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END OF STUDY MEMORY

With a view to obtaining the Academic Master in Biological Sciences Speciality: Biodiversity and Environment

THEME

Ethnobotanical Study of Medicinal Plants Used to Treat Delayed Childbearing in Northern Sahara (Ouled Djellal and Touggourt)

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University year: 2024 -2025

ا لا هـد

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"وآخر دعواهم أن الحمد لله رب العالمين"

وبعد بسم الله الرحمان الرحيم دائما ما كان شعاري في الحياة الأحلام وجدت لتتحقق وها أنا اليوم أحقق أسمى أحلامي فأهدي فرحتي لنفسي طالما ...تحدت...جاهدت تعثرت...وقامت حتى وصلت فكان وصولها أحلى نهاية لأجمل حكاية ...

أهدي تخرجي لأنيسة روحي ومهجة قلبي جنتي في الأرض لمن كانت أملي حين يتبدد الأمل من حولي إلى من أوصاني الله بها برا ... لصاحبة الدعاء الصادق... للقلب الحنون... أمي

إلى من أحمل اسمه بكل افتخار...أبي الغالي

إلى من جمعني بهم سقف واحد و ضلعي الثابت وسندي في الحياة إخوتي "سليم مبروك وعبد الواحد" إلى شقيقات الروح... لمن أشعر بالفخر بوجودكن بجانبي طالما كنتن لي دائما الداعم الأكبر في الحياة حبيبات قلبي"حليمة سمية زهرة رقية و آخر العنقود رحمة "

الى ابي الثاني خالي" الطاهر"

إلى صديقتي جهينة التي ساندتني في هذا العمل وكل صديقاتي "سارة سلمى كيتو هاجر خديجة حيزية مروة أسماء

إلى كل من جمعني بهم القدر فتركوا أحلى ذكرى..

سعدية

الاهداء

قال الله تعالى بعد بسم الله الرحمان الرحيم :

(يرفع الله تعالى الذين امنوا منكم والذين اوتو العلم درجات)

أحييكم بتحية الإسلام السلام عليكم ورحمة الله وبركاته

اهدي تخرجي هاذا إلى تلك الصامدة القوية التي استمد منها طاقتي ومندفعي في الحياة إلى

مدرستي إلى من وضعت تحت أقدامها الجنة إليك أماه .

إلى من طاب انسي به إلى من شاب شعره من اجلي إلى حبيب الروح وصديق العمر إلى الغالي

ابي

إلى من اشد عضدي بهن إلى فراشات حياتي إلى المؤنسات الغاليات أخواتي (سارة ؛ لجين ؛ نهى

(

إلى كتفي الذي لا يميل إلى منبع قوتي الى إخوتي (حسام الدين ؛ وائل)

الى كل من نفعني بكلمة او حرف الى مدرسيني بكل الأطوار شكرا لكم وألف شكر إليكم

إلى صديقاتي صديقات العمر التي بكن يحلى الأنس.

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Contenu

List of tables:

List of figures:

List of abbreviations

BMI	Body mass index
FIC	Informant consensus factor
FIV	Family Importance Value
POWO	Plants of the world online
RFC	Relative Frequency of Citation
RSI	Rahman Similarity index
SHBG	Sex hormone binding globulin
UV	Use value

Introduction

Introduction:

Delayed childbearing has become a prominent phenomenon in modern societies, attributed to several factors such as changing social values, career priorities, and advancements in medical technology. As more women choose to conceive later in life, they face fertility challenges that prompt them to explore alternative methods to enhance reproductive health (Sobotka and Beaujouan, 2021).

Among these alternatives, medicinal herbs emerge as an ancient traditional remedy for promoting fertility and improving reproductive function. Although assisted reproductive technologies (ART) are a modern solution, many individuals prefer herbal treatments due to their reputation as natural and holistic approaches to addressing the physiological and hormonal imbalances that can hinder conception (Nantia et al., 2009). Research supports the potential of certain medicinal herbs to enhance reproductive health through various mechanisms, such as their antioxidative properties and hormonal regulation (Mbemya et al., 2017; Masjedi et al., 2024).

Despite the growing interest in herbal interventions for fertility, there is a critical need for systematic scientific research to validate their effectiveness and elucidate their mechanisms of action. This research could help bridge the gap between traditional practices and modern medical understanding, providing a more comprehensive approach to reproductive health.

Recent research has highlighted several medicinal herbs that may improve fertility and address the challenges associated with delayed childbearing. Notably, *Vitex agnus-castus* (chaste tree) is known for its potential to balance hormonal levels by affecting the pituitary gland, which may improve ovulation and luteal phase function (Isaia, 2007). Withaniasomnifera (ashwagandha), an adaptogen, helps reduce cortisol levels, contributing to better hormonal balance and endocrine function (Al-Alim et al., n.d.). Additionally, *Trigonella foenum-graecum* (fenugreek) has shown potential in enhancing insulin sensitivity and regulating blood sugar levels, which may be especially beneficial for women with polycystic ovary syndrome (PCOS) (Goswami et al., 2020). *Cinnamomum cassia* (cinnamon) has been studied for its role in improving insulin resistance, which could benefit those with metabolic imbalances affecting delayed childbearing (Malik et al., 2023).

Other herbs, including *Rheum palmatum* (Chinese rhubarb), *Allium sativum* (garlic), and *Angelica sinensis* (dong quai), have been associated with regulating menstrual cycles, improving uterine health, and balancing hormones (Noor Khan et al., 2022).

The significance of this research lies in its potential to clarify the mechanisms of action of these herbs through scientific evidence, helping to bridge the gap between traditional knowledge and modern scientific understanding. Additionally, exploring the pharmacological properties of these herbs is crucial to ensuring their safe and effective use in managing delayed childbearing.

The primary aim of this study is to collect questionnaires from the regions of Ouled Djellal and Touggourt to investigate the treatment of delayed childbearing, focusing on identifying the different types of herbs used in these regions to enhance fertility. The study also aims to compare our results with previous reviews and studies on herbs and treatments used for delayed childbearing.

This study is divided into two parts: The first part consists of two chapters, the first of which provides a general introduction to the research topic, and the second is dedicated to reviewing the literature on medicinal herbs used in treating delayed childbearing. The second part includes a chapter explaining the materials and methods used in the experiments and protocols applied, followed by a chapter presenting the main results and their discussion. Finally, the study concludes with general conclusions.

The theoretical part

Chapter 1:

Herbal medicines and infertility

Chapter 1.-Herbal medicines and infertility

In this chapter, we present the history of medicinal plants in the world and in Algeria. Wentouched on the definition of medicinal plants and traditional medicine, the uses of medicinal plants and their global use, and the mechanism of action of medicinal plants in treating of delayed childbearing.

1.- History of use of plants

There is proof that for thousands of years, humankind have relied on nature for medicinal purposes, and that plants or plant extracts have served as the foundation for traditional medication. Many parts of the world still practice traditional medicine, which is where medical therapies first came from. Despite the fact that using plants as medications has been practiced for thousands of years (Hassan, 2015).

1.1.- In the world

One of the oldest documents and what is believed to be the oldest documented evidence ofbthe use of medicinal plants dates back to approximately 5,000 years ago. It was inscribed on Sumerian clay tablets, and included dozens of recipes for creating more than 200 distinct plant medicines (Sumner, 2000). Some writings, written on clay, come from ancient Mesopotamia and date to approximately 2600 BC.Tablets written in Cuneiform (Scurlock, 2014).

The ‘Ebers Papyrus’ (ca. 1550) was the most important of these recordings and contains over 600 prescription drugs of various plant species (Le Strange, 1977). European medicine is thought to have initiated with Hippocrates (460–377 BC) who compiled over 200 medicinal plants which were classified by physiological action and he is considered the ‘father of medicine (Castiglioni, 1985). Dioscorides, who was a Greek military physician and considered the father of pharmacognosy’, recorded the use of medicinal plants and wrote De Materia Medica in ça. 77 AD, which was used as a reference in Europe for more than a millennium and translated into several languages (Riddle, 1985)

1.2- In Africa

The Egyptians recorded their medicinal knowledge in tomb illustrations and on papyrus dating from the Old Kingdom of Egypt. African traditional medicine has also been practiced for many centuries and it has diverse medical treatments for different diseases (Vossen and Keuthmann,1986). Herbs have been studied scientifically, although many local herbal traditions survive ,most are passed down from generation to

generation (Zevin et al., 1997). In many areas of the world, and in a very general way, the use of herbal medicines can be classified into two main branches: orally transmitted folk traditions that are passed down from generation to generation and doctrinal or "formal" traditions that are often common today. It is based more on scientific research (Alexander, 2014). Many well-known medical works have recorded a large number of medicinal plants. These works are considered a valuable cultural heritage. Since the majority of traditional medicines are of plant origin, this system was previously called herbal (Yaniv and Bachach, 2005).

