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THEME

Preparing for a cream from natural oils *Ammi majus, Glycyrrhiza glabra, Salvia officinalis* **to reduce the effects and symptoms of psoriasis**

Examining committee:

President	**LAIB Ibtissam**	**MCB**	**El-Oued University**
Examiner	**BOURAS Biya**	**MCB**	**El-Oued University**
Supervisor	**MAHBOUB Nasma**	**M.C.A**	**El-Oued University**
Co-supervisor.	**CHERFI Inasse**		**El-Oued University**

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بسم الله الرحمن الرحيم

"ألم ترَ أن الله أنزل من السماء ماءً فأخرجنا به ثمراتٍ مختلفًا ألوانُها، ومن الجبال جُددٌ بيضٌ وحمرٌ مختلفٌ ألوانُها وغرابيبُ سود، ومن الناس والدواب والأنعام مختلفٌ ألوانُه كذلك، إنما يخشى الله من عباده العلماء، إن الله عزيز غفور"

[سورة فاطر، الآيتان 27–28]

إهداء:

آمنت أن الله لايتركني في وجهة أكبر من عقلنا ، حتى ولو رأينا عكس ذلك قال الله تعالى

{ قُلِ اعْمَلُوا فَسَيَرَى اللَّهُ عَمَلَكُمْ وَرَسُولُهُ وَالْمُؤْمِنُونَ **}**

الهي لايطيب الليل إلا بشكرك ولا يطيب النهار إلا بطاعتك

ولا تطيب اللحظات إلا بذكرك.. الشكر الله سبحانه الذي وفقني وأعانني وألهمني الصبر والثبات والتوفيق

الى من غرس في نفسي حب العلم والى دعما خطواتي بدعاء ووقفا الى جانبي في كل لحظة ضعف وتعب الى من كانو دومًا الملجئ والسند والنور في طريقي الى والدي الحبيبين أهديكم هذا العمل ثمرة جهدي، وتقديرا وعرفانا لتضحياتكم التي لاتعد ولاتحصى أسأل الله أن يجزيكما عني خير الجزاء ويقر أعينكما بي, **...**

وإلى من كان لي سنداً افتخر به ورفيقا لايعوض الى من شجعني في كل خطواتي دراسية توأمي وروحي أخي دمت خليلي وفخري أخي الحبيب علي. **...**

والى اخواتي المؤنسات الغاليات أسأل الله ان يقر اعينكم بي فخرا وسرورا دعاء ولوجين وآدم

الى أعز العابرين في عمري الى أشباهي ورفيقات الدرب التي لم تفارقني دعواهم في كل محطات حياتي الى من كانو لعزيمتي وقوداً ولأحلامي صوتا يشجعني اخواتي صفاء ومنار واشراق وسندس ولكل من كان سندي قولا وفعلا اهديكم هذا العمل عربون محبة وامتنان، وذكرى صادقة ستظل محفورة في قلبي ماحييت. ...

الى رفيقي وشريك عمري الذي رافقني في تفاصيل هذا الطريق بكل حب وصبر والى من كان لي الدعم حين خفت الأمل ورفع عزيمتي بكلماته وشاركني الحلم وجعلني فخراً له اهديك هذا العمل المتواضع عرفانا لوقفتك النبيلة أسأل الله ان يجعل هذا الانجاز بداية لمزيد من النجاحات

والى من شاركتني اللحظات وتقاسمنا التعب والنجاح الي من كانت خير صديقة في كل مراحل الانجاز ايمان شرفي اهديك هذه الثمرة تقديراً لرفقتك النبيلة وامتنانا لكل اللحظات التي كنا فيها معا فلك مني كل الشكر وكل الاحترام وكل الدعاء بالسعاده والتوفيق.

أهداء:

الحمد لله الذي بنعمته تتمّ الصالحات، وبتوفيقه تثمر البدايات، وتنبت الأحلام

له وحده أرفع هذا الامتنان العظيم، فقد كان النور حين أظلمت الطرق، والسند حين خذلتني قواي، والطمأنينة التي تسكن القلب حين يشتدّ القلق.

