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Ethnobotanical and Ethnopharmacological Surveys of *Cannabis sativa* (Beldiya Species) Use in the Provinces of Taounate and Al Hoceïma

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ABSTRACT

Cannabis sativa (family Cannabaceae) is a plant of Asian origin, widely recognized for its psychoactive and therapeutic properties, which have been harnessed for recreational and medicinal purposes since ancient times. Currently, a number of scientific studies have investigated the medicinal value of Cannabis, while traditional knowledge regarding its therapeutic and cosmetic applications is steadily declining. This research project aimed to collect data on the traditional uses of *Cannabis sativa* in the provinces of Taounate and Al Hoceïma, located in Northern Morocco, by conducting an ethnobotanical survey. Eighty-five structured questionnaires were distributed to traditional practitioners, peasants, herbalists, and users of the plant over a period of four months. The questionnaires consisted of open-ended and closed-ended questions, covering topics such as the plant parts used, the modes of administration, the indications, the dosage, the frequency of use, and the adverse effects of *Cannabis sativa L.* Descriptive statistics was used to analyze the data and chi-square tests were used to determine the associations between the variables. The study revealed that *Cannabis sativa* is commonly utilized as a recreational or medicinal plant for several purposes, including the treatment of physical and mental health conditions, cosmetic application, and even as a building material. Furthermore, the findings indicated that various factors, such as demographic data and patterns of cannabis use, are associated with the specific plant parts used and the modes of administration.

***Keywords*:** *Cannabis sativa*; Ethnobotanical; Traditional uses; Morocco; Taounate; Al Hoceïma

Introduction

Cannabis sativa is a plant with a long and rich history of traditional use in various regions and communities around the world.[1-3] In Morocco, cannabis, also known as marijuana or hashish, has been an essential part of the country's heritage for centuries, serving multiple purposes such as medicine, spirituality, and recreation.[3,4] The Rif Mountains in northern Morocco are the main hub for cannabis cultivation, where farmers skilfully grow a wide range of cannabis varieties, each with its own unique genetic and quality traits.[3] Some of these varieties are native to the Rif, such as the local "Beldia," which is well adapted to the specific climatic conditions of the region, while others are imported from different parts of the world, such as Khardala, Critical, Amnesia, Gaouriya, and Lemon Haze.[5]

However, cannabis is more than just a plant in Morocco. It is a symbol of identity, a source of spiritual connection, and a means of healing.[1] For generations, cannabis has played an integral role in Moroccan society, fulfilling medicinal, recreational, and religious functions.[1,4,6,7] Its therapeutic properties have been harnessed as a natural treatment for numerous health problems, such as pain, inflammation, and digestive disorders. In addition, , cannabis has been a common recreational drug at social events like "seshas," where friends gather to smoke, chat, and share stories while appreciating the herb's effects. Furthermore, for some, especially Sufis, cannabis has mystical and spiritual qualities that help in meditation and contemplation, adding another dimension to the plant's value in Morocco.

Although cannabis has a rich history of traditional use in Morocco, its legal status has been unstable and controversial since the country's independence in 1956.[8,9] However, in a ground-breaking move in July 2021, Morocco legalized the cultivation of cannabis for medical, cosmetic, and industrial purposes, joining the league of countries that have taken this historic step.[10] This decision was driven by the growing global market for medical cannabis, which is projected to increase by more than 20% annually, with Europe as the main consumer.[11] Morocco has a great opportunity to enter this market, credit to its favourable human, climatic and logistical conditions, as well as its strategic geographical location.

The objective of this study is to survey the population in the Taounate and Al Hoceïma provinces, where cannabis cultivation and consumption have been a longstanding tradition for many generations. This study investigated the traditional uses of *Cannabis sativa* as well as various aspects of its social and functional uses, including recreational, therapeutic, and cosmetic applications. In addition, the study also analyzed how these practices are influenced by the mode of consumption and the specific components of the cannabis plant used in these situations.

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The survey was conducted to support the sustainable and profitable development of the cannabis industry in Morocco, while preserving and enhancing the country's natural resources and cultural diversity. It also aimed to provide valuable scientific information that could help the development of new pharmaceutical and cosmetic products based on the traditional knowledge of cannabis. Furthermore, it sought to acknowledge and respect the cultural identity and pride of the Moroccan people who have been using cannabis for centuries.

