be shown in Figure 1, weeds account for 45% of yearly losses in agricultural produce, insects for 30%, diseases for 20%, and other pests for 5%.
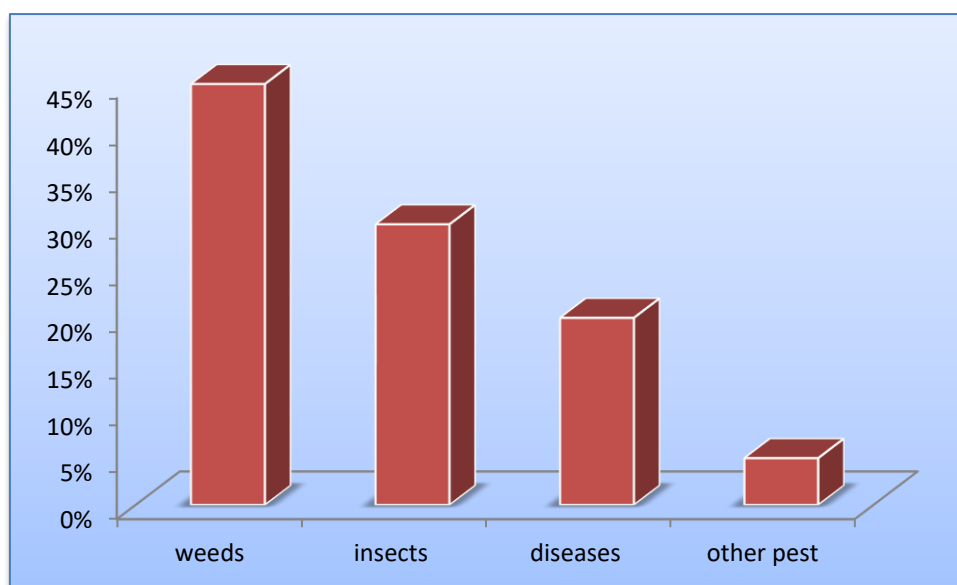
Figure 1: Losses caused by different pests and weeds

Weeds inflict significant damage to medicinal crops.

- Weeds deplete soil resources by outcompeting desirable plants for food.

- Competition for space both above and below ground reduces the yield contributing character.

- A decrease in soil moisture.

- Adulteration/mixing of weeds during post-harvest processing reduces the quality of medicinal plants. Asparagus, chlorophyllum and other root crops are all negatively impacted by the presence of kans grass (Cyperus rotundus) in the soil.

- The profits from growing medical plants and from farming are both diminished when weed is present.

- Reduced productivity and quality are the results of weeds' high intensity, which causes them to take longer to germinate and grow, necessitating wider row spacing and slower lateral spread.

CONCLUSION

Cannabinoids, of which THC and CBD are the most studied and acknowledged, are largely responsible for the therapeutic effects of cannabis plants. Although the euphoric effects of THC get all the press, the compound's potential as an analgesic and antiemetic makes it useful in the treatment of pain and nausea. CBD, on the other hand, has been investigated as a therapy for anxiety disorders, epilepsy, and inflammatory illnesses due to its broad spectrum of possible therapeutic effects and the fact that it is not psychotropic. It is important to better investigate the immense therapeutic potential of weed plants. Medical cannabis has the potential to become a beneficial supplement to contemporary medicine by resolving the difficulties, boosting research efforts, and applying evidence-based procedures.

REFERENCES

1. Dalal, Jyoti & Lata, Pushap & Gupta, Lalita. (2022). Biological control of weeds through medicinal plants. 09. a744- a748.

2. Odieka, Anwuli & Obuzor, Gloria & Oyedeji, Opeoluwa & Gondwe, Mavuto & Hosu, Yiseyon & Oyedeji, Adebola. (2022). The Medicinal Natural Products of Cannabis sativa Linn.: A Review. Molecules. 27. 1689. 10.3390/molecules27051689.

3. Bhargavi, B & Kavya, S & Somasundaram, Sharmila & Sakthivel, Mownika. (2021). Survey of medicinal weeds in paddy field ecosystem with special emphasis on Ammannia baccifera Linn.-A potent weed. 6. 64-70.

4. Sahrawat, Alka & Rahul, Siddarth & Singh, Dr-Sameer & Patel, Shweta. (2020). The potential benefits of weeds: A comparative study: A review. International Journal of Chemical Studies. 8. 148-154. 10.22271/chemi.2020.v8.i2b.10134.

5. Sahrawat, Alka & Rahul, Siddarth & Singh, Dr-Sameer & Patel, Shweta. (2020). The potential benefits of weeds: A comparative study: A review. International Journal of Chemical Studies. 8. 148-154. 10.22271/chemi.2020.v8.i2b.10134.

6. Rizki, Rizki & Nursyahra, Nursyahra & Fernando, Oki. (2019). Study of Weeds as Traditional Medicinal Plants Used by Indigenous People of West Pasaman, Indonesia. Journal of Tropical Horticulture. 2. 10.33089/jthort.v2i2.21.

7. Khajoei Nasab, Farzaneh & Esmailpour, Mohammad. (2019). Ethno-medicinal survey on weed plants in agro-ecosystems: a case study in Jahrom, Iran. Environment Development and Sustainability. 21. 2145–2164. 10.1007/s10668-018-0128-9.

8. Islam, A K M Mominul & Yeasmin, Sabina & Qasem, J.R. & Juraimi, Abdul & Anwar, Md. (2018). Allelopathy of Medicinal Plants: Current Status and Future Prospects in Weed Management. Agricultural Sciences. 09. 1569-1588. 10.4236/as.2018.912110.

9. Da Silva Filho, Antonio & Ferraz, Rener & Silva, Emanuela & Silva, Gildevânio & Andrade, Leandro & Barbosa, Marcelo de Andrade. (2016). Floristic and medicinal potential of weeds in agroecosystem of Jatropha mollisima (Pohl) Baill under saline condition. Revista Brasileira de Agroecologia. 11. 45-53.

10. Panda, Debabrata & Pradhan, Smitanjali & Palita, Sharat Kumar & Nayak, Jayanta. (2014). Medicinal weed diversity and ethno medicinal weeds used by tribal's of Koraput, India. Ecology, Environment, and Conservation. 20.