وفي القلب مكان لا يملؤه سواهم...

لأمي وأبي، نبض الحياة ومعناها، الدعامة التي بُنيت عليها روحي. في كل دعاء منكما كان دفء، وفي كل كلمة دعم، كانت هناك طاقة تُحملني من جديد. لولا حبّكما، ما كنت هنا. ولولا عطاءكما، ما حملت هذا الفخر.

ثم لإخوتي، الذين منحوني طمأنينة الأخوة، وفرح المشاركة، ووقوفهم حولي دون أن أطلب، بل بمحبة لا تُفسَّر.

ولصديقاتي بشرة وآلاء اللاتي كنّ مرآة للحنان، وروحًا خفيفة قرب القلب، تمنحن الضحكة وسط التعب، وتَصبِرن على مزاجٍ متقلّب وأيامٍ صعبة. وجودكنّ كان سندًا حقيقيًا.

وفي الزاوية الأقرب، يبقى لخالي حضورٌ لا يُنسى، بكلماته المشجعة، وحرصه الدائم على أن أؤمن بنفسي وأمضي بثقة، وكأنّه يرى النجاح قبلي ويوقن به نيابة عني.

ولزميلتي وشريكة وصديقتي هذا البحث هبيته رجاء ، التي كانت بحقّ رفيقة الدرب، في كل فكرة، وكل تحدٍّ، وكل لحظة ضيق وفرح. تشاركنا العمل كأننا عقل واحد، وبذلنا الجهد وكأن النجاح لا يكتمل إلا بنا معًا.

أستاذتي الفاضلة، من كانت كلماتها دليلًا وهدوءها حافزًا، من رأت فينا قدرات قد نغفل عنها نحن.

وأخيرًا...

لنفسي، لمن تحملتِ كثيرًا ولم تطلبي شيئًا، لمن شككتِ مرات، ثم نهضتِ في صمت... شكرًا لكِ، لأنكِ أصررتِ على أن تصلي، وها أنتِ تصلين.

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ABSTRACT

This study aimed to develop and evaluate a natural topical cream based on oil extracts from three medicinal plants *Glycyrrhiza glabra (licorice), Salvia officinalis (sage),* and *Ammi majus* with potential application in reducing the effects and symptoms of psoriasis. Each plant was selected based on its phytochemical profile and traditional therapeutic use. The oils were extracted by steam distillation and incorporated into a cream formulation, which was then subjected to a series of analytical and biological tests. Antioxidant activity was assessed via DPPH assay, revealing notable radical-scavenging capacity. demonstrated a notable inhibitory effect compared to the standard antioxidant ascorbic acid. The extract exhibited a progressive increase in inhibition percentage, reaching approximately 70% at the highest tested concentration (160 mg/ml), with an IC_{50} value of 18.929 mg/ml. Antimicrobial activity was evaluated using the agar well diffusion method against E. coli, S. aureus, and C. albicans, showing significant inhibitory zones, particularly for Ammi majus. Physicochemical evaluation confirmed that the cream had appropriate pH, smooth texture, and stable homogeneity under microscopy. In vitro SPF testing placed the product in the "low protection" category (SPF = 3.38), recommending its use under non-sunlight conditions. Finally, clinical application on eight psoriasis patients over 20–30 days demonstrated visible symptomatic relief, reduced inflammation, and improved skin quality. These findings highlight the potential of plant-based formulations as complementary dermatological therapies.

Keywords: Psoriasis, Herbal Cream, Antioxidant Activity, Essential Oils, Antimicrobial Effect.

تحضير كريم من الزيوت الطبيعية الخلة البرية، عرق السوس، الميرمية لتقليل آثار وأعراض الصدفية.