Materials and Methods

Study areas

Taounate province

The Province of Taounate is located in the southwest region of Taza-Al Hoceïma-Taounate, with an area of 5,585 km^2. It is bounded by the provinces of Al Hoceïma and Chefchaouen in the north, the region of Fez in the south, the province of Taza in the east, and the province of Sidi Kacem in the west (Figure 1).[12]

The province of Taounate is a predominantly rural province with a scattered habitat across more than 1600 villages. It covers an area of 5,585 km^2 and its current population is 662,246 inhabitants.[12] The climate is Mediterranean, with cold and wet winters and decreasing precipitation from the north (1800 mm/year) to the south (500). It is divided into two distinct parts: the northern part of the province has mountainous terrain, covering approximately 40% of the total area. Its altitudes vary, reaching up to 1800 m. It is traversed by six major rivers, which form the primary tributaries of the Oued Ouergha. On the other hand, the southern part of the province features hilly relief, encompassing an area of approximately 3300 km^2. Altitudes range from 1000 m at Jbel Zeddour region to 150 m along the Wadi Inaouen region.[12] .

The study sites were distributed across the following locations: Timegzana, Zrizer, and Bouhouda in the north; Tioulalte Beni Zeroual, the common center Galaz and Ratba in the northwest; Tamedit in the northeast.

Al Hoceïma province

The province of Al Hoceïma is located in central northern Morocco on the Mediterranean coast, with an area of 3,550 km^2. The province of Al Hoceïma is characterized mainly by a slope ranging from 10% to 40% and 12,000 ha of plains. It is bounded by Chefchaouen and Taounate to the west, Nador to the east, Taza to the south, and 120 km of Mediterranean shoreline to the north (Figure 2).[13]

The province of Al Hoceïma is characterized by a high density of the rural population, which represents 65.6% of the population compared to only 34.4% in urban areas, an urbanization rate that is lower than the national average (60.3%). It covers an area of 3,550 km^2 and its current population is 399,644 inhabitants.[13] The climate is Mediterranean, characterized by rainy and cool winters and dry and hot summers. The temperature varies between 10°C and 30°C and the average annual rainfall is 300 mm on the coast and 1,000 mm in the higher altitudes.Although the lithology varies, the marly and schistose series predominate. The relief of the province consists of 3 distinct units, one of which is the Bokkoyas massif (500-750 m) that constitutes the northern part, composed of schistose or sandstone hills. The central unit of the province is occupied by a zone of high-folded mountains, formed by quartzite sandstone banks or sandstone series of the flysch type. The third unit, which is located in the extreme southwest of the province, consists of a zone of low mountains and hills.[13]

The study sites are distributed across the following locations: Tlata Ketama in the southwest, Bni Bounsar, Issaguen in the west, Zarkt in the north, and finally, Beni Ahmed imoukzan in the south.

Data collection

The main objective of this study was to conduct an ethnobotanical survey among the residents of rural communes where Cannabis is cultivated in Northern Morocco. The study also sought to collect the current practices and knowledge about Cannabis among these people, who have a long tradition of using this plant for various purposes. To achieve this goal, 12 villages were selected in the provinces of Taounate and Al Hoceïma, which are known for their Cannabis production. The villages were: Tioulalte Beni Zeroual, Douar Mechkour, Galaz Center, Tamedit, Zrizer, Bouhouda, and Ratba in Taounate province; and Bni Bounsar, Issaguen, Ketama, Beni Ahmed Imoukzan, and Zarkat in Al Hoceïma province. These villages were visited from January to June 2022 and 85 participants were interviewed who agreed to take part in the survey. Structured questionnaire were used to collect data from the participants during individual interviews that lasted about half an hour each. The questionnaire consisted of two parts: the first part asked the respondents about their personal information (such as age, education level, family situation, occupation, etc.), and the second part asked them about their use and knowledge of Cannabis (such as local name, part used, preparation method, collection period, therapeutic and traditional uses, etc.).

Statistical analysis:

The data recorded on raw cards were transferred to the database and processed by three statistical software programs: SPHINX-V5, GraphPad Prism 8, and IBM SPSS 13. The results were presented in tables, graphs, and percentages that suited the data type and analysis. The level of significance was determined using a 95% confidence interval and p-value. This approach ensured that the statistical findings were reliable and accurate, enabling us to draw meaningful conclusions from the data.

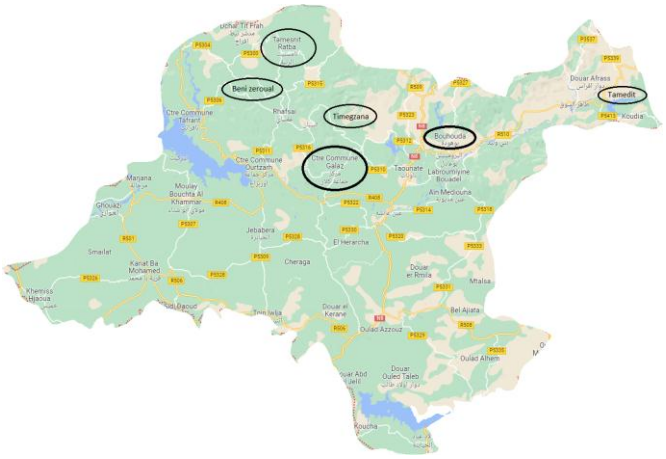

Figure 1: District map of the province of Taounate. The map was obtained from Google Maps.