1.3.- In Algeria

Every culture has a story about how medicinal plants were used to treat various ailments. The use of medicinal plants dates back more than a millennium in Algeria (Belkhodja, 2016). The first written accounts of medicinal plants in Algeria and the Maghreb date back to the ninth century, when Ishâ-Ben-Amran, physician the prince of Kairouan, left behind many teachings on medicine and simple drugs (Baba aissa, 2000). Throughout the French colonial era, botanists managed to classify a significant number of medicinal species. Fourment and Roques published a book in 1942 detailing Algeria's medicinal and aromatic plant species. They mentioned 200 species, the majority of which were described and studied in northern Algeria, and only six species from the Sahara (Belkhodja, 2016).

Data gathered from the National Center of the Trade Register indicates that by the end of 2009, there were 1926 vendors in Algeria with a focus on selling medicinal plants, comprising 1393 sedentary vendors and 533 ambulant vendors. With 199 stores, the capital alone has the most, followed by the wilaya of Sétif (107 stores), Bechar (100 stores), and El Oued (60 stores) (Boumediou and Addoun, 2017).

2.- Definition of traditional medicine

According to the WHO, "Traditional medicine is the sum total of knowledge, skills and practices that are based on the theories, beliefs and experiences of a and are used to maintain healthy human beings as well as to preventing, diagnosing, treating and curing physical and mental illnesses» In Africa, more than 80% of the population uses traditional medicine and medicinal plants for primary health care (Ait ouakrouch, 2015). Currently, according to WHO estimates, more than 80% of the population world, especially in underdeveloped countries, resorts to traditional treatments to meet their health and primary care needs (Boumediou and Addoun, 2017).

3.- Medicinal plants

3.1.-Definition

Medicinal plants are plant medicines, and this is what is meant by the European Pharmacopoeia. They contain medicinal properties, and this is a definition according to the tenth edition of the French Pharmacopoeias (Debuigne, 1974). On the other hand, medicinal plants are those that contain substances that can be they are used for treatment or are precursors in making useful medicines (Abayomi, 2010).

3.2.- The part used in the plant

The medicinal plants are harvested in their natural habitat, if feasible (Leslie, 2004):

- Whole plants: throughout the time of their flowering.
- The leaves: following full development and, if feasible, prior to flowering.
- The flowers and flower stalks: just prior to the full blooming of flowers
- The roots of annual plants: at the conclusion of their growing period, or vegetative phase
- Biennial plants' roots are found toward the conclusion of the first year's vegetative phase

  and prior to the start of the second
- Perennial plant roots: in the second or third year, before they become too fibrous and hard (lignification)
- The grains and fruits are either fully grown or fully grown when they are Regarding fruits
- Tree bark: in winter or early spring (or during the dry season); shrub bark: after the hot season (or in and of wet season).

3.3.- Preparation method

3.3.1.- Infusions

This is the most straightforward way to prepare. It is kept for tea, which is made by covering.The plant(s) with boiling water, leaving the blossoms and leaves for ten to fifteen minutes, and then filtering the liquid. An infusion can be stored in the fridge for up to 48 hours. In theory, it is best to avoid adding sugar to herbal teas. Since certain plants don't taste good, you can add some honey to your herbal tea to make it sweeter (Anne and Nogaret, 2003; Aribi, 2012; Gayet, 2013; Borrle, 2017).

3.3.2.- Decoction

The process of making a decoction is identical to that of an infusion, with the exception that a pan full of cold water is used to hold the plant or a portion of it. Heat

everything until it boils. The amount of time that a plant or part of a plant takes to boil varies (10 to 30 minutes).Select tougher, thicker plant components for decoctions. These are the thick roots, bark, stalks, or leaves. Fresh or dried plants might be used (Djerroumi and Nacef, 2004; Nicolas, 2009; Francois, 2014).

3.3.3.- Maceration

This is letting the plants soak for ten or twelve hours in either cold or lukewarm water. The maximum duration of water macerations should be twelve hours to avoid the liquid fermenting and oxidizing. Additionally, plants can be macerated in vinegar, glycerin, alcohol, or another solvent (Anne and Nogaret, 2003; Pierre and Lis, 2007).

3.3.4.- Powders

Can be made by grinding and drying. Because the plant cell is acclimated to water scarcity, the entire plant holds up quite well after desiccation. However, the grinding process may eventually change the stability of the active components. A high-quality powder requires the finest possible grinding, which can be done using a hammer, chisel, or disc. Powders can be blended with meals, dissolved with water, made into extracts, and prepared into capsules (Isrin, 2001; Letard et al., 2015).

3.4.- Methods of use

Table 1: ways to use plants (Bensalek, 2018)

Method name	Explain the method
Herbal tea	It is a beverage made by macerating, decocting, or infusing plant material into either hot or cold water. It is taken orally
Fumigation	It involves using vapors infused with active ingredients from a given plant to bolster it. Two methods are used: one uses an inhalator, and the other is a retracted teat technique from an empty serviette. Placing the face above the fuming water bowl,holding the plants
Compresses	It is the application of a somewhat pasty plant concoction to the skin for medicinal effects. To get the desired consistency, the plant can be diced, crushed, or combined with flax flour, either way
Baths	They are consistent in adding an infusé, décocté, or macéré to the bath water

Gargle	The medication, which consists of an infusion or as hot a décocté as feasible, is used to rinse the back, throat, pharynx, amygdales, and muqueuses. It is useful for disinfecting or calming, but it should never be used.

4.- Medicinal plants that help in reproduction

Procreation has always been a vital objective for human beings and particularly for housewives. Today, women's ability to have children can be significantly impacted by environmental and social factors (Ménézo et al., 2012). It is well known that the procreation always remains the fundamental reason for marriage in Africa As a result, the problems related to procreation negatively affect the life and wellbeing of individuals, couples and families until they become a heavy burden on their socioeconomic development. Its treatment in modern medicine is costly and sometimes presents many side effects. That’s why the use of medicinal plants appears to be an appropriate alternative for resolving this infertility. Indeed, studies have reported that the African flora in general,is made up of a large reserve of medicinal plants, occupying an important place in pharmacopoeia traditional medicine offers effective and accessible options for the predominated pathologies in the local communities. It is also a national cultural heritage and a better way to connect people with their own history and culture. But, this common traditional practice for managing pathologies, like infertility (Togola et al., 2022;2023)

Chapter2:

Delayed childbearing

Chapter2.-Delayed childbearing

In this chapter, we discussed the definition of delayed childbearing, its causes, how to treat it, and the female reproductive system.

1.- Definition:

Infertility is defined by the World Health Organization (WHO) as the inability of a couple to achieve conception and carry a pregnancy to term after one year or more of regular, unprotected sexual intercourse for women under 35 years of age and after six months for women over 35 years of age. (Who, 2018). Infertility can have a real impact whether at the social, economic or psychological level. Infertile couples were one of the most neglected and silent minorities in society. (Umezulike, 2004).

Infertility is defined as the incapacity to fulfill pregnancy after a reasonable time of sexual intercourse with no contraceptive measures taken. The terms sterility and infertility are sometimes used interchangeably and at times define different populations. In the Spanish literature, the definition of the word sterility is the difficulty to fulfill pregnancy, whilst the term infertility is used when pregnancy develops but is interrupted at some point; hence, the term is used as a synonym of recurrent. (Brugo-Olmedo, 2000).