ملخص

هدفت هذه الدراسة إلى تطوير وتقييم كريم موضعي طبيعي قائم على مستخلصات زيتية من ثلاثة نباتات طبية: عرق السوس ، والمريمية ، والخلة البرية ، مع إمكانية استخدامه في علاج الصدفية. اختير كل نبات بناءً على خصائصه الكيميائية النباتية واستخدامه العلاجي التقليدي. استُخلصت الزيوت بالتقطير بالبخار وأُدمجت في تركيبة كريم، خضعت بعد ذلك لسلسلة من الاختبارات التحليلية والبيولوجية. قُيّم النشاط المضاد للأكسدة عبر اختبار ، كاشفًا عن قدرة ملحوظة على إزالة الجذور الحرة. قُيّم النشاط المضاد للميكروبات باستخدام طريقة انتشار الآجار ضد الإشريكية القولونية ، والمكورات العنقودية الذهبية ، والمكورات العنقودية البيضاء ، حيث أظهر مناطق مثبطة هامة، وخاصةً في الخلة الشيطانية . أكد التقييم الفيزيائي والكيميائي أن الكريم يتمتع بدرجة حموضة مناسبة، وملمس ناعم، وتجانس ثابت تحت المجهر. صنّف اختبار عامل الحماية من الشمس المنتج في المختبر ضمن فئة "الحماية المنخفضة" ، مما يُوصي باستخدامه في ظروف خالية من أشعة الشمس. وأخيرًا، أظهر التطبيق السريري على ثمانية مرضى مصابين بالصدفية، على مدى يومًا، تحسنًا ملحوظًا في الأعراض، وانخفاضًا في الالتهاب، وتحسنًا في جودة البشرة. تُبرز هذه النتائج .إمكانات التركيبات النباتية كعلاجات جلدية تكميلية

الكلمات المفتاحية: الصدفية، كريم عشبي، نشاط مضاد للأكسدة، زيوت عطرية، تأثير .مضاد للميكروبات

INTRODUCTION

The use of herbal medicinal products and supplements has increased tremendously over the past three decades with not less than 80% of people worldwide relying on them for some part of primary healthcare both in developing and developed countries (Ekor, 2014).

The use of herbal remedies has also been widely embraced in many developed countries with complementary and alternative medicines (CAMs) (Ekor, 2014).

The terms 'complementary medicine', 'alternative medicine' and 'complementary and alternative medicine' (CAM) refer to a broad set of health practices and products (Lee et al., 2022). Medicine is a substance that has nutritive, curative, or preventive properties, while the term “herbal” refers to a botanical or plant-based preparation. Hence, the term “herbal medicine” is used for plant-based substances that consist of nutritive, curative, or preventive properties. Herbal medicine is an interdisciplinary branch between herbal medicine and Ayurveda as it covers all fields of herbal medicine related to botany, medicinal plant research, *pharmacognosy, phytochemistry, phytotherapy*, botanical medicines, Ayurveda, natural chemistry, agriculture science, Unani medicine, biotechnology, and biochemistry. A person who deals with herbs, especially medicinal herbs, is known as an herbalist. Herbal journals deal with the use of plants in the treatment of diseases (Sharma et al., 2021).

Importantly, the herbal plants were identified to contain *alkaloids, phenolics, glycosides, terpenes, lignans, quinones, flavonoids*, tannins, coumarins curcuminoids etc. Numerous herbal medicines and plant-derived products show promising credibility for the treatment and prevention in many skin disorders. (Shoaib et al., 2022). It is estimated that up to four billion people (representing 80% of the world’s population) living in the developing world rely on herbal medicinal products as a primary source of healthcare and traditional medical practice which involves the use of herbs is viewed as an integral part of the culture in those communities. (Ekor, 2014)

In some populations, TM is the only source of healthcare; the ratio of traditional healers to the African population is 1:500, whereas the ratio of medical doctors to the population is 1:40,000. Dissatisfaction with conventional medicine is also a motivation for the use and development of complementary traditional medicine under specialized medical supervision, making it safer and more effective (Lee et al., 2022).