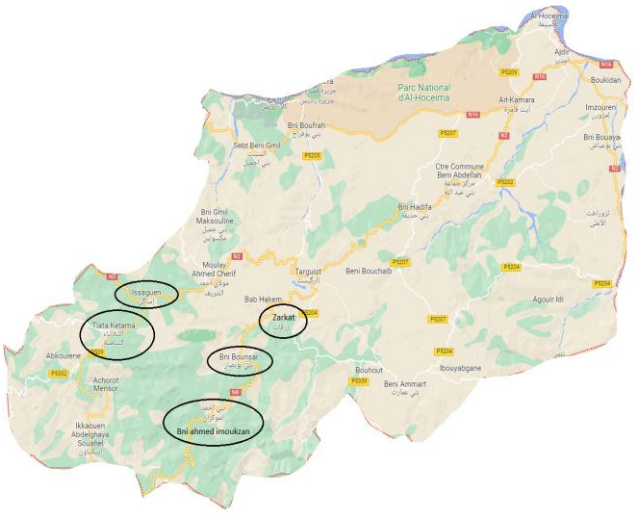

Figure 2: District map of the province of Al Hoceïma. The map was obtained from Google Maps.

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Ethical approval:
In accordance with the rigorous ethical guidelines set out by the International Society of Ethnobiology (ISE). Ethical principles were adhered to throughout the duration of the research. The study, which focused on the multifaceted uses of *Cannabis sativa* in the regions of Taounate and Al Hoceïma, Northern Morocco, aimed to preserve and document traditional knowledge while promoting responsible and respectful engagement with local communities. During the comprehensive ethnobotanical survey, obtaining informed consent and ensuring the protection of participant anonymity were prioritized. The significance of this research is underscored by a commitment to ethical standards, contributing not only to the national medicinal flora database but also establishing a solid foundation for future investigations in phytochemistry and pharmacology. This approach fosters a holistic and sustainable study of *Cannabis sativa*.

Results and Discussion:

Data description
Sociodemographic data of the study population
Usage of cannabis sativa according to age
Cannabis usage was widespread among all age groups surveyed, with the highest usage rates observed in the 30-44 (36.5%) and 45-59 (32.9%) age brackets. The youngest group (15-29) also reported a significant rate of 16.5%. However, the oldest group (60 years and above) had the lowest rate of 14.1%, which might reflect historical, health, and cultural factors (Table 1). These results are consistent with similar ethnobotanical studies, conducted in the north of Morocco and other regions, of the practice of using medicinal plants according to age groups.[14- 18]

Usage of cannabis sativa according to gender
The questionnaire was mainly completed by male respondents (92.9%), who reported using Cannabis for therapeutic reasons, such as relaxation, anxiety reduction, and enhanced pleasure. They also considered Cannabis as a safer substitute for other harmful drugs that they had previously used for similar purposes. The current findings support the results of Parent *et al.* who suggest that men consume Cannabis for recreational motives, such as increasing pleasure, lowering inhibitions, and alleviating stress.[19] On the other hand, women represented a small proportion of the participants (7.1%), due to the cultural barriers that discouraged them from discussing topics like sexual behaviour and drug use (Table 1). Moreover, it was difficult to recruit women who were willing to take part in the survey.

Profession
Cannabis consumption is widespread among various occupational groups in Morocco, according to the data. Farmers account for half of the total consumption, followed by employees (18.8%) and herbalists (8.2%). The remaining 18% were distributed equally among housewives and the unemployed (Table 1). However, the reasons for consuming cannabis vary from coping with work-related stress, to treating medical conditions, to enjoying recreational activities, or to enhancing cosmetic or social aspects. These findings are consistent with other studies that have examined cannabis consumption by occupation.[20,21]

Study level
The study shows a strong inverse relationship between cannabis use and educational status. People with lower educational status are more likely to use cannabis than those with higher educational status. This may be due to the cultural and traditional factors that influence cannabis use in the region, such as the oral transmission of information from generation to generation.

Table 1 : Demographic data of the respondents and plant information

	Fréquency (%)	**Mean ± SD**	**Median [25 ;75]**	**Min–Max**
Age :		43.78 ±13.71	43 [33.5 ;54]	18 - 75
15–29	14(16.5%)			
30-44	31(36.5%)			
45-59	28(32.9%)			
60-up	12(14.1%)			
Gender :				
Female	11 (12.9%)			
Male	74 (87.1%)			
Profession :				
without or housewife	15 (17.6%)			
Peasant (cannabis et autres)	47 (55.3%)			
Herbalist	7 (8.2%)			
Employee	16 (18.8%)			
Study level :				
Without	25 (29.4%)			
Primary	36 (42.4%)			
Secondary	21 (24.8%)			
University	3 (3.5%)			
Marital status :				
Single	15 (17.6%)			
Married	70 (82.4%)			