2.- Anatomy of the female genital system:

The female genital system plays two essential roles in reproduction: it ensures the production of gametes on the one hand and allows the development of an embryo for 9 months on the other hand. Here is a brief

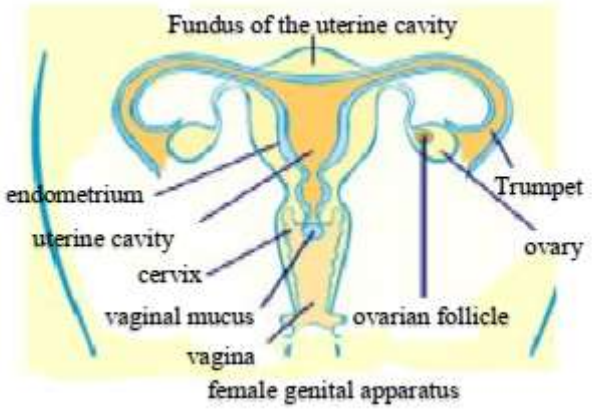


Figure 1: Anatomy of the female genital (Keddar and Meflah, 2021)

The menstrual cycle lasts on average 28 days and begins on the first day of menstruation. In the first days, the hormone GnRH stimulates the secretion of FSH and LH. FSH stimulates the development and maturation of ovarian follicles while LH stimulates the synthesis of androgens. Under the action of FSH, the follicles in turn secrete estrogen which stimulates the thickening of the endometrium (inner wall of the uterus). Under the effect of estrogen stimulation, a sudden increase in LH. This is the signal that leads to the maturation of the egg and then to ovulation around the 14th day of the cycle. The egg then travels to the uterus through the fallopian tubes. If there is no fertilization, the corpus luteum degrades and stops progesterone production, which causes the uterine wall to detach. If the egg is fertilized, the resulting blastocyst secretes the hormone human chorionic gonadotropin (HCG), the role of which is to stimulate the corpus luteum so that it continues to secrete progesterone to maintain the endometrium (Tortora and Derrickson, 2014).

3.- Some causes of infertility :

The various causes of infertility can vary from one woman to another: ovulation disorders, fallopian tube damage, uterine abnormalities, endometriosis, abnormal cervical mucus, decreased fertility due to age, congenital abnormality, smoking, weight, diet, lifestyle, alcohol and caffeine, stress, the environment and unknown causes that to date have not all been documented (Arnaud and Vérité, 2016; Jean and Petit, 2013). For Fledderjohann (2017), certain sexual habits practiced in several cultures are at the origin of the causes of infection of the genital tract that can lead to infertility and the main causes of infertility are ovulation disorders and anatomical abnormalities. Menstrual cycles longer than 35 days (oligomenorrhea) or cessation of menstruation (amenorrhea) indicate ovulatory dysfunction. Ovulatory problems are usually of hormonal origin and result from a communication problem between the hypothalamus and the pituitary gland. The release of sex hormones is altered, which prevents the normal development of ovarian follicles and their maturation. The most common hormonal syndrome is polycystic ovarian syndrome (PCOS); it affects 8 to 10% of women of reproductive age (Thomton, Von Wald, and Hansen, 2015). Ovarian insufficiency, which is defined by a loss of the ovaries' ability to produce estrogen, thyroid dysfunction and hyperprolactinemia (excessive secretion of prolactin), can also have impacts on ovulatory function (Managing anovulatory infertility, 2004).

3.1. - Infertility due to ovulation disorders :

Ovulatory disorders are among the leading causes of female infertility and have been

identified in 25–50% of infertile women (Weiss and Clapauch, 2014). Women with ovulatory disorders typically have irregular menstrual cycles. The normal cycle ranges from 25 to 35 days (Treloar et al., 1967); any cycle shorter than 25 days or longer than 35 days is considered irregular and a sign of ovulatory dysfunction.

Ovulation disorders can be manifested by:

● Luteal insufficiency, particularly of progesterone secretion by the corpus luteum. This can be a short luteal phase (survival of the corpus luteum less than 10 days) or an inadequate luteal phase (normal survival but insufficient progesterone level). Metrorrhagia due to endometrial hyperplasia can be observed (imbalance of the estrogen / progesterone ratio)

● Anovulation: Total absence of ovulation.

● Dysovulation: Presence of cycles where ovulation occurs sporadically. Menstrual disorders can accompany ovulatory disorders:

● Oligomenorrhea: Irregular menstrual cycles, occurring from 35 days to 6 months apart.

●Spaniomenorrhea: Very spaced periods. Less than four to five times a year. Its worsening can sometimes be progressive until amenorrhea.

●Amenorrhea: More often secondary in the context of consultations for infertility.

3.2.- Cervical infertility :

It can be due to a birth defect, a malformation or a polyp obturating the cervix, but it is more often due to the qualities of the mucus. In the preovulatory period, the mucus is physiologically abundant, clear, stringy, its weave must be organized parallel to the axis of the duct and the diameter of its mesh must be sufficient to let spermatozoa pass. Outside the preovulatory period, the mucus is not abundant, thick and hostile to spermatozoa.

3.3.- Infertility by general causes :

3.3.1.- Diabetes

Diabetes is an increasingly common pathology in women of childbearing age due to the increase in the incidence of type 2 diabetes, including in young subjects. Apart from the association of PCOS, diabetes and subfertility, in which subfertility is not unequivocal, there are various arguments for an endometrial impact of hyperglycemia that may be related to implantation abnormalities. A role of hyperglycemia or hormonal abnormalities associated with type 2 diabetes (hyperleptinemia, hyperinsulinemia, dysregulation of IGFs) has been reported in implantation abnormalities (Dimitriadis et

al., 2005; Hansen and Castracane, 2006) and placentation (Giachini et al., 2008) in animal models, or ex vivo humans (Galettis et al., 2004).

3.3.2.- Dysthyroidism

Thyroid hormones play a crucial role in development, energy production, tissue activities. Ovarian activity, the state of the menstrual cycle, reproductive capacities, the course of pregnancies are profoundly influenced by the state of thyroid function (Wemeau, 2010). In many circumstances, gynecological disorders, infertility, abortions are indicative of dysthyroidism (Krassas, 2000; Krassas et al., 2010).

3.3.3.- Obesity

Due to its high prevalence in developed countries and its metabolic complications, obesity is a major public health problem. According to WHO data, obesity affected 14.9% of women worldwide in 2014 (Ng et al., 2014). With age, weight is an important prognostic factor for fertility. Indeed, for each point of body mass index (BMI) greater than 29 kg/m2, the chances of spontaneous pregnancy decrease by 5%, mainly due to ovulation disorders often associated (Steeg et al., 2008). These ovulation disorders can have several origins: central origin by an alteration of the functioning of the gonadotropic axis under the action of leptin, peripheral origin by excessive production of androgens converted into estrogens via aromatase of adipose tissue or by the direct action of inflammatory molecules secreted by adipose tissue on follicular cells. The resulting insulin resistance and hyperinsulinism, frequently found in obese subjects, also contribute to a state of relative hyperandrogenism through a reduction in hepatic synthesis of SHBG resulting in an increase in free steroids such as testosterone. The ovary is also a target organ for insulin, which will stimulate steroidogenesis (Brewer et al., 2010).

3.3.4.- 21-Hydroxylase deficiencies :

Severe 21-hydroxylase deficiency is the most common genetic cause of congenital adrenal hyperplasia. In its complete form in women, this pathology is often the cause of a salt-wasting syndrome in the neonatal period that can be life-threatening for the newborn. It also leads to a disorder of sexual differentiation by virilization of the external genitalia. The mechanisms of infertility are multifactorial and common in both forms of 21-hydroxylase deficiency block. They are the consequence, on the one hand, of adrenal hyperandrogenism and, on the other hand, of the accumulation of the enzyme substrates that are progesterone and, to a lesser extent, 17-OHP. (Dewailly 2002; Claahsen-van der Grintenet al., 2006).

Applied part

Chapter 3

Materials and Methods

Chapter 3.-Materials and Methods

In this chapter, we will present the study area, the methodology, the most important sources of information, as well as the questionnaire and the methods used to calculate the results.

1.-Type of study

An ethnobotanical study was conducted on herbal plants used in traditional medicine to treat delayed conception in women in the regions of Ouled Djellal and Touggourt. A questionnaire was used to collect information about the medicinal plants utilized for treatment. Multiple visits were made to various municipalities in each region, and information was gathered based on the responses to the questionnaire. The study focused on women who experienced delayed conception or faced reproductive system issues and were treated with medicinal herbs. Each interview lasted approximately twenty minutes.

2.-Representation of the study area

Zone 1: Ouled Djellal

The Wilaya of Ouled Djellal is located in the southern Sahara Atlas region and holds a strategic position that connects northern and southern Algeria. It lies between latitudes 34° and 35° North and longitudes 5° and 6° East of the Greenwich Meridian. It is bordered to the north by the Wilayas of Biskra and M'Sila, to the east by Biskra and El-M'Ghair, to the south by Ouargla and Djelfa, and to the west by Djelfa and M'Sila.