In recent years, there has been growing interest in exploring the potential of these traditional remedies for modern applications, particularly in the field of dermatology. (Ha et al., 2024)

Prominently, the ongoing therapeutic strategies have been reported to be present with adverse reactions, low efficacy and often, drug resistance complicates the disease status, emerging as one of the most diminishing situations (Shoaib et al., 2022).

The application of herbal remedies to prevent and treat illness. It encompasses a variety of practices, from the use of standardized and treated herbal extracts to traditional and popular medicines used worldwide. Many skin conditions and wounds are treated with herbal extracts and isolated plant compounds. Different portions of plants, such as stems, leaves, flowers, roots, or seeds, are used in herbal medicine, also known as botanical medicine or phytomedicine, to treat and prevent diseases (Ingale et al., 2025).

The emerging in vitro, in vivo and clinical studies indicate that herbal plants have been used for their immense potential against almost every kind of skin disorder. Importantly, the herbal plants were identified to contain alkaloids, *phenolics, glycosides, terpenes, lignans, quinones, flavonoids, tannins, coumarins curcuminoids* etc. Numerous herbal medicines and plant-derived products show promising credibility for the treatment and prevention in many skin disorders. The herbal medicines are of great interest due to their beneficial aspects in terms of safety, efficacy and fewer side effects. Interestingly, the herbal medicines and their bioactive ingredients have long been investigated for their antibacterial, anti-dermatophytic, antioxidant, anti-inflammatory, anti-proliferative, and chemoprotective against melanoma and non-melanoma skin cancers, dermatophytosis, atopic dermatitis, psoriasis, and acne. The current situation demands more intense research for getting approval of many herbal derived products in combating the skin disorders (Shoaib et al., 2022).

The prevalence of diseases, the spread of epidemics, and the need for medicine have led humans to become interested in medicinal plants, studying them and extracting their substances. Today, medicinal plants are used to treat chronic diseases and manufacture pharmaceuticals. The effectiveness of these plants is due to molecules resulting from primary or secondary metabolism. Plants are also used to extract what are known as volatile oils, which are of great importance in the medical and economic fields (Valdivieso-Ugarte et al.,2019).

Essential oils are found either in all parts of the plant or in specific parts, such as leaves like mint or flower petals like roses (Kemper, 2005). Essential oils consist of *terpenes (biterpene, triterpene, tetraterpene, and terpenoid*), alcohols, and *phenolics*, and oxygenated compounds. *Biterpenes, triterpenes, tetraterpenes* are bigger molecule than monoterpenes and sesquiterpenes, but are present at very low concentrations. These compounds are the combination of C, H, and O i.e. organic in nature (Lucchesi et al., 2004).

And antibacterial properties of essential oil are due to the presence of *phenolic* compounds as one of its ingredients. Some *terpenes* happen to be useful in various diseases concerning heart (cardiovascular disease), blood (malaria) and cancer (Panda et al., 2020).

Essential oils have been used for treatment since ancient times. The therapeutic uses of these oils are wide, as their compounds have noticeable effects on the human body. The use of essential oils in the field of medicine is indispensable, despite the remarkable development in the manufacture of chemical and organic materials in the pharmaceutical industry, as these oils are considered a real reservoir of compounds that cannot be replaced. Many oils are used in industries and pharmaceutical materials (Valdivieso-Ugarte et al.,2019).

Essential oils are used in pharmaceutical, food, and cosmetic fields, and a single essential oil can have multiple uses. Exposure of essential oils to light, heat and moisture leads to oxidation, decomposition and polymerization reactions, which lead to changes in their chemical and physical properties. (Aziz et al.,2018). Due to their molecular structure, such as the presence of double bonds and functional groups such as *hydroxyl*, *aldehyde* and ester, essential oils are easily oxidized by light, heat and air. (Aziz et al.,2018). Extraction is defined as the process of separating the active components from the biologically inactive components of the tissues using suitable solvents based on the polarity and chemical nature of the component and obtaining the crude extract (Aziz et al.,2018). Extraction by hydrodistillation consists of boiling a mixture of organic compound and of water. The formed water vapour carries the organic compounds in gaseous state to the refrigerant. The condensation of this gas mixture causes its separation into two phases liquids: an oily and highly odorous organic phase, called "essential oil", containing the majority of odorous compounds, an aqueous phase, odorous, called "aromatic waters", which contains only very (Panda et al., 2020).