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The majority of cannabis users in the study area had only completed primary education (42.4%), while nearly a third of them were illiterate (29.4%). In contrast, only a small proportion of cannabis users had attained secondary (24.8%) or university (3.5%) education (Table 1). These findings are in line with other studies that have reported similar trends of cannabis use and educational status.[16,22-25]

Marital status

Married participants demonstrated a higher cannabis usage rate (82.4%) compared to singles (17.6%), revealing a positive association between marital status and cannabis use (Table 1). This trend agrees with findings from other studies.[26,27]

Plant information

Origin of the plant

Our survey revealed that Beldia (94.1%), a traditional variety of cannabis, was the most popular among local consumers, who appreciated its low tetrahydrocannabinol (THC) content and rich aromas and flavours (Figure 3). However, for production and export purposes, hybrid varieties such as Khardala (72.4%) and Critical (22.2%) were more advantageous, as they had higher yields and potency (Figure 4). These findings are consistent with previous study that showed the superior performance of hybrid cannabis over traditional varieties.[28,29] On the other hand, the preferences of European consumers differed from those of the locals, as they favoured high THC products with intense taste and effects.[30,31] Some farmers, who are aware of this demand, cultivated hybrids for the European market, but did not consume them themselves. The use of hybrids, however, also posed some challenges, such as the increased need for fertilizers and pesticides, which could negatively affect the environment, human health, and the quality of cannabis resin.[1,32]

Parts of plants used

The plant parts that were most frequently used were the flowers and flowering tops, which accounted for 57.6% of the total usage. The resin, which contains the active compounds, was the second most preferred part, accounting for 29.4% of the usage. The seeds, leaves, roots, and whole plant were used less often (Figure 5). The high concentration of cannabinoids in the flowers explains their preference, as these compounds modulate the body's homeostasis and mood by interacting with the peripheral and central nervous systems, especially with the cannabinoid-1 and cannabinoid-2 (CB1 and CB2) receptors.[33-37] However, some studies indicated different preferences for other plant parts. For example, Lozano *et al.* reported a significant inclination toward the seeds, which are rich in essential fatty acids and proteins.[38] Hourfane *et al.* emphasized the importance of leaves, which have anti-inflammatory and analgesic properties.[4] These studies suggest that different plant parts may have different therapeutic effects and applications.

Mode of Administration and Dosage

This survey found that the most common way of consuming cannabis in both provinces was fumigation, with 57.6% of respondents preferring to inhale the smoke produced by burning it. This was usually done by smoking it in a pipe or joint or rolling it with tobacco. However, 29.4% of the respondents preferred oral administration of cannabis to avoid the short- and long-term effects on the respiratory and digestive systems that is associated with inhalation (Figure 6).[39-41] In the majority of the cases, dosages were primarily administered in the form of a standardized handful (58.82%), quantifiable pinch (56.5%), and measurable spoonful (11.8%) (Figure 7). These findings suggested that there was a significant variation in the methods and dosages of cannabis consumption among the respondents, which might have implications for their health and well-being.

Traditional uses of cannabis sativa L.

This survey explored the longstanding use of the Beldia variety of *Cannabis sativa* for therapeutic and cosmetic purposes in the provinces of Taounate and Al Hoceïma. Through rigorous analysis, we identified numerous diseases and health conditions that had been traditionally treated with cannabis (Table 2). The findings of the survey provided compelling evidence of the medicinal properties of cannabis, indicating its potential in managing a wide range of health issues.