The Wilaya covers an area of 11,298 square kilometers and had an estimated population of 239,111 as of December 2020. It is characterized by its agricultural and pastoral nature, where agriculture and livestock herding are the main economic activities (Amor. and Chettir,.,2023) (Fig. 2). The region is especially known for desert agriculture, particularly the cultivation of date palms, including high-quality varieties such as "Deglet Nour." Livestock farming remains a key livelihood in both rural and desert areas.

The climate in Ouled Djellal is mild during winter, with relatively moderate temperatures, but becomes extremely hot in summer. The Wilaya is administratively composed of six municipalities: El-Doucen, Ouled Djellal, Sidi Khaled, and three others.

Zone 2: Touggourt

Touggourt is a significant oasis city located in the northeastern Algerian Sahara and serves as the capital of Touggourt Province, established in 2019. Geographically, it lies at 33°06′N and 6°04′E, at an altitude of about 65 meters above sea level. Strategically positioned, it is 160 km northeast of Ouargla, 100 km from El Oued, 225 km south of Biskra, and 660 km southeast of Algiers. Situated at the northern edge of the Grand Erg Oriental, Touggourt anchors the Oued Righ region, a fossil river valley marked by a chain of oases. It borders the provinces of El M'Ghair to the north, El Oued to the east, and Ouargla to the west and south (Fig 2). Administratively, Touggourt is part of a larger agglomeration comprising four communes and serves as the center of a wilaya that includes 5 districts (daïras) and 13 communes (Helal and Ourihane, 2004; Mouane et al., 2024).

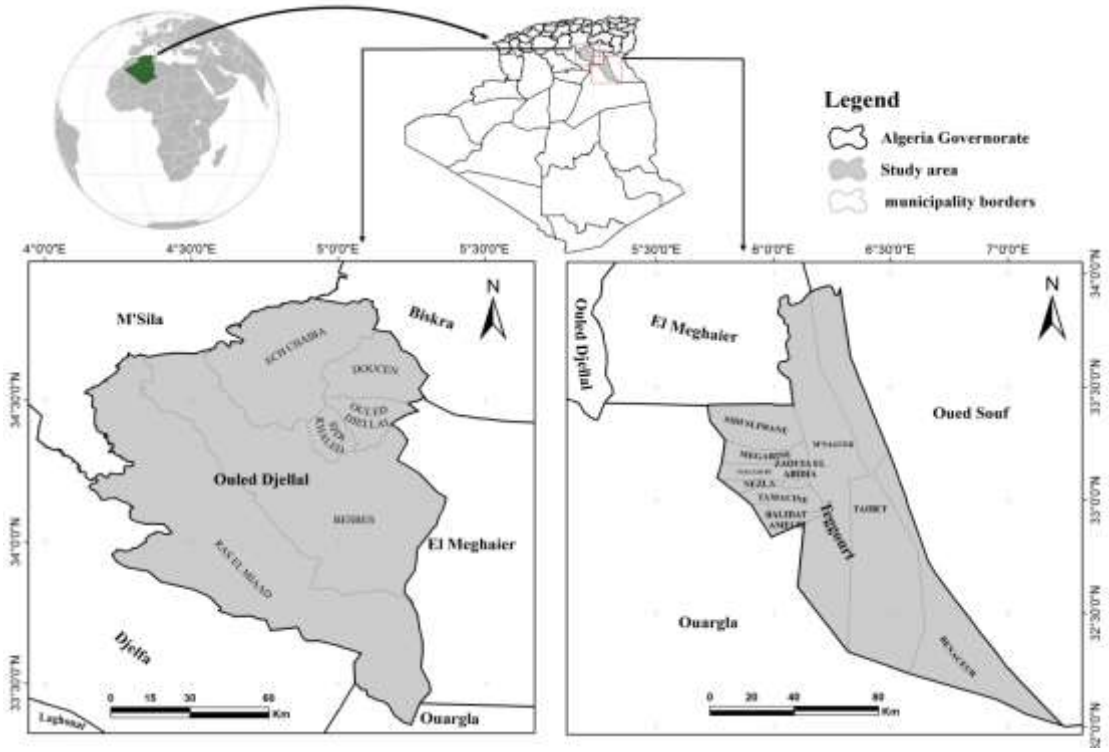


Figure 1: Geographical location the Ouled Djellal and Touggourt

3.- Method of work

An ethnobotanical study of the treatment of infertility in the Ouled Djellal and Touggourt area. In this study, we conducted an ethnobotanical survey focused on traditional treatments for female infertility in the regions of Ouled Djellal and

Touggourt. To collect the necessary data, we developed a structured questionnaire consisting of 40 questions, divided into three main sections. The first section gathered general information about the participants, including address, gender, and educational level, place of residence, profession, age, weight, and type of habitat. The second section focused on the medical history of the patients. It included questions such as whether the woman had children, the number of children, age at first pregnancy, duration until conception after treatment, diagnosis (exact cause of infertility), treatment duration, whether the pregnancy occurred naturally or with the use of medicinal plants, history of miscarriage and its causes. The third section addressed the use of medicinal plants. It included questions about the scientific and local names of the plants, their botanical families, the source of knowledge (e.g., grandparents or general knowledge), the origin of the plant, the part used, and whether the respondent was familiar with the plant. It also covered how the plant was administered (as a drink, compress, or ointment), the time of day it was taken, frequency of use, duration of treatment, effects on menstruation, whether it was used in combination with other plants, level of satisfaction with the treatment, as well as any warnings or advice regarding its use.

A total of 258 women were randomly selected to participate in the survey. Some filled out the questionnaire directly, others were interviewed in person, and a portion received the questionnaire through social media platforms. Data collection on the use of medicinal plants in the treatment of infertility took place between September and December 2025.

