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Original Research Article

Ethnobotanical Survey of Medicinal and Aromatic Plants used in the Treatment of Skin Burns in the Province of Sefrou of Morocco

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ABSTRACT

The inhabitants of Morocco and particularly of the province of Sefrou use traditional medicine based on aromatic and medicinal plants to treat many diseases such as digestive and respiratory problems, and skin burns Unfortunately, there are very few botanical studies on medicinal and aromatic plants used to treat skin burns in Morocco, especially in the province of Sefrou. This study describes the traditional practice of treating skin burns with medicinal plants in six cities of the province of Sefrou for future pharmacological validation. The survey was conducted using a semi-structured questionnaire in the province of Sefrou in the period of September 2020 and October 2022 which contains information on the plant, their family, and the method of preparation, and method of use. It was found that Lamiaceae and Asteraceae were the two most preferred families by the participants surveyed for the treatment of dermatological problems. The most used medicinal plants are *Allium cepa, Curcuma longa, Eryngium tricuspidatum, Ricinus communis, Mentha pelugium, Origanum compactum.*
It was found that the leaves are the most frequently used part of the plant with a percentage of 52%, followed by the whole plant with 26%. In most treatments, the powder is sprinkled directly on the burn. The study has documented the plants that are found in the province of Sefrou use to treat skin burns.

***Keywords*:** Ethnobotanical knowledge; Herbal medicines; Ethno pharmacology; Sefrou; Medicinal and aromatic plants; PAM; Ethnobotanical statistic; Skin burns

Introduction

The skin is considered the most important organ because it performs many vital functions, including protecting the organs, preserving the body's shape, and controlling the body's temperature [1]. Skin burns are a major problem worldwide, especially in Morocco [2]. The majority of treatments begin with topical application of a drug that can play an anti-infective role to limit or reduce infections [3]. Cellular therapy has been used in burn patients for several years and is now part of the therapeutic means available to manage the most serious burns. Numerous studies report the experience and difficulties encountered by teams using these cutting-edge techniques, which are e still rather cumbersome and costly [4]. Clinical applications of cellular therapy can be classified according to the cutaneous location where these cells are applied: the epidermis, the dermis, and the total skin, which includes both the epidermis and the dermis [5].

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Cell therapy at the epidermal level consists of using keratinocytes taken from healthy skin and cultivated *in vitro* to reconstitute the initial architecture of the superficial layer of the skin, which involves the superposition of multiple layers of keratinocytes. Several laboratory culture techniques and in situ application methods are available, including autologous epithelial culture (AEC) in layers, on transfer media, or in suspension [6].

There are two types of herbal medicine: Traditional herbal medicine, which aims to treat the symptoms of a disease, and clinical herbal therapy [7], which requires a global approach to the patient and their environment to determine the treatment, as well as a clinical examination. The mode of action of clinical herbal therapy is based on long-term treatment acting on the nervous system. In this type of treatment, the indications are linked to complementary therapy, which complements or reinforces the efficacy of a classic allopathic treatment for certain pathologies. Traditional herbal medicine is based on the use of plants according to their empirically discovered virtues and is used to treat seasonal pathologies and mild psychosomatic disorders, including digestive or dermatological disorders. According to the latest statistics from the World Health Organization (WHO), the majority of developing countries, especially African countries, use traditional medicine based on medicinal plants, with a percentage of 80%, due to their effectiveness, affordability, and lower risk. The most important side effects based on medicinal plants are less reduced compared to modern drugs, which can sometimes have negative effects through adverse reactions [8]. Traditional medicine varies from one country to another and from one region to another because of the differences in personal philosophy and culture among countries. The use of traditional

medicine based on plants is widespread in various fields, notably in the food industry, as well as in industries such as corrosion inhibitors for different metals and alloys, and cosmetics, particularly for dermatological problems like skin burns.
Skin burns are considered as a partial or total cellular destruction, with several causes including thermal, chemical, radiation, and electric sources [9, 10, 11, 12, 13]. Most modern medicine treatments start with a topical application to prevent infection, which explains most modern medicine treatments for skin burns typically begin with a topical application to prevent infection, which is why they tend to focus more on antimicrobial activity rather than directly treating the burns. However, the effectiveness of modern drugs may have negative impacts, such as a risk of toxicity against fibroblasts and potential allergy problems. As a result, researchers are exploring other methods to address this issue [14, 15, 16]. Research conducted on the province of Sefrou in Morocco revealed that no botanical survey had been carried out for the treatment of dermatological problems. Based on this information, a survey was conducted among various herbalists in the Sefrou region with the objective of evaluating their practices in managing the most common dermatological problems and the use of plants in cosmetology.