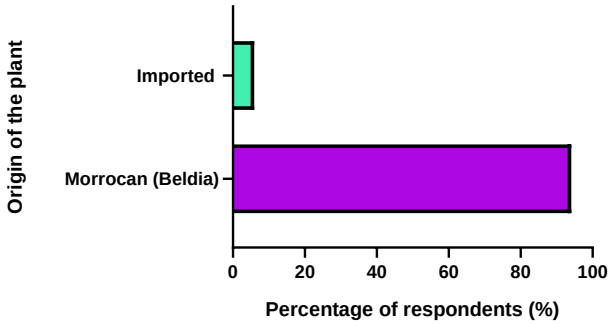

Figure 3: Origin of the plant used by the populations

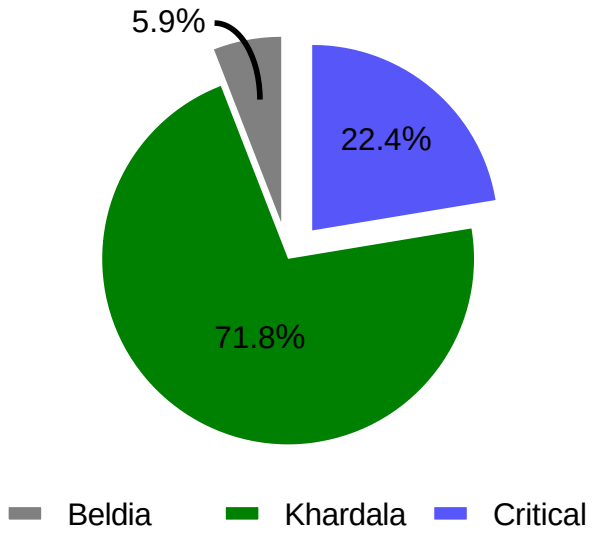

Figure 4: Medical cannabis production and export

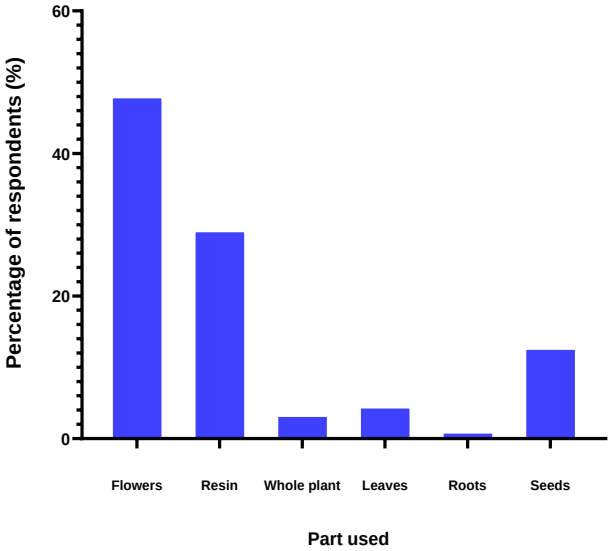

Figure 5: Used part by the participants

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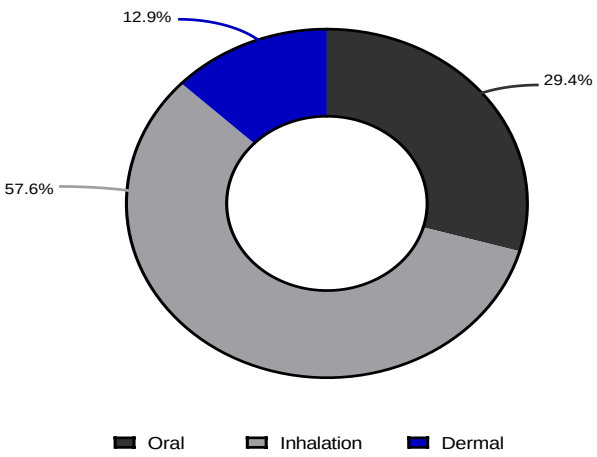

Figure 6: Mode of administration by the participants

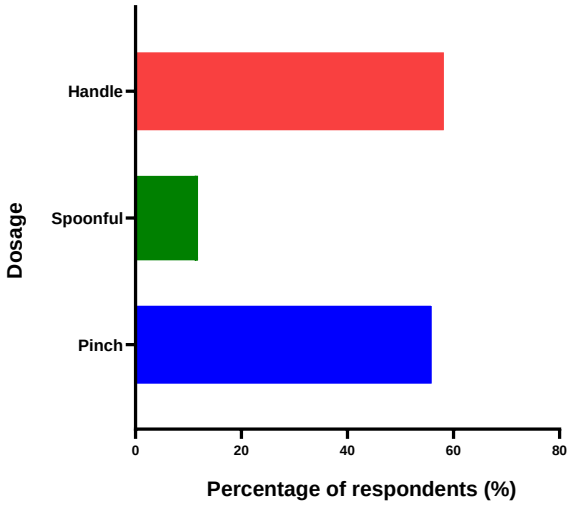

Figure 7: Dosage information by the participants

Therapeutic uses of cannabis Sativa

This survey revealed that folk medicine practitioners used different parts of the cannabis plant for various purposes, especially its flowers and flowering tops. One of the ways it is consumed is "Kif", a mixture of ground-up flowering tops and tobacco leaves. Some older users preferred this method because it was observed to lower blood sugar levels and eased severe pain. Several cross-sectional and ethnopharmacological studies supported this observation, indicating that cannabis regulated insulin and glucose levels, and reduced waist circumference.[16,42-44] They also advised drinking some ampoules (sebssi) of Kif before alcohol intake to prevent nausea and vomiting. This assertion was supported by several studies.[16,45] Moreover, smoking Kif enhanced night vision and reduced intra-occular pressure, as confirmed by a few studies.[46-48] The sebssi produced a black residue called soot, which they used as a poultice to heal wounds by soaking and applying it to the skin. Other studies agreed with this practice and suggested that the cannabis-based products had antibacterial and anti-inflammatory properties.[49-52]