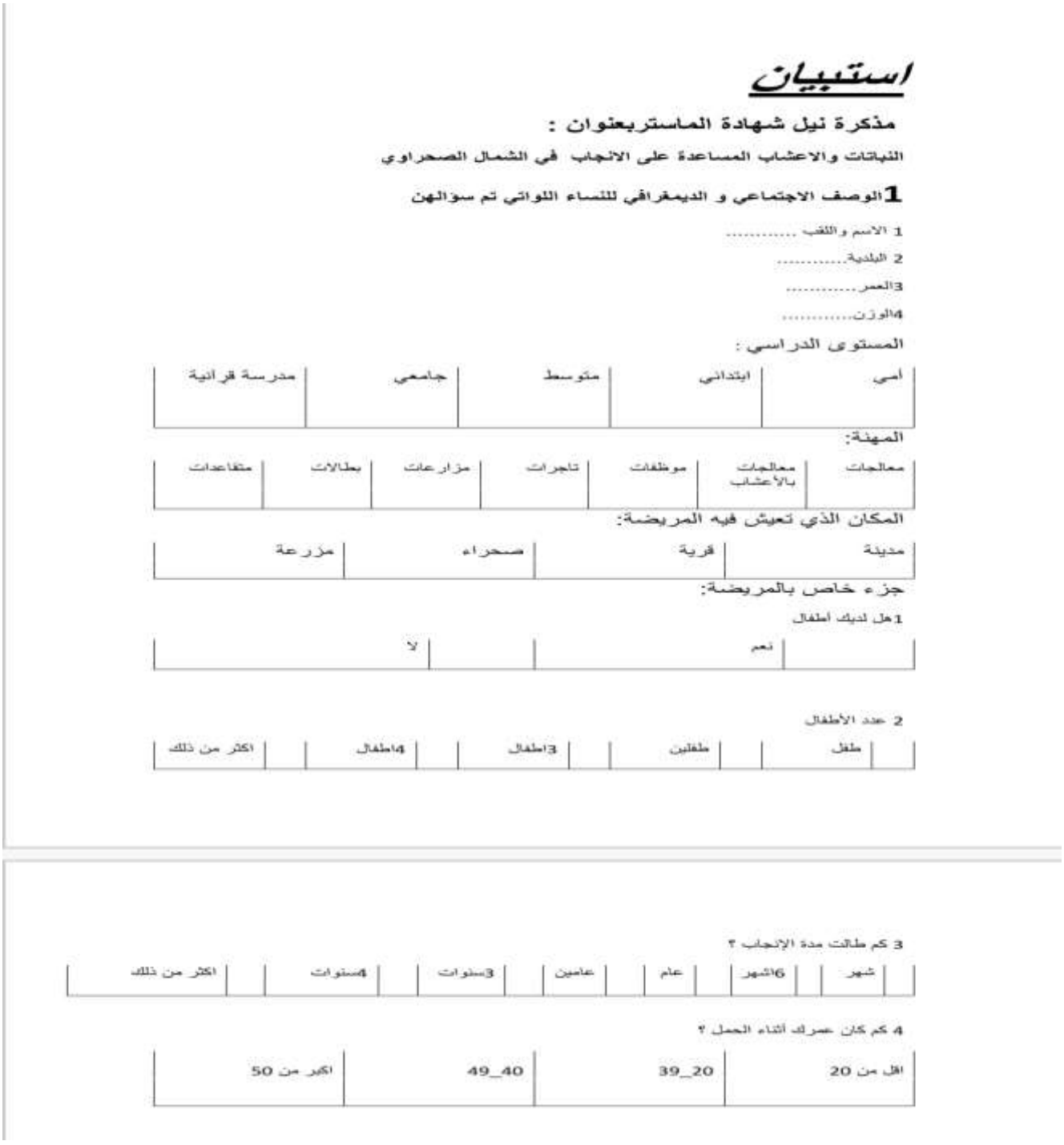
4.-Information sources

A preliminary list of medicinal plants traditionally used by local communities to treat infertility (delayed conception) was established. This inventory focused on species commonly employed in the Ouled Djellal and Touggourt regions, where ethnobotanical knowledge remains an integral part of reproductive health practices.

The identification of species was carried out using well-established Sahara flora references, notably Quézel and Santa (1962) and Médail (2004). The preliminary taxonomy was submitted for expert validation to Mr. Boukalba Mounsef, Head of the Forest Department of Talab Al-Arabi, Oued Province, Algeria. To ensure scientific accuracy and alignment with current botanical standards, plant names and their conservation status were verified and updated using authoritative online resources, including: Plants of the World Online (POWO) – developed by the Royal Botanic Gardens, Kew; The Plant List – a working list of all known plant species; Catalogue of

Life – an integrated taxonomic index for species validation; International Plant Names Index (IPNI) – for nomenclatural and bibliographic verification.

This classification constitutes an essential step toward the documentation and scientific validation of traditional phytotherapeutic knowledge in the Ouled Djellal and Biskra regions, particularly in relation to female reproductive health and fertility disorders



استبيان

مذكرة نيل شهادة الماستر بعنوان :

النباتات والاعشاب المساعدة على الانجاب في الشمال الصحراوي

1 الوصف الاجتماعي و الديمغرافي للنساء اللواتي تم سؤالهن

1 الاسم واللقب .....

2 البلدية.....

3العمر.....

4الوزن.....

المستوى الدراسي :

امي	ابتدائي	متوسط	جامعي	مدرسة قرانية

المهنة:

معالجات	معالجات بالأعشاب	موظفات	تاجرات	مزارعات	بطالات	متقاعدات

المكان الذي تعيش فيه المريضة:

مدينة	قرية	صحراء	مزرعة

جزء خاص بالمريضة:

1هل لديك أطفال

	نعم		لا

2 عدد الأطفال

	طفل		طفلين		3اطفال		4اطفال		اكثر من ذلك

3 كم طالت مدة الإنجاب ؟

	شهر		6اشهر		عام		عامين		3سنوات		4سنوات		اكثر من ذلك

4 كم كان عمرك أثناء الحمل ؟

اقل من 20	39_20	49_40	اكبر من 50

5 هل أجضبت من قبل ؟

	نعم		لا

6 كم مذالت مدة الحمل بين الطفل و الاخر؟

عام	عامين	3سنوات	4 سنوات	5سنوات	أكثر من ذلك

7هل يؤثر الوزن الزائد على الحمل ؟

	نعم		لا

8 هل كان الحمل طبيعي أو بالأعشاب ؟

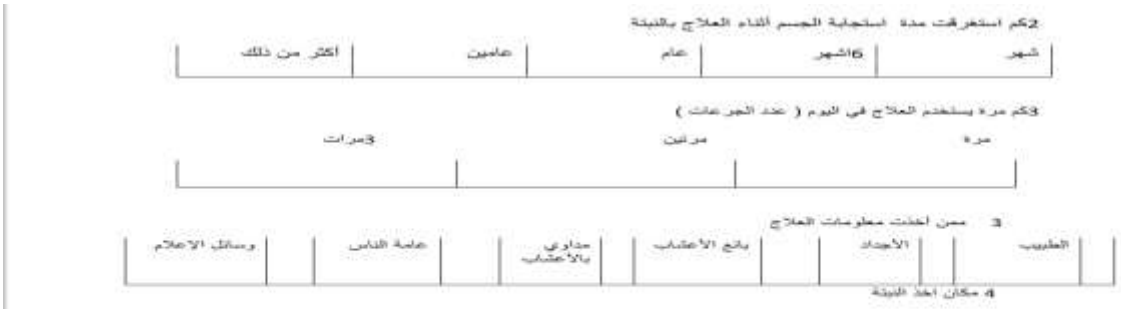
طبيعي	بالاعشاب

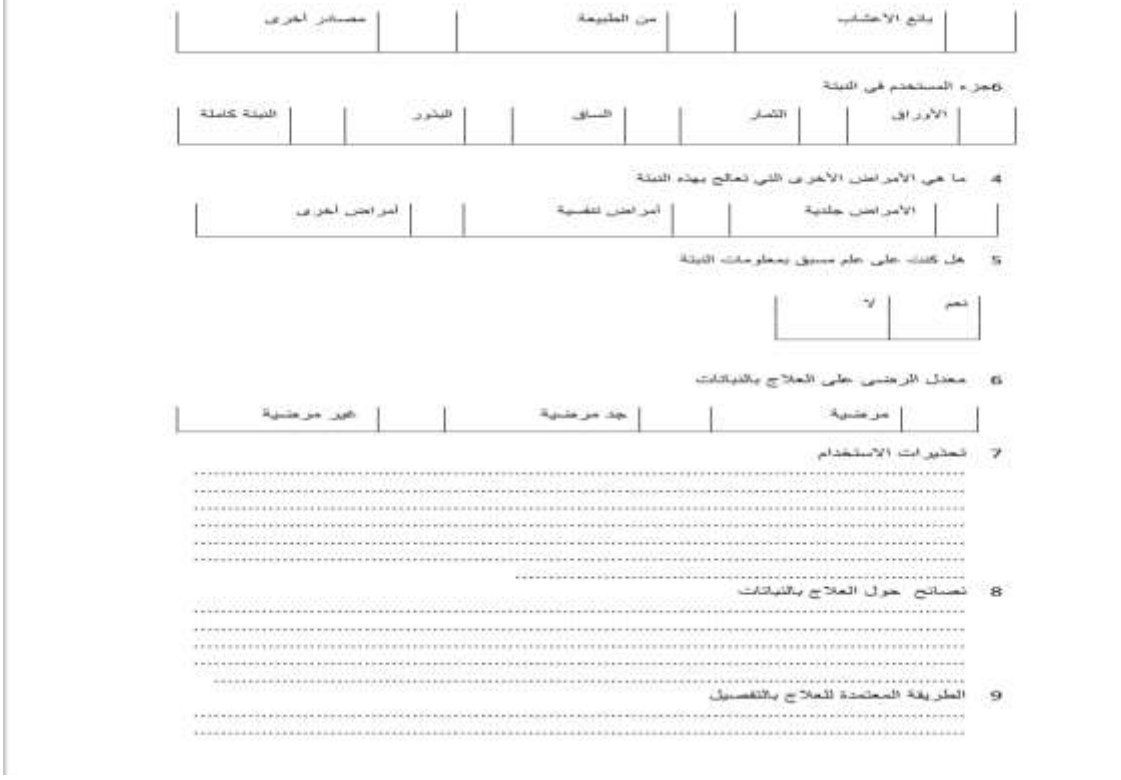
جزء خاص بالنبتة

اسم النبتة	الاسم العلمي للنبتة	الاسم العائلي للنبتة

1 كيف يتم استخدام العلاج بالنبتة

يتم العلاج على شكل كمادات
يتم العلاج على شكل مرهم
يتم العلاج عن طريق تناول النباتات
يتم العلاج على شكل مسحوق
يتم العلاج على شكل مشروب
يتم العلاج مع مزج مع مكون اخر
يتم العلاج على شكل بخار
يتم العلاج عن طريق النقع الزيتي
يتم العلاج على شكل تحميلات
يتم العلاج عن طريق الاستحمام