Materials and Methodology

Study area
The province of Sefrou is located between the Sais plateau and the northern piedmont of the Middle Atlas. It is bordered by the provinces of Boulemane and Ifrane to the south, the province of Taza to the east, the prefecture of Fez to the north, and the provinces of Malay Yacoub and El Hajeb to the west. The province covers an area of 4008.76 km2 (with a density of 67 ha/km2), which represents 19.7% of the total area of its region. According to the RGPH 2004, the population of the province is 259,577, of which 146,050 are rural inhabitants, accounting for 56% of the total population [17]. The province comprises 23 communities, including 18 rural communities and 5 urban communities [18 ,19].

To determine the sample size of the target population in the province of Sefrou, the following formula was used [20,21]:

$N = \frac{Z}{D^2}^2 \times P(1-P)$ (Eqn. 1)

Where N represents the sample size,
Z is the confidence level according to the normal distribution (for a 95% confidence level, z = 1.96; for a 99% confidence level, z = 2.575),
P is the estimated proportion of the population with the characteristic (since the proportion of the population with the characteristic is unknown, we use P = 0.5),
D represents the tolerated margin of error, which is set at 5%.

$N=\frac{1.96}{0.05^2}^2 \times 0.05 \times 0.05 = 384, 16$

Survey method
The study was conducted in the Sefrou province from September 2020 to October 2022. The research involved conducting open interviews with local residents to identify various MAPs (medicinal and aromatic plants), followed by administering surveys to gather information on the therapeutic uses and preparation methods of these plants. The surveys included inquiries about the gender, age, education level, and family status of the respondents, as well as specifics regarding the particular plant parts used and the methods of administration. A total of 450 surveys were collected, and the data were analyzed using XLSTAT and Minitab software to generate tables and graphs.

Relative Frequency Citation (RFC)
Relative frequency citation index (RFC) which means the important value of each species $RFC = \frac{FC}{N}$ (Eqn. 3)
$(0 < RFC < 1)$
FC represents the number of informants who use a given species. [22,23,24]

Fidelity Level (FL)
FL is applied to identify the most appropriate species to use in treating a specific ailment [25 ,26]. the fidelity level was determined as follows:

$FL = \frac{N_p}{N}$ (Eqn. 4)
Where NP represents the number of informants for a specific disease remedy and N is the total number for an application of a given species.

Coefficient of determination (R)

$A = \frac{\sum_1^n (Xi-XB)(Yi-YB)}{\sum_1^n (Xi-XB)2}$ (Eqn. 5)
$A' = \frac{\sum_1^n (Xi-XB)(Yi-YB)}{(Yi-YB)2}$ (Eqn. 6)

$R^2 = A * A'$
$(Xi - XB)$: represents the difference between the Use Value (UV) and the average UV
$(Yi - YB)$: represents the difference between Relative Frequency Citation (RFC) and the average of RFC
A: represents the directing coefficient of the linear function in the form Y =Ax + B
A′ : Represents the directing coefficient of the linear function in the form X =A' y + B'
R between 0 and 1 plus r close to 1 means a strong and perfect correlation. [27, 28]
Today, alternative medicine implies a strong correlation between modern and traditional medicine. In the study, we considered and recorded the educational status of the survey participants.

Use Value (UV)
The Use Value (UV) is a commonly used metric for assessing the relative importance of a local species, particularly plants. The formula used to calculate this index is as follows: $UV = \frac{U}{N}$ (Eqn. 2)
Where U is the number of uses mentioned by each informant and N stands for the number of informants. [29, 30,31]

Results and Discussion

A total of 450 people, distributed in the province of Sefrou, Morocco was chosen to select the various medicinal and aromatic plants use for the treatment of burns.
The results showed that 62.2% of the participants were illiterate and had poor knowledge of reading and writing, while 22.2% had a primary education, 8.9% had a secondary education, and 6.7% had a university education, which represented the weakest category (Table 1). Other botanical studies published in Morocco and internationally are in agreement with our results .[32, 33, 34] Two main factors improve the quality of survey data and positively influence ethno-pharmacological surveys: the age of the participants and the length of their experience. This is because the experience of the participants increases significantly with age, which has a strong correlation. Additionally, ancestral knowledge of medical ethics is transmitted orally from generation to generation.

Interesting findings from our survey indicate that 3.1% of participants reported having experience ranging from 50 to 59 years old. The insights provided by this group serve as a baseline for validating the comments of others. Additionally, 6.7% of participants reported experience between 40 and 49 years old, while 42.2% reported experience between 2 and 5 years old.

The diversity of aromatic and medicinal plants in the province of Sefrou Morocco with anti-burn characteristics
Morocco boasts a significant diversity of flora, largely attributed to its varied climatic and geographical conditions. This diversity manifests in a wide array of plant species across its territory. In the province of Sefrou, known for its biodiversity, it has been noted that numerous medicinal and aromatic plants are utilized in traditional medicine for the treatment of dermatological conditions. These plants, often passed

down through generations, have been integral to local healthcare practices for centuries, renowned for their therapeutic properties in addressing skin ailments such as eczema, psoriasis, fungal infections, among others.