The leaves of the cannabis plant could also be used for various purposes: When prepared as a tea and consumed orally, they could eliminate intestinal worms in children, alleviate joint pains, stop diarrhoea, prevent migraine attacks, or reduce chronic cancer pain by reducing inflammation. These uses were supported by some studies, which reported that cannabis leaves had been used for treating intestinal worms, joint pains, diarrhoea and migraine.[53-56] Additional studies further substantiated the efficacy of cannabis in managing chronic cancer pain, providing a comprehensive perspective on its therapeutic potential.[57-60]

Another product derived from cannabis was hashish, made from the resin secreted by the plant. Hashish was usually smoked and had many therapeutic effects. It is used to shorten the onset of sleep and prolong sleep duration, leading to better rest and alertness. This observation is supported by previous research, which indicated that high doses of cannabidiol (CBD), the main non-psychoactive compound in cannabis, and other cannabinoids had a mild sedative effect.[61-63]

Cannabis resin is also used to treat mental illnesses, such as depression, social anxiety, and post-traumatic stress disorder (PTSD), by alleviating symptoms and improving quality of life. Many studies proved that cannabis treated a wide range of psychological disorders by modulating the endocannabinoid system, which regulated stress, emotion, and cognition.[61,64,65]

Table 2: Traditional Uses of *Cannabis sativa* as Phytomedicine by Folk Medicine Practitioners in the Provinces of Taounate and Al hoceïma in Morocco

Kind of use	Parts used	Method of use	Recommended uses among study participants	Indications from the litterature
Therapeutics	Flowering tops	Smoke inhalation	Manage intraocular pressure, Reduces inflammation and swelling, Fights against bacterial infections, Induces sleep and reduces chronic pain, Exhibits mood-enhancing properties and regulates blood sugar levels.	Hypoglycemic and antiemetic activities,[16,42-45] reduction of eye pressure,[46-48] antibacterial and anti-inflammatory properties,[49-52] relief from chemotherapy side effects and chronic pain,[57-59] hypnotic attributes for enhanced sleep,[61-63] and antidepressant activity.[61,64,65]
		Poultice	Stimulate wound healing.	
	Leaves	Infusion	Antigiardial agents and Rheumatoid Arthritis pain relief.	Treating intestinal worms, joint pains, diarrhea and migraine,[53-55] Cancer pain and Chronic pain management,[57-59] Spasticity , Anti-inflammatory activity .[56]
		Decoction	Gastrointestinal Distress, cancer pain and Severe Headache.	

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		Poultice	Migraine	
	Resin	Smoke inhalation	Reducing depression, chronic insomnia, appetite stimulants, and relieving stress.	Regulate stress, emotion, and cognition,[61,64,65] hypnotic attributes for enhanced sleep,[61-63]
	Roots	Decoction	High blood pressure	Fever,[66,67] Anti inflammatory and pain reliever, [66]
		Maceration	Fever	
Cosmetics	Seeds	Trituration	Providing therapeutic care for the skin, hair, and nails, managing the condition of hair loss, combatting cutaneous aging of the face, reducing the appearance of fine lines and wrinkles, and relieving rheumatoid arthritis.	Anti-inflammator and antioxydant activity,[73-76] anti-rheumatic[4] , cardiovascular diseases, obesity, and diabetes mellitus.[73]
Other use of Cannabis	Stems		Durable construction material.	Textile production, paper industry, insulation and building materials, Biostimulant and Fiber production,[77,78] as well as Animal nutrition.[79-82]
	Seeds		Enhancing egg production capacity	

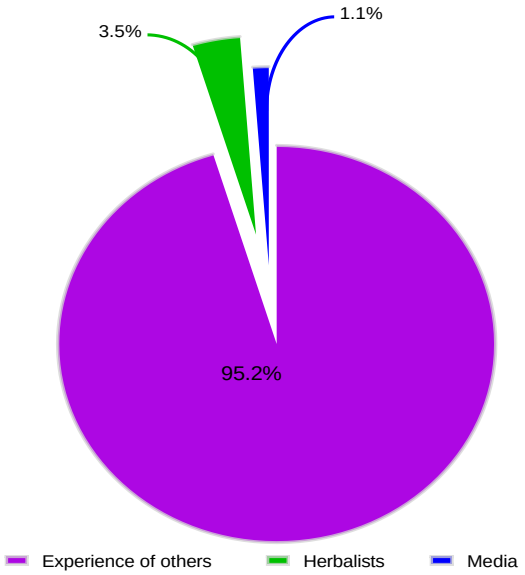

Figure 8: Source of information by the participants

The cannabis root was valued by the individuals surveyed in the Al Hoceïma provinces, especially for its ability to lower high blood pressure and ease fever. This is consistent with existing research that indicates that cannabis root has anti-inflammatory and analgesic properties,[66] as well as the ability to induce fever.[66,67] However, no specific study has yet examined the use of cannabis root for treating high blood pressure.