2كم استغرقت مدة استجابة الجسم اثناء العلاج بالنبتة
شهر
6اشهر
عام
عامين
اكثر من ذلك
3كم مرة يستخدم العلاج في اليوم (عدد الجرعات)
مرة
مرتين
3مرات
3 ممن اخذت معلومات العلاج
الطبيب
الأجداد
بائع الأعشاب
مداوي بالأعشاب
عامة الناس
وسائل الاعلام
4 مكان اخذ النبتة


بائع الأعشاب
من الطبيعة
مصادر أخرى
6جزء المستخدم في النبتة
الأوراق
الثمار
الساق
البذور
النبتة كاملة
4 ما هي الأمراض الأخرى التي تعالج بهذه النبتة
الأمراض جلدية
أمراض تنفسية
أمراض أخرى
5 هل كنت على علم مسبق بمعلومات النبتة
نعم
لا
6 معدل الرضى على العلاج بالنباتات
مرضية
جد مرضية
غير مرضية
7 تحذيرات الاستخدام
8 نصائح حول العلاج بالنباتات
9 الطريقة المعتمدة للعلاج بالتفصيل

6.-Data Analysis

To analyze the results of the interviews, the data were recorded by using Excel 2007

6.1.-Quantitative analysis

The results of the interviews were analyzed using 5 ethnobotanical indices: relative frequency of citation (RFC), use value (UV), informant consensus factor (Fic), and the Jaccard index, which was used to evaluate the association between knowledge about traditional uses of medicinal plants and the different socio-demographic characteristics of the questioned population.

6.1.1.- Relative frequency of Citation (RFC)

The Relative Frequency of Citation (RFC) is an index used to evaluate the prominence of a particular plant species within an ethnobotanical survey. It is calculated by dividing the number of informants who mentioned the use of a specific plant species by the total number of informants participating in the study, regardless of the category of use. The RFC value ranges from 0 (indicating that no informant mentioned the plant) to 1 (indicating that all informants cited it) (Tardío and Pardo-de-Santayana, 2008). The formula is expressed as:

$$\mathbf{RFC = FC / N}$$

Where: **FC** is the frequency of citation (i.e., the number of informants who mentioned the plant), **N** is the total number of informants in the survey.

6.1.2.- Use value (UV)

The use value of species (UV) is a quantitative method that reveals the importance of species known and used locally. This index is obtained by the following formula (Tardío and PardoDe-Santayana, 2008; Andrade-Cetto and Heinrich, 2011; Achab and Djheich, 2024)

$$\mathbf{UVS = \sum Uis / ns}$$

Where Uis is the number of use reports of species s mentioned by each informant (i) and ns is the total number of informants citing a given species.

6.1.3.- Informant consensus factor (Fic)

To identify the potentially effective medicinal plants, Trotter and Logan developed a

method based on the concept of ‘informant consensuses. The Fic is calculated using the following formula (Heinrich et al., 1998; Thomas, 2008)

$$\mathbf{Fic = nresp – nt/nresp – 1}$$

Where nresp is the number of use-reports in each category and nt is the number of taxa used. The product is between 0 (if plants species are not very well known and used by informants) and 1 (if plants species are very well known and used by informants) (Thomas, 2008 ; Mouane et al. 2025).

6.1.4.-Family Importance Value (FIV)

In an ethnobotanical study, the Family Importance Value (FIV) is a quantitative metric used to evaluate the significance or importance of a particular plant family (Vitalini et al., 2013; Savikin et al., 2013)

$$\mathbf{FIV = FC/N*100}$$

Where N is the total number of species utilized in the study, and FC is the number of species in the family included in the study.

6.1.5.-Rahaman similarity index

The data obtained from the population of two study areas w ere compared using Rahaman similarity index in order to determine the similarity and the difference between these zones in the species used for managing scorpion bites. This index is calculated using the following formula (González-Tejero et al., 2008; Mouan et all 2025)

$$\mathbf{RSI = [C/A+B-C]*100}$$

Where A is the number of species of zone A, B the number of species of zone B and C the number of the species common to A and B.

Conclusion

Conclusion

The study conducted in the regions of Ouled Djellal and Touggourt addresses an important topic related to the use of medicinal plants for treating infertility. The results of the ethnobotanical survey revealed significant diversity in the plants used, identifying 30 species belonging to 21 plant families. Notable among these are *Atriplex halimus*, *Vitex aganus*, and *Lavandula stoechas* which are the most recognized and commonly used by local populations.

the methods of use vary based on personal knowledge and local traditions, with common practices including infusions and poultices. The upper parts of the plants and seeds were the most frequently used, as they contain the highest concentration of active compounds. The age group most knowledgeable about medicinal plants was between 30 and 39 years old, with housewives being the most familiar and frequent users of these treatments, predominantly located in urban areas. This reflects an intersection between traditional knowledge and the urban environment.

Importance of the Study:

These results emphasize the importance of local knowledge regarding medicinal plants and their role in providing natural solutions for health issues related to the reproductive system and infertility. However, these uses heavily depend on personal experiences and folk traditions, indicating a need for in-depth scientific research to confirm their effectiveness and safety

Recommendations

1. Consult a doctor before using any medicinal plant to ensure your safety.*

2. *Research accurate information about medicinal plants, their benefits, and dosages.*

3. *Start with a small dose of herbs and gradually increase it to monitor your body's response.*

4. *Check the quality of herbs from reliable sources to avoid counterfeit products.*

5. *Be aware of any changes in your health after using herbs and keep a record of those observations.*

6. *Ensure that herbs do not interact with any medications you are taking to avoid risks.*

7. *Use herbs as a complement to traditional treatment, not as a substitute for it.*

8. *Follow current research and studies on herbs to understand their effectiveness.*

9. *Store herbs in a cool, dry place to maintain their quality.*

10. *Enjoy trying new herbs, but be careful not to overuse them.*

11. *Avoid using herbs during pregnancy or breastfeeding without consulting a specialist.*

12. *Use traditional preparation methods like steeping or boiling to ensure the effectiveness of herbs.*

13. *Make sure to vary your use of herbs to gain comprehensive benefits.*

14. *Know how to use each plant correctly, as methods of use can differ.*

15. *Avoid storing herbs for long periods, as they lose their effectiveness over time.*

16. *Be cautious when using herbs if you have chronic health conditions like diabetes or high blood pressure.*

17. *Rely on herbs that have been well-studied by scientists to ensure your safety.*

18. *Use herbs in their natural form rather than synthetic supplements whenever possible.*

19. *Share your experiences with others, as they may find them helpful in choosing suitable herbs.*

20. *Maintain a balanced healthy lifestyle alongside using herbs to achieve the best results.*

Bibliographic references

Bibliographique references

Abayomi, S., 2010. Plantes médicinales et médecine traditionnelle d'Afrique. Ed karthala. 375 P.

Ait Ouakrouch, I., 2015. Enquête ethnobotanique à propos des plantes médicinales utilisées dans le traitement traditionnel du diabète de type Ii à Marrakech. These Du Doctorat en Medecine 75 P.

Al-Alim, M., Ghazoul, F., Gifour, N., Harb, N., Al-Hariri, I., Haydar, A., Al-Hindi, I., Khamis, S., & Mus, R. (n.d.).*Modern Arabic Literature (The Cambridge History of Arabic Literature).*

Al-Asmari, A., Manthiri, R.A., Abdo, N., Al-Duaiji, F.A., and Khan, H.A., 2016, Saudi

Alexander, K., 2014. 'Stability and Sustainability in Banking Reform: Are Environmental Risks Missing in Basel III?' Cambridge/UNEP.39.P.

alpine ethnobotanical study," Journal of Ethnopharmacology, vol. 145,no. 2, pp. 517–

Amazon Regions of Bolivia (PhD thesis). Faculty of Bioscience Engineering, Ghent

and Health, 48, 1-14.

Andrade-Cetto, A., Heinrich, M., 2011. From the field into the lab: useful approaches to

Anne, S., Nogaret, E., 2003. La phytothérapie ; se soigner par les plantes. Ed.

Aribi, I., 2012. etude ethnobotanique de plantes médicinales de la région de Jijel **.**Thèse**.** Université des sciences et de la technologie Houari Boumediène. 120 P.

Baba aissa, F., 1999. Encyclopédie des plantes utiles (Flore d'Algérie et du Maghreb).