The study presented herein focuses on documenting and characterizing the medicinal plants used in dermatological treatments within the Sefrou region. The findings of this investigation are compiled in Table 2, delineating the identified medicinal plants alongside their specific applications in dermatological care. This compilation offers valuable insights into local traditional medicine practices and serves as a foundation for future research aimed at scientifically validating these traditional remedies

Ethnic medicinal characteristics: growth form, plant parts, method of preparation and administration

The results of the frequencies of each medicinal and aromatic plant's scientific name used in the treatment of skin burns are presented in Figure. (2, 3). The results show that the most commonly used and represent a high percentage included Curcuma *longa* [Zingiberaceae], *Ricinus communis* [Euphorbiaceae], *Rosmarinus officinalis* [Lamiaceae], *Origanum compactum* [Lamiaceae], *Ranunculus bullatus* [Ranunculaceae], and *Linum usitatissimum* [Linaceae].

These results provide a basis for further scientific research that can confirm the pharmacological validation of the botanical study conducted in the province of Sefrou. The ethnobotanical study carried out in Sefrou has allowed for the identification of bioactive molecules that may be responsible for the partial or total reduction in the severity of cutaneous burns. These pharmacological studies enable us to identify and target various bioactive molecules that may play a vital role in treating cutaneous burns.

Parts of plants used

The study has revealed that the target population employs the plant's leaves in various forms, with 43% of respondents indicating it as the primary component for preparing treatments for skin burns. This was followed by the whole plant at 21%, and the root and fruit at 11%, as depicted in Figure 4. These results could be attributed to the leaves being recognized as a hub for biochemical reactions due to photosynthesis processes. Moreover, other botanical surveys conducted both in Morocco and abroad have consistently shown that leaves are the most frequently utilized part for treating skin burns and dermatological conditions [35, 36, 37, 38, 39]

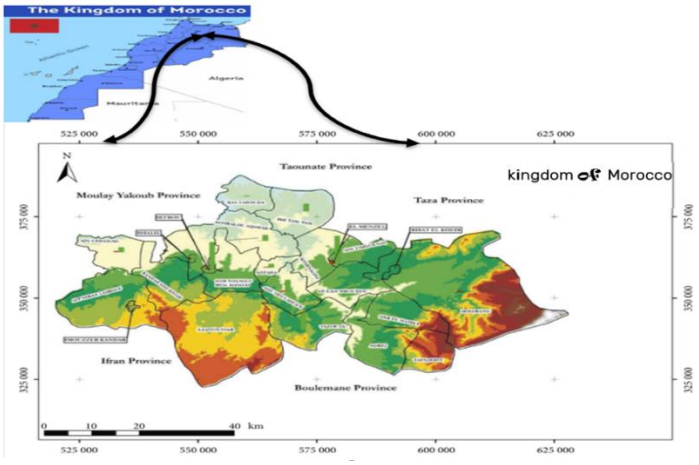

Figure 1: Sefrou Province and geographical location of the different studies.[40]

Table 1: Demographic profile of botanical survey participants

Demographic profile	N = 450	Fi%
Age (mean number of years ± SD)	50 .55 ± 14.6	
Gender		
Male	380	84.4
Female	70	15.6
Level of education		
Informal	280	62.2
Primary school	100	22.2
Secondary	40	8.9
University	30	6.7
Residence		
Sefrou	180	40.0
Imouzzer kandar	98	21.8
Bhalil	60	13.3
Bir tamtam	71	15.8
Azaba	30	6.7
Ouald mekoudou	11	2.4
Years of experience		
2–5	190	42.2
6–9	101	22.4
10–19	89	19.8
20–29	15	3.3
30–39	11	2.4
40–49	30	6.7

50–59	14	3.1

Table 2: Medicinal and aromatic plants used for the treatment of t skin burns

Scientific name [family]	Local name	Parts used	Method of preparation and application	Ni	Fi	UV(Xi)	RFC(Yi)
Allium cepa [Amaryllidaceae]	basla	Leaf	The initial state of the mucus extract from the leaves is in the form of a paste, which is then applied to burns	14	0.031	0.15	0.031
Lavandula stoechas [Lamiaceae]	halhale	Entire plant	The juice of the whole plant is extracted and used as a compress to clean the burned area	10	0.022	0.09	0.022
Curcuma longa [Zingiberaceae]	karkoume	Leaf	The mucus extract of the fresh leaves in paste form is applied as a poultice on burns	13	0.029	0.14	0.029
Opuntia ficus [Cactaceae]	Handia	Stem part	The juice is extracted from the stem of the plant and used as a compress to clean the burned area	11	0.024	0.08	0.024
Artemisia herba alba [Asteraceae]	Chih	Entire plant	The powder of entire plant is sprinkled directly on burns	12	0.027	0.10	0.027
Eryngium tricuspidatum [Chenopodiaceae]	mkhinza	Leaf part	The liquid extracted from the leaf is used to treat skin burns.	14	0.031	0.14	0.031
Inula viscosa [Asteraceae]	magramane	Leaf part	The liquid extracted from the leaf is used to treat skin burns.	10	0.022	0.07	0.022
Helichrysum italicum [Asteraceae]	imortel	Entire plant, root	The juice extracted from the entire plant or root is used as a as a compress to clean burns.	3	0.007	0.03	0.007
Anacyclus pyrethrum [Asteraceae]	ginase	Leaf	After drying the leaves, crush and disperse them directly on burns	10	0.022	0.08	0.022
Nasturtium officinale [Brassicaceae]	Grnounch	Leaf	After drying the leaves, crush and disperse them directly on burns	4	0.009	0.02	0.009
Ricinus communis [Euphorbiaceae]	kharwa3e	Entire plant	The liquid extracted from the entire plant is used to treat skin burns.	12	0.027	0.10	0.027
Origanum majorana [Lamiaceae]	mardadouche	Leaf	After drying the leaves, crush and disperse them directly on burns	9	0.020	0.06	0.020
Marrubium vulgare [Lamiaceae]	marriouate	Leaf	After drying the leaves, crush and disperse them directly on burns	8	0.018	0.05	0.018

Mentha piperita [Lamiaceae]	na3na3 beldi	Entire plant	extraction of the juice of the whole plant, use as a compress to clean the burned part	9	0.020	0.06	0.020
Mentha pelugium [Lamiaceae]	fliou	Entire plant	The liquid extracted from the entire plant is used to treat skin burns.	12	0.027	0.10	0.027
Rosmarinus officinalis [Lamiaceae]	azir	Stem, leaf part	After drying the leaves, crush and disperse them directly on burns	23	0.051	0.18	0.051
Salvia officinalis [Lamiaceae]	salmia	Leaf part, stem	After drying the leaves, crush and disperse them directly on burns	11	0.024	0.10	0.024
Vitex agnus-castus [Lamiaceae]	Kharwâe	Leaf part	The liquid extracted from the leaf is used to treat skin burns.	9	0.020	0.05	0.020
Origanum compactum [Lamiaceae]	zaatare	Leaf part	After drying the leaves, crush and disperse them directly on burns	12	0.027	0.10	0.027
Teucrium polium [Lamiaceae]	alkhiatae	Root	the powder of root plant is sprinkled directly on burns	6	0.013	0.03	0.013
Lavandula officinalis [Lamiaceae]	khzama	Entire plant	extraction of the juice of the whole plant, use as a compress to clean the burned part	10	0.022	0.09	0.022
Ocimum basilicum [Lamiaceae]	7ba9	Entire plant	the powder of the whole plant is agglomerated with olive oil and applied On the Burns	5	0.011	0.02	0.011
Pinus sylvestris [Pinaceae]	tayda	leaf	After drying the leaves, crush and disperse them directly on burns	8	0.018	0.04	0.018
Sorghum vulgare [Poaceae]	Dora rafiaa	Leaf, root	The powder of leaf plant or root is sprinkled directly on burns	3	0.007	0.01	0.007
Agropyrum repens [Poaceae]	Nejam	Leaf	The powder of leaves or stem is sprinkled directly on burns	3	0.007	0.01	0.007
Nigella sativa L [Ranunculaceae]	sanouj	Entire plant	The powder of the whole plant is agglomerated with olive oil and applied on the burns	2	0.004	0.01	0.004
Ranunculus bullatus [Ranunculaceae]	wdan lhalouf	Entire plant, stem	The entire plant powder is mixed with argan oil and applied as a poultice on burns	11	0.024	0.09	0.024

Geranium [Geraniaceae]	garnou9i	Entire plant	extraction of the juice of the whole plant, used as a compress to clean the burned part	10	0.022	0.07	0.022
verbascum thapsus[Scrophulariaceae]	masa7 ndar	Entire plant	The liquid extracted from the entire plant is used to treat skin burns.	5	0.011	0.02	0.011
Pistacia lentiscus [Anacardiaceae]	dro	Leaf	The liquid extracted from the leaf is used to treat skin burns.	5	0.011	0.02	0.011
Opuntia ficus cactus [Cactaceae]	sabar chawki	Entire plant	The liquid extracted from the leaf is used to treat skin burns.	3	0.007	0.01	0.007
Tanacetum annuum [Asteraceae]	Babounj	Leaf, stem, entire plant	The liquid extracted from the leaf is used to treat skin burns.	2	0.004	0.01	0.004
Tetraclinis articulate [Cupressaceae]	3ar3are	Leaf	The powder of the leaf is agglomerated with olive oil and applied on the burns	4	0.009	0.02	0.009
Lawsonia inermis L. [Lythraceae]	L-hennâ	Leaf	The leaf powder is mixed with olive oil or argan and applied as a poultice on burns	2	0.004	0.01	0.004
juglans [Juglandacées]	jawze	Fruit, leaf	The powder of fruit is sprinkled directly on burns, the leaf powder is mixed with olive oil and applied as a poultice on burns	10	0.022	0.04	0.022
Trigonella [foenumgraecum]	Lhelba	Leaf, root	The leaf or root powder is mixed with rose oil and applied as a poultice on burns.	9	0.020	0.04	0.020
Linum usitatissimum [Linaceae]	Zariat lktan	Fruit	After drying of fruit, crush and disperse them directly on burns	12	0.027	0.10	0.027
Prunus armeniaca [Rosaceae]	Machmach	Fruit	The fruit Powder Is agglomerated with olive oil and applied On the Burns	8	0.018	0.03	0.018
Olea europaea [Oleaceae]	Zabouj	Leaf	The leaf powder is agglomerated with olive oil and applied On the Burns	12	0.027	0.03	0.027
Ginkgo biloba [Ginkgoaceae]	ochbat jinko	Leaf	extraction of the juice of the leaf, use as a compress to clean the burned part	3	0.007	0.02	0.007

Meliaceae [Azadirachta]	Combat nim	Leaf	The juice extracted from the leaves or stem is used as a as a compress to clean burns.	8	0.018	0.04	0.018
Crataegus [Rosaceae]	combat zoror	Leaf	The leaf Powder Is agglomerated with olive oil or with argan oil and applied on the Burns	2	0.004	0.01	0.004
Zingiber officinale Roscoe [Zingiberaceae]	Skin jbir	Leaf	The leaf powder is mixed with olive oil or argan and applied as a poultice on burns	10	0.022	0.07	0.022
Alpinia officinarum [Zingiberaceae]	Khedanjel	Leaf, flowers	The powder of flowers or leaf is mixed with olive oil or argan oil and applied as a cataplasm on burns	6	0.013	0.03	0.013
Asphodelus fistulosus [Xanthorrhoeaceae]	Brewag	Leaf, flowers	The powder of flowers or leaves is mixed with olive oil or argan oil and applied as a cataplasm on burns	10	0.022	0.07	0.022
Populus nigra [Salicaceae]	Safsaf	Leaf, Fruit	After drying of fruit or leaf, crush and disperse them directly on burns	10	0.022	0.07	0.022
Populus alba [Salicaceae]	Safsaf	Leaf, Fruit	The powder of leaf or fruit is sprinkled on burns	10	0.022	0.07	0.022
Panicum miliaceum [Poaceae]	Ilane	Leaf, root	After drying the leaf, grind and mix with olive or argan oil and use directly in the skin burn	3	0.007	0.01	0.007
Agropyrum repens [Poaceae]	Nejam	Leaf	After drying the leaves, crush and disperse them directly on burns	4	0.009	0.02	0.009
Fumeterre officinale [Papaveraceae]	bakalat malik	Entire plant	The powder of the whole plant is Agglomerated with honey and applied to the burns.	6	0.013	0.02	0.013
Myrtus communis [Myrtaceae]	Rihan	Fruit, leaf part, root	After drying the flowers or leaf, grind and mix with olive or argan oil and use directly in the skin burn	11	0.024	0.08	0.024
Teucrium polium [Lamiaceae]	Al'khiyyata	Entire plant, stem	The powder of the entire plant or stem is sprinkled directly on burns	7	0.016	0.04	0.016
Phaseolus aureus [Fabaceae]	Soja	Leaf	After drying the leaves, crush and disperse them directly on burns	7	0.016	0.04	0.016
Euphorbia officinarum [Euphorbiaceae]	Dghmouss	Entire plant	After drying the entire plant, grind and mix with olive or argan oil and use directly in the skin burn	6	0.013	0.04	0.013

Opuntia ficus indica [Cactaceae]	Zeaboul	Leaf	After drying the leaves, crush and disperse them directly on burns	5	0.011	0.03	0.011
Brassica nigra [Brassicaceae]	bouhamo	Leaf	After drying the leaves, crush and disperse them directly on burns	6	0.013	0.04	0.013