The results from this study suggested that cannabis had a wide range of therapeutic applications in folk medicine, especially for conditions that conventional medicine struggled to treat. These findings agreed with some of the reported benefits of cannabis in the scientific literature, but also revealed some novel uses, such as lowering of high blood pressure with cannabis roots. This indicated that cannabis had a long and rich history of use in Moroccan culture, and that folk medicine practitioners had their own knowledge and practices based on experience and observation.

Cosmetic use of cannabis Sativa

Cannabis sativa seeds are widely used for hair and skin care by women in the Moroccan provinces of Taounate and Al Hoceïma, where they have a long history of traditional use. The seeds are mixed with olive oil or henna paste to make herbal preparations that have various benefits for the skin and hair. These benefits include stimulating hair growth, preventing hair loss, nourishing hair follicles, hydrating the skin, reducing signs of aging and improving skin pigmentation. Scientific studies support the use of cannabis oil, which is obtained by cold-pressing the seeds, for hair and skin health.[16,68-70] Cannabis oil is rich in essential fatty acids, especially alpha-linolenic acid, as well as vitamins (tocopherols and carotenoids), and antioxidants (phenolic compounds and flavonoids).[71-73] These bioactive compounds have anti-inflammatory, antioxidant properties, and modulate the expression of genes involved in skin and hair development and maintenance.[73-76] The use of cannabis seeds for hair and skin care reflects the cultural and medicinal value of this plant in the lifestyle of women in these regions.

Other uses of Cannabis Sativa

Cannabis stems are versatile materials for construction applications in the province of Al hoceïma. They exhibit high performance in terms of mechanical properties, such as strength, durability, flexibility, and lightness. They also provide thermal comfort and adaptability to the climatic conditions. One of the methods of wall construction with cannabis stems is to combine them with stones, mud, organic matter, and bovine excrement in a composite material. This is consistent with studies that show that cannabis stems have high cellulose content and low lignin content, which make them suitable for building materials.[77,78] Another way that cannabis is used is to feed its seeds to hens to boost their egg production and growth. The seeds are rich in nutrients, such as protein, essential fatty acids, and minerals, which can benefit the bird's health and productivity.[79-82]

Analyzing the Diversity of Information Sources Used by the Participants:

Cannabis is a native plant in these regions that has been used for medicinal purposes for centuries. The local people inherited their knowledge and skills of cannabis use as a medicine from their ancestors, who passed them down through generations. This historical legacy is the main source of information for most respondents (95.3%), highlighting the importance of preserving traditional

practices for this plant. A minority of respondents (3.5%) consulted herbalists or media sources (1.2%) about the medicinal benefits of cannabis (Figure 8). This is consistent with the existing ethnobotanical studies in Morocco on medicinal plants, which indicated that the ancestral sources are the key channels for information transmission.[14,83-86]

Factors associated with the plant's uses

The aim of conducting this study was to explore the factors influencing the utilization of *Cannabis sativa* among participants through rigorous statistical analysis. Employing the chi-square test, we investigated the correlation between various forms of cannabis use and participants' characteristics.

The findings revealed a significant association between the part of cannabis used (flower, resin, or seed) and variables such as gender, profession, dose, and purpose of use (recreational, therapeutic, or cosmetic) (Table 3). This underscores the diversity in cannabis consumption, suggesting that individuals may safely and effectively use distinct parts of cannabis for specific purposes. This agrees with existing literature suggesting that men typically opt for the flower and resin for recreational use, while women often prefer cannabis seeds for cosmetic applications.[16] Furthermore, other studies have postulated that the impact of cannabis varies based on the utilized part and dosage, given the distinct components and effects associated with each part.[4,87]

The mode of cannabis administration (inhalation, oral, or dermal) also exhibited a significant association with gender, profession, dose, and purpose of use (Table 4). This implies that the chosen method of administration can either enhance or diminish the effects and benefits of cannabis. This aligns with prior studies affirming that different methods of cannabis administration have different effects on the body, and users choose the method according to their preferences and purposes.[15,54,88] Thus, the diversity of cannabis use reflects the complexity and versatility of this plant.