Baba aissa, F., 2000. Encyclopédie des plantes utiles. P2-3.

based on the useful wild plants of Southern Cantabria (Northern Spain). Economic

Belkhodja, H., 2016. Effet des biomolécules extraites à partir de différentes plantes de la région de Mascara : Evaluation biochimique des marqueurs d'ostéo articulation et de l'activité

biologique. Thèse de Doctorat LMD 3éme Cycle en sciences biologiques. Université de Mustapha Stambouli, Mascara.

Bensalek, F., 2018. « L'utilisation des plantes médicinales pour le traitement des troubles fonctionnels intestinaux dans le contexte marocain ».p 25-27.

Biological Sciences 24, 1204–1211.

B-Lactamase producing Pseudomonas aeruginosa in wound infections in Duhok city,

Bonnet, D., Coltri, A., Butera, G., Fermont, L., Le Bidois, J., Kachaner, J., Sidi, D., 1999.

Boorrel, M., 2017. Le grand livre des plantes médicinales a cultivé soi-même.

Ed.Leducs.288P.

botany, 62, 24-39.

Boumediou, A., Addoun, S., 2017**.** Étude Ethnobotanique Sur L'usage Des Plantes Toxiques, En Médecine Traditionnelle, Dans La Ville De Tlemcen (Algérie). Universite Abou Bekr Belk Aîd Faculte De Medecine Tlemcen Departement De Pharmacie 119 P.

by herbalists in the treatment of snakebite envenomation in Uganda. Tropical Medicine

Castiglioni, A., 1985. 'A History of Medicine', Jason Aronson Inc. Publishers, New York.

Chehma, A., ET Djebar, M.R., 2008. Les espèces médicinales spontanées du sahara

Claahsen-van der Grinten H.L.., Stikkelbroeck N.M., Sweep C.G., Hermus A.R. and Otten B.J. (2006).Fertility in patients with congenital adrenal hyperplasia. J Pediatr Endocrinol Metab 19(5): 677–85

Courrier du Savoir-N°03, 47-51 P.

dans la médicine traditionnelle de la région d'Ouargla (Sahara septentrionale est)

Debugine, G., 1974. Larousse des plantes qui guérissent, Ed. Larousse. en médecine traditionnelle contre les envenimations ophidiennes. International Journal et facteurs pronostiques. Thèse de docteur en médecine. Université de Bamako, 87P.

Detection of transposition of the great arteries in fetuses reduces neonatal morbidity and

Dewailly D. (2012).Nonclassic 21-hydroxylase deficiency. Semin Reprod Med 20(3): 243–8.

Dimitriadis E., White C.A., Jones R.L. (2005). Cytokines, chemokines and growth factors in endometrium related to implantation. Human Reprod Updates 11: 613-30.

Djerroumi, A., Nacef, M., 2004. 100 plantes médicinales d'Algérie. Ed Palais.

Ethnopharmacology vol. 146, no. 3, pp. 803–810 P.

François, G., 2014. « Les ressorts symboliques du consumérisme. Au-delà de la marchandise, le symbole et le don », in Revue du MAUSS semestrielle 44 : 137-157.

Galettis A., Campbell S., Morris J.M.,Jackson CJ., Twigg SM., Gallery ED.(2004). Monocyte Adhesion to Decidual Endothelial Cells Is Increased in Pregnancies Complicated by Type 1 Diabetes but not by Gestational Diabetes.Diabetes Care 27: 2514-5

Gayet, C., 2013. Guide de poche de phytothérapie. Ed. Quotidien MalinGroupe Eyrolles, 2ème édition, 191 P.

Gedif, T.E., Hahn, H.J., 2003. The use of medicinal plants in self-care in rural central Ethiopia.

Giachini F.R.C., Carriel V., Capelo L.P., Tostes RC., Carvalho MH., Fortes ZB., Zorn TM., and San MartinS.(2008). Maternal diabetes affects specific extracellular matrix components during placentation. J Anat 212: 31-41

Goswami, P., Laskar, M. A., & Basak, M. (2020).*A Review on Medicinal Plants of North Eastern Region with Potential Antifertility Activity*. https://doi.org/10.22270/AJPRD.V8I3.762

Hadjaiji-Benseghier, F. E.T., Derridj, A., 2013. Relative importance of the exploitation of

Hassan, H.M.A., 2015. A short history of the use of plants as medicines from ancient times. Chimia, 69 (10), 622 P.

Healers' consensus and cultural importance. Social science & medicine, 47(11), 1859-

Heinrich, M., Ankli, A., Frei, B., Weimann, C., Sticher, O., 1998. Medicinal plants in Mexico:

HELAL F. & OURIHANE D., 2004- Etude hydrogéologique du continental intercalaire et du complexe terminale de la région de Touggourt. Aspect hydro- chimique et problème techniques posés. Mémoire Ing. Etat hydraulique UNIV HOUARI BOUMEDIEN, 110 P.

Isaia, C. F. P. (2007). Estudo de Revisão da Eficácia Clínica do Vitex agnus-castus na Saúde Feminina.*Revista Fitos Eletronica*.

Iserin, P., 2001. Encyclopédie des plantes médicinales. 2em Ed. Larousse, 335P.

nopharmacologie. ; 87: 155–161 P.

Keddar h. and Meflah y. 2021.Etude ethnobotanique et phytochimique des plantes médicinales utilisées pour le traitement de l'infertilité féminine auprès des herboristes dans la wilaya de Mostaganem.

knowledge on medicinal and food plants used in Val San Giacomo (Sondrio, Italy)-an

Krassas G.E. (2000).Thyroid disease and female reproduction. Fertil Steril 74: 1063–70

Krassas G.E., Poppe K. and Glinoer D. (2010).Thyroid function and human reproductive health.Endocr Rev 31 : 702–55

Le Strange, R. A., 1977. A History of Herbal Plants.Arco Publishing Company Inc., New York.

Leslie, T., 2004. The Healing Power of Rainforest Herbs: A Guide to Understanding and Using Herb Medicinals. New York, 519 P.

Létard, J.C., Canard, J.M., Costil, V., Dalbiès, P., Grunberg, B., Et Lapuelle, J., 2015. Phytothérapie -Principes Généraux. Hegel, 5(1), 29-35.P.

Livelihood Among Quechua, Yuracar_e and Trinitario Communities in the Andes and

Malik, N., Panesar, G., Kumari, P., Jangra, S., Kaur, R., Al-Ghamdi, M. S., Albishi, T., Chopra, H., Singh, R. J., & Murthy, H. C. (2023). Phytochemicals: Alternative for Infertility Treatment and Associated Conditions.*Oxidative Medicine and Cellular*

Longevity. https://doi.org/10.1155/2023/1327562

Masjedi, M., Izadi, Y., Montahaei, T., Mohammadi, R., Helforoush, M. A., & Rad, K. R. (2024). An illustrated review on herbal medicine used for the treatment of female infertility.*European Journal Of Obstetrics & Gynecology And Reproductive Biology*. https://doi.org/10.1016/j.ejogrb.2024.09.028

Mbemya, G. T., Vieira, L. A., Canafistula, F. G., Pessoa, O. D. L., Rodrigues, A. P. R., & Rodrigues, A. P. R. (2017). Reports on in vivo and in vitro contribution of medicinal plants to improve the female reproductive function.*Reprodução & Climatério*. https://doi.org/10.1016/J.RECLI.2016.11.002

medicinal and aromatic plants used by the population National Park of El Kala

medicinal plants for the treatment of scorpion sting envenomation. *Saudi Journal of*

medicinal plants in South-Western Serbia, Zlatibor district," Journal of

medicinal plants in traditional medicine in the Northeastern sahara. Emir.J.Food Agric.

Ménézo, Y., Entezami, F., Lichtblau, I., Belloc, S., Cohen, M. and Dale, B. 2012. Oxidative stress and fertility: Incorrect assumptions and ineffective solutions? Zygote, 12, 1-11.

mortality. *Circulation*, 99(7), 916-918.

Mouane, A., Harrouchi, A.K., Ghennoom, I. & Sekour, M., 2021. Diversity and distribution patterns of reptiles in the northern Algerian Sahara (Oued Souf, Taibet and Touggourt). Algerian Journal of Biosciences, 2(2), pp

n 17:36-45 P.