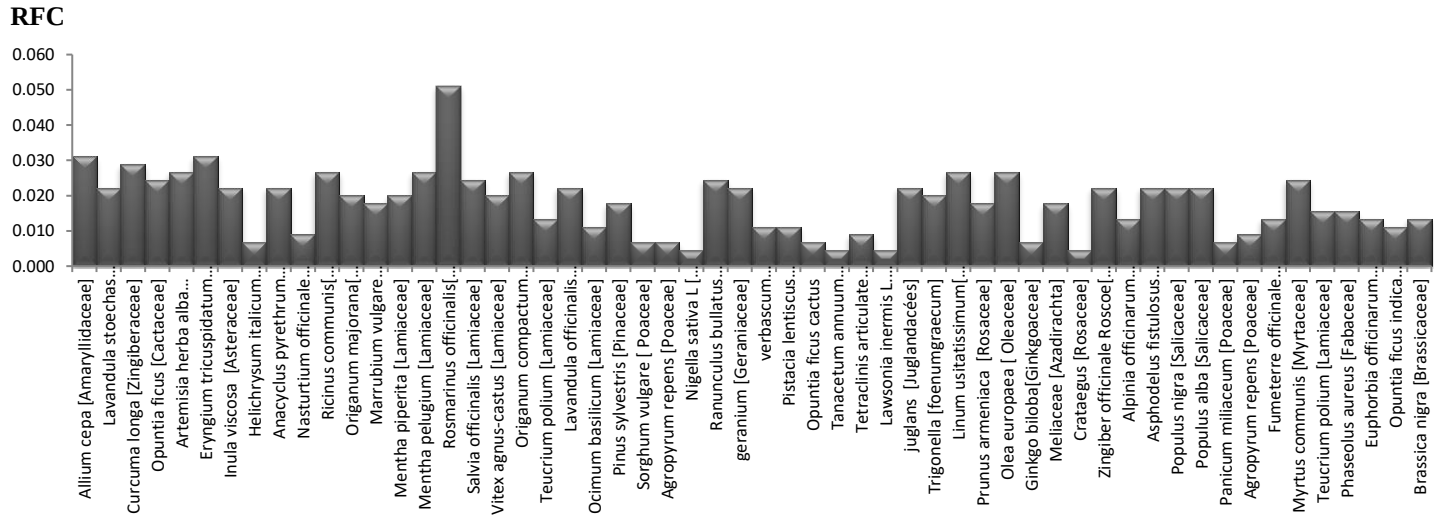

Figure 2: Graphical representation as a function of the relative frequency of citation (RFC).

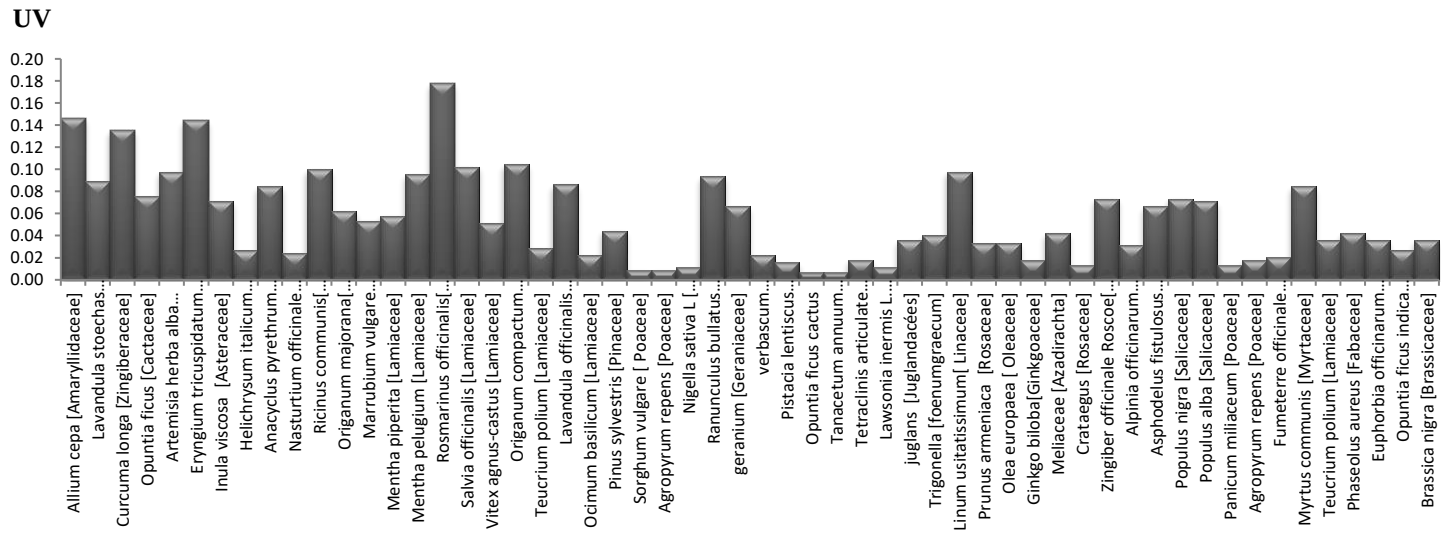

Figure 3: Graphical representation as a function of the use value (UV).

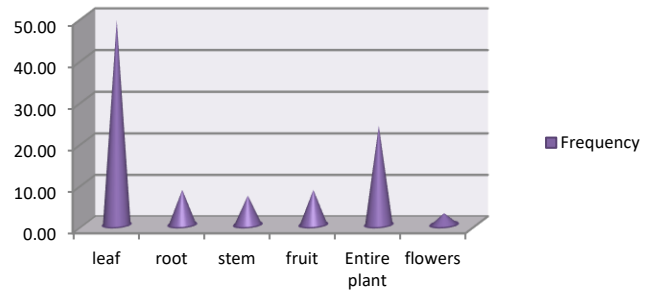

Figure 4: Breakdown of the different parts used of the medicinal plants in Sefrou province.

Statistical analysis

The Pearson correlation coefficient (r) between RFC and UV revealed a strong linear relationship (R = 0.925). However, the corresponding R^2 value, representing the coefficient of determination, was slightly lower at 0.851 (see Table 3). Despite this, a scatter plot depicting the relationship between RFC and UV demonstrated a clear linear trend (Figure 5 and Figure 6).

The standard deviation is a crucial statistical measure used to assess the spread or variability of data points around the mean within a sample. A higher standard deviation indicates greater dispersion of data points, signifying higher variability in the dataset. Conversely, a lower standard deviation suggests that data points are closer to the mean [41], indicating lower variability. In our study, the standard deviations for UV (Xi) and RFC (Yi) were computed as 0.009 and 0.040, respectively. These values, being close to zero and clustered around the mean, suggest tight

grouping of data points with minimal deviation from the mean (Table 4).

Furthermore, variance serves as another essential statistical measure for analyzing data distribution. By examining the variance of the dataset, data scientists can effectively identify outliers or data points[8] that significantly deviate from the mean. In our analysis, in our study, we identified a very low variance for both RFC (Xi) and UV (Yi), nearly equal to 0.002 (Table 4). This suggests an extremely narrow dispersion of data points around the mean.

Conclusion

The province of Sefrou in Morocco boasts a diverse flora, with over 32 families of plants utilized for medicinal and aromatic purposes. Notable species like *rosemary officinalis* and *Mentha pleugium* are commonly employed. Traditional medicinal recipes often utilize all parts of these plants, predominantly leaves, with preparations taking the form of powders for local application. However, the reliance on oral transmission of knowledge poses a risk of cultural heritage loss, particularly among the elderly. Research in Sefrou focuses on identifying plants used to treat skin problems, offering insights crucial for public health solutions. This highlights the importance of preserving traditional knowledge while leveraging it to address contemporary healthcare challenges.

Conflict of Interest

Authors declare no conflict of interest

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.

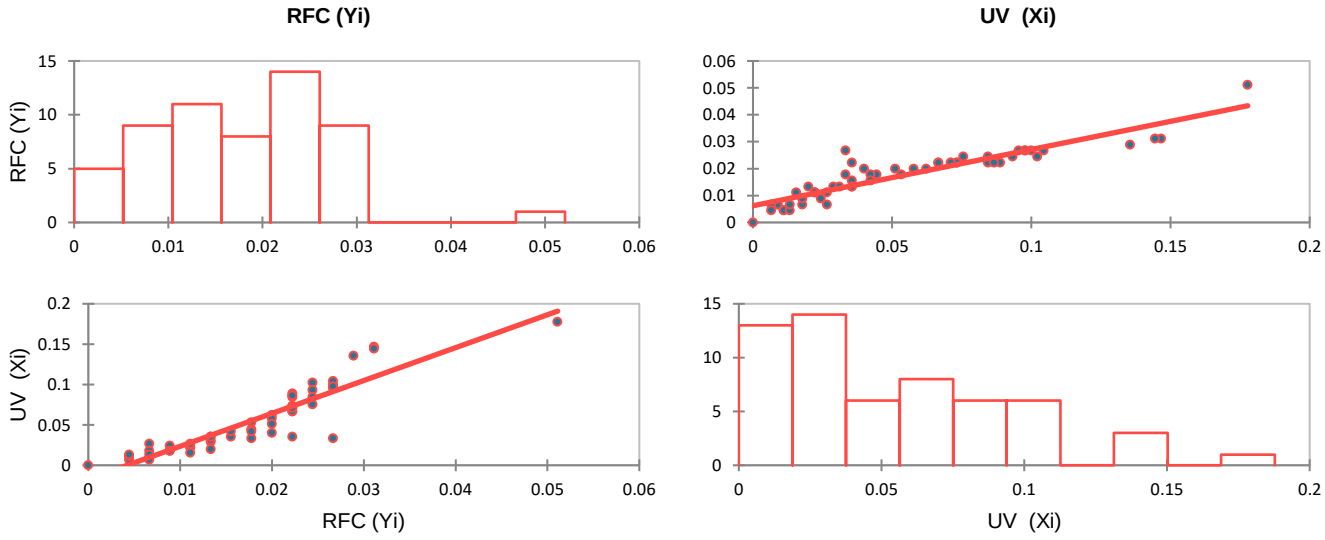

Figure 5: Correlation between UV(Xi) and RFC(Yi).

Table 3: Calculation of Various Statistical Parameters: UV (Xi) and RFC (Yi)

Statistical parameter	UV (Xi)	RFC (Yi)	$\sum(Xi - XB)\,(Yi - YB)$	$\sum$(Xi-XB)2	$\sum$(Yi − YB)2	R
	Average	Average	sum of multiplication of two factors Xi and Y i	square sum of factor Xi	square sum of factor Yi	Correlation coefficient equals the square root of A multiplied by A'
	0.05	0.07	0.0193	0.0925	0.0047	0.925

Table 4: Descriptive Statistics (Quantitative Data)

Statistics	UV (Xi)	RFC (Yi)
No. of observations	57	57
Minimum	0,000	0,000
Maximum	0,051	0,178
1st Quartile	0,011	0,022
Median	0,018	0,042
3rd Quartile	0,022	0,084
Mean	0,018	0,054
Variance (n-1)	0,000	0,002
Standard deviation (n)	0,009	0,040
Coefficient of variation (n)	0,520	0,743

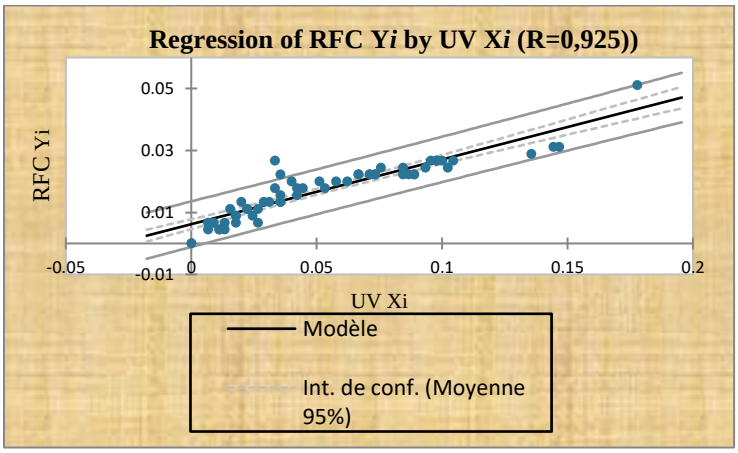

Figure 6: Correlation between UV and RFC.

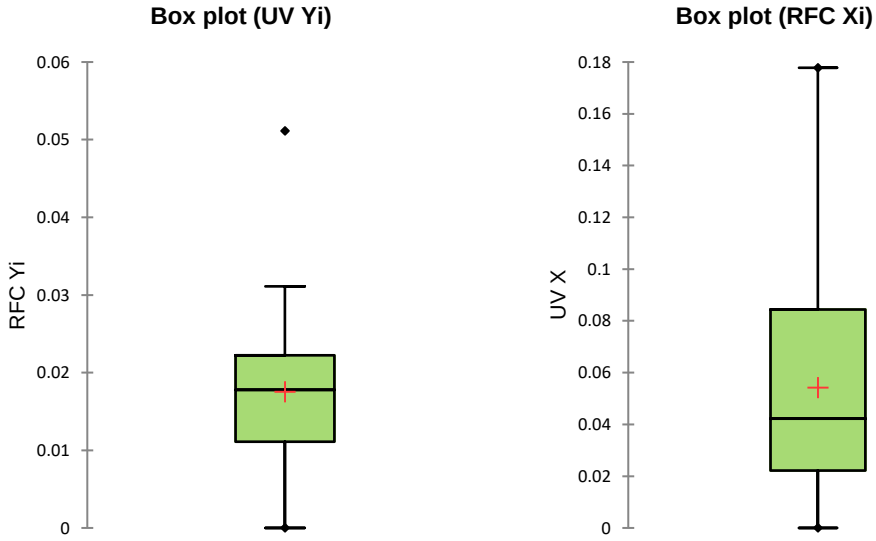

Figure 7: Box plot representations of the RFC (Yi) and UV (Xi) variable.

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