The water vapor extraction methods (steam extraction of water)are based on the fact that the most of the volatile compounds in plants are carried by water vapour, because of their relatively low boiling point and hydrophobic character. Under the action of water vapour

introduced or formed in the drive vessel, the aromatic essence contained in the plant is heated, dislocated from the plant tissue and by water vapor. Heterogeneous vapors are condensed on a cold surface and the oil essential is separated by decantation. Depending on its density (Samate, 2014), it can be collected in two levels: at the top of the distillate, if it is lighter than water, at the lower level of the distillate, if it is denser than water.

Solvent extraction is a technique widely used in both industrial and laboratory applications. It includes a variety of techniques such as solid-liquid extraction, liquid-liquid extraction, supercritical fluid extraction (SFE) and other special techniques. Separates solids from liquids, as they are immiscible. In this method, the raw material (solid) is ground and mixed with the solvent (liquid) so that the materials to be extracted are soluble in the solvent. To separate the solids from the liquids, the extraction process is followed by a separation stage by concentration or filtration (Aziz et al.,2018).

The principle of compression extraction is very simple: the secretory pockets, located in the layers of the peel or in sacs withh in the juicy lobes, are torn (destroyed), either by hand pressing or using mechanical pressing machines. The essential plant oils are then directly collected after removing the solid residues. This method is commonly used for citrus fruits and aromatic plant sources (Panda et al., 2020).

Essential oils are extensively utilized in the cosmeceutical industry due to their numerous properties that promote healthy skin, enhancing elasticity and firmness. These ingredients also possess pharmaceutical benefits, making them suitable for treating conditions such as stretch marks, acne, dark spots, and premature skin aging (Irshad et al., 2019). EOs are found in a multitude of products including food flavoring, soaps, lotions, shampoos, hair styling products, cologne, laundry detergents, and even insect repellents. (Ramsey et al., 2020).

According to its function, the ingredients of a cosmeceutical are classified as humectant, emollient, emulsifier, creams, solvent antimicrobial, skin conditioning, preservative and perfume, chelating agent, surfactant, and film-forming. The cosmeceutical industry is interested in obtaining active ingredients from aromatic and medicinal plants that fulfill at least one of the functions indicated above. (Olivero-Verbel et al., 2024).

Licorice has been widely appreciated as an important medicinal plant. Its rhizomes and roots have been used for centuries in traditional medicine due to their renowned therapeutic properties (Quirós-Sauceda et al., 2016). Licorice is a perennial plant, growing about 1.5m high. The wrinkled and woody rootstock is brown outside and yellow inside. Leaves are

unequally branched in four to seven pairs and their flowers are pale, blue, violet, yellowish white, or purplish in color, arising from the axils of the leaves in racemes or spikes, followed by pods. (Quirós-Sauceda et al., 2016).

The main chemical components in licorice are *triterpenoid saponins, flavonoids, polysaccharides, coumarins, alkaloids*, volatile oils, amino acids, and trace elements. Among them, the main active components of *Glycyrrhiza* plants are *triterpenoid saponins* and *flavonoids* (Ding et al., 2022).

The bioactive ingredients in *licorice* extract such as glycyrrhizin, *licoricidin, glabridin, licochalcone* A, and *licorisoflavan* A have anti-inflammatory, antimicrobial, and anti-adherence effects that are beneficial against periodontal disease (Khan et al., 2023). Pharmacological studies have confirmed that *Glycyrrhiza* species exhibit a broad range of biological activities.

Many pharmacological activities, such as hypocholesterolemic and hypoglycemic, anxiolytic, antimicrobial, antiviral, preliminary free radical scavenging anti-ulcer cytotoxic, antitumor, antiallergic