Nantia, E. A., Moundipa, P. F., Monsees, T. K., & Carreau, S. (2009). Medicinal plants as potential male anti-infertility agents: a review.*Basic and Clinical Andrology*. https://doi.org/10.1007/S12610-009-0030-2

Ng M., Fleming T., Robinson M. et *al*. (2014). Global, regional, and national prevalence of overweight and obesity in children and adults during 1980–2013: a systematic analysis for the Global Burden of Disease Study 2013. The Lancet. 384: 766–81

Nicolas, J. P., 2009. Plantes médicinales pour le soin de la famille au Burkina Faso.Impriemrie djiffon.

Noor Khan, N.-A., Isa, M. R., Md Rashidi, N. N., Mohammad Zaip, N. I. I., & Nik Rohaimi, N. N. S. (2022). Herbal Treatment for Infertility in Women: A Systematic Review.*Journal of Comprehensive Nursing Research and Care*. https://doi.org/10.33790/jcnrc1100181

northeastern Algeria. Int J Biosci., 12(4), 55-77 P.

Nov: 2(4):1576-1579 P.

Okot, D. F., Anywar, G., Namukobe, J., Byamukama, R. 2020. Medicinal plants species used

Ould El Hadj, M.D., Hadj-Mahmmed, M., Zabeirou H., 2003. Place des plantes spontanées

Pierre, M. Lis, M., 2007. Secrets des plantes. Ed. Artemis, Paris. 464 P.

Riddle, D., 1985. «Vivez à l'ère du service !», Harvard-L'Expansion, décembre, p. 98-109.

Savikin, K., Zdunic, G., Menkovic, N., et al., 2013. "Ethnobotanical study on traditional use of

Scurlock, J.A., 2014. Sourcebook for ancient Mesopotamian medicine. Writings from the Ancient World 36. Atlanta: SBL Press.

selecting species based on local knowledge. *Frontiers in pharmacology*, 2-20.

septentrional algérien distribution spatio-temporelle et *éthnobotanique. Revue Synthèse*

Sobotka, T., & Beaujouan, E. (2021).*Late Motherhood in Low-Fertility Countries: Reproductive Intentions, Trends and Consequences*. https://doi.org/10.1007/978-3-319-14857-1_2

Souilah, N., Zekri, J. Grira, A., Akkal, S., Et Medjroubi, K., 2018. Ethnobotanical study of

Steeg J.W., Steures P., Eijkemans M.J., Habbema J.D., Hompes P.G., Burggraaff J.M., Oosterhuis G.J., Bossuyt P.M., van der Veen F, Mol BW. (2008). Obesity affects spontaneous pregnancy chances in subfertile, ovulatory women. Hum Reprod; 23: 324–8.

Substances végétales d'Afrique, d'Orient et d'Occident, Ed. Edas, 178 P.

Sumner, J., 2000. The Natural History of Medicinal Plants' Timber Press, London.

Tardío, J., Pardo-de-Santayana, M., 2008. Cultural importance indices: a comparative analysis

Thomas, E., 2008. Quantitative Ethnobotanical Research on Knowledge and Use of Plants for

Togola I, Konaré MA, Diarra N, Karembé M. 2022. Ethnobotanical and floristic investigations of Datura species in Mali. European Journal of Medicinal Plants. 33(12):73–87. Available: https://doi.org/10.9734/EJMP/2022/v33i12 1114.

Togola I, N Diaye M, Traoré N, Konaré AM, Diarra N. 2023. Ethnobotanical and comparative study of the antioxidant and anti-inflammatory potential of three organs of Zanthoxylum zanthoxyloides, a plant used in the traditional treatment of sicklecell disease in Bamako. GSC Biological and Pharmaceutical Sciences. 25(01):019–030

University, Belgium

Vitalini, S., Iriti, M., Puricelli, C., Ciuchi, D., Segale, A., Fico, G., 2013. "Traditional

Vosen, R., Keuthmann, K., 1986. Contemporary studies on Khoisan. Honour of Oswin Köhler on the Occasion of his Seventieth Birthday.

Wémeau J.L. (2010). Les maladies de la thyroïde. Paris : Elsevier Masson

Yaniv, Z., Bachrach, U., 2005. Handbook of medicinal plants. (Eds.).CRC Press.

Yassin Haval, M., Iraq Najim, A., Khalid Ayman, O., Hassan., 2014. Prevalence of Metallo-

Zevin, S., Jacob, P., Benowitz, N., 1997. Cotinine effects on nicotine metabolism. Clin Pharmacol Ther. ; 61(6):649–654 P.

Majbari, Kh.,Nadjmaoui,N.,Ghenim,A.,2022.Evaluation de l'effet de quelques formules poly herbales sur la conception et la régulation de la fonction endocrine chez la femme ménopausée. Mém de Master.Département des Science degree la Nature et de la vie Spécialité biochimie Appliquée.Université Ahmed DRAIA-Adrar

Abstract

Ethnobotanical Study of Medicinal Plants Used to Treat Delayed Childbearing in Northern Sahara (Ouled Djellal and Touggourt)

Abstract

This working to identify a botanical study in the northern desert of Algeria, characterized by its diverse medicinal plants. A series of survey swore conducted in the study area of the states of Ouled Djellal and Touggourt among the local population, with 258 questionnaires on medicinal plants that aid in treating in fertility in both sexes. The study extended from September to December 2024. The results obtained from the population allowed for the identification of 30 species belonging to 21 plant families. We found that catnip was the most used by patients at a rate of 20 percent, followed by lavender at 19 percent, and marigold at 11 percent. These were the most commonly used in our study. The most utilized parts were the upper part of the plant, followed by the whole plant and the seeds. The plants were prepared in various ways, but the most common methods in our study were suppositories and hot infusions. Most of the plants used were wild and combined with others. The largest percentage of treatment information was obtained from grandparents, and most of the treatment results with plants were satisfactory, with a success rate of 40 percent.

Résumé

Cette étude botanique a été menée dans le désert du nord de l'Algérie, caractérisé par la diversité de ses plantes médicinales. Une série d'enquêtes a été menée auprès de la population locale dans la zone d'étude des gouvernorats d'Ouled Djellal et de Touggourt, à l'aide de 258 questionnaires sur les plantes médicinales contribuant au traitement de la fertilité chez les deux sexes. L'étude s'est étendue de septembre à décembre 2024. Les résultats obtenus auprès de la population ont permis d'identifier 30 espèces appartenant à 21 familles de plantes. Nous avons constaté que l'herbe à chat était la plus utilisée par les patients (20 %), suivie de la lavande (19 %) et du souci (11 %). Ces plantes étaient les plus couramment utilisées dans notre étude. Les parties les plus utilisées étaient la partie supérieure de la plante, suivie de la plante entière et des graines. Les plantes étaient préparées de diverses manières, mais les méthodes les plus courantes dans notre étude étaient les suppositoires et les infusions chaudes. La plupart des plantes utilisées étaient sauvages et associées à d'autres. La plus grande partie des informations sur les traitements a été obtenue auprès des grands-parents, et la plupart des résultats obtenus avec les plantes étaient satisfaisants, avec un taux de réussite de 40 %. Par conséquent, cette étude est considérée comme une source précieuse d'informations sur l'utilisation des plantes médicinales et leurs applications.

Mots-clés : Étude ethnobotanique, plantes médicinales, stérilité, Sahara septentrional, Ouled Djellal et Touggourt

ملخص

يهدف هذا العمل الى التعرف الى دراسة نباتية في الشمال الصحراوي للجزائر التي تتميز بنباتاتها الطبية المتنوعة وأجريت سلسلة من الدراسات الاستقصائية في منطقة الدراسة ولايتي اولاد جلال وتقرت بين السكان المحليين (258 استبيان) للنباتات الطبية التي تساعد في علاج تأخر الانجاب عند الجنسيين وكانت الدراسة ممتدة من شهر سبتمبر الى ديسمبر 2024و قد اتاحت النتائج التي حصل عليها السكان التعرف على 30نوع تنتمي ل 21 عائلة نباتية حيث وجدنا ان عشبة القطف اكثر استخداما للمرضى بنسبة20بالمئة ونبات الخزامى بنسبة 19بالمئة وعشبة مريم بنسبة11بالمئة و هذه كانت الاكثر استخداما في دراستنا وكان الجزء اكثر استعمالا هو الجزء العلوي ثم النبات الكلي ثم البذور ويتم تحضير النبات بطرق متعددة لكن الاكثر استخداما في دراستنا التحميلات والمنقوع الساخن و أغلب النباتات التي استعملت كانت برية وتستعمل مع