Table 3 : Factors associated with the parts used of Cannabis

	Part used				
	Flowers and flowering	**Resin**	**Seeds**	**Others(whole plant , leaves or roots)**	**P value**
Age :					
15–29	6(7.05%)	5(5.88%)	2(2.35%)	1(1.17%)	0.103
30-44	15(17.64%)	9(10.58%)	6(7.05%)	1(1.17%)	
45-59	12(14.11%)	10(11.76%)	2(2.35%)	4(4.70%)	
60-up	8(9.41%)	1(1.17%)	1(1.17%)	2(2.35%)	
Gender :					
Female	0(0%)	0(0%)	6(7.05%)	0(0%)	**0.000**
Male	41(48.23%)	25(29.41%)	5(5.88%)	8(9.41%)	
Professional status :					
without or hoyusewife	2(2.35%)	2(2.35%)	11(12.94%)	0(0%)	**0.001**
Peasant	23(27.05%)	21(24.70%)	0(0%)	3(3.52%)	
Herbalist	3(3.52%)	2(2.35%)	0(0%)	2(2.35%)	
Employee	13(15.29%)	0(0%)	0(0%)	3(3.52%)	
Kind of Cannabis used :					
Beldia					
Imported	39(45.88%)	23(27.05%)	11(12.94%)	7(8.23%)	0.740
	2(2.35%)	2(2.35%)	0(0%)	1(1.17%)	
Dosage :					
Pinch	17(20%)	1(1.17%)	1(1.17%)	6(7.05%)	**0.000**
Spoonful	24(28.23%)	24(28.23%)	0(0%)	2(2.35%)	
Handle	0(0%)	0(0%)	10(11.76%)	0(0%)	
Kind of uses :					
Récreational use :					
Yes	41(48.23%)	25(29.41%)	0(0%)	0(0%)	**0.000**
No	0(0%)	0(0%)	11(12.94%)	8(9.41%)	
Therapeutic use :					
Yes	29(34.11%)	5(5.88%)	1(1.17%)	6(7.05%)	**0.002**
No	12(14.11%)	20(23.52%)	10(11.76%)	2(2.35%)	
Cosmetic use :					
Yes	5(5.88%)	0(0%)	11(12.94%)	0(0%)	**0.011**
No	36(42.35%)	25(29.41%)	0(0%)	8(9.41%)	

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Conclusion

In conclusion, our comprehensive ethnobotanical investigation conducted in the Taounate and Al Hoceïma provinces has illuminated the enduring reliance and trust of the local population in traditional herbal remedies derived from *Cannabis sativa*. This survey has unveiled the multifaceted ways in which cannabis is employed, reflecting a wealth of accumulated wisdom and expertise. Our findings have not only catalogued the various plant parts and administration methods associated with *Cannabis sativa* but also have the potential to inform delivery techniques for a wide spectrum of therapeutic and nutritional applications. Moreover, the study highlighted the interesting possibility of interactions and synergies between *Cannabis sativa* and other medicinal plants or substances, which could enhance or modulate its effects. This traditional knowledge is a valuable source of scientific information that can lead to the discovery and development of new pharmaceutical and phytotherapeutic products from cannabis.

Conflict of Interest

The authors declare no conflict of interest.

Table 4 : Factors associated with the mode of administration of cannabis

	Mode of administration			
	Oral	**Inhalation**	**Dermal**	**P value**
Age:				
15–29	2(2.35%)	10(11.76%)	2(2.35%)	0.083
30-44	7(8.23%)	18(21.17%)	6(7.05%)	
45-59	10(11.76%)	16(18.82%)	2(2.35%)	
60-up	6(7.05%)	5(5.88%)	1(1.17%)	
Gender:				
Female	0(0%)	0(0%)	6(7.05%)	**0.000**
Male	25(29.41%)	49(57.64%)	5(5.88%)	
Professional status:				
without or housewife	1(1.17%)	3(3.52%)	11(12.94%)	**0.000**
Peasant	12(14.11%)	35(41.17%)	0(0%)	
Herbalist	2(2.35%)	5(5.88%)	0(0%)	
Employee	10(11.76%)	6(7.05%)	0(0%)	
Kind of Cannabis used:				
Beldia	22(25.88%)	47(55.29%)	11(12.94%)	0.108
Imported	3(3.52%)	2(2.35%)	0(0%)	
Part used:				
Flowers and flowering tops	18(21.17%)	23(27.05%)	0(0%)	**0.000**
Resin	1(1.17%)	24(28.23%)	0(0%)	
Seeds	0(12.94%)	0(0%)	11(12.94%)	
Other	6(7.05%)	2(2.35%)	0(0%)	
Dosage:				
Pinch	24(28.23%)	0(0%)	1(1.17%)	**0.000**
Spoonful	1(1.17%)	49(57.64%)	0(0%)	
Handle	0(0%)	0(0%)	10(11.76%)	
Kind of uses :				
Récreational use:				
Yes	19(22.35%)	47(55.29%)	0(0%)	**0.004**
No	6(7.05%)	2(2.35%)	11(12.94%)	
Therapeutic use:				
Yes	21(24.70%)	19(22.35%)	1(1.17%)	**0.000**
No	4(4.70%)	30(35.29%)	10(11.76%)	
Cosmetic use:				
Yes	5(5.88%)	0(0%)	11(12.94%)	**0.000**
No	25(29.41%)	44(51.76%)	0(0%)	

Authors' Declaration

The authors hereby declare that the work presented in this article is original and that any liability for claims relating to the content of this article will be borne by them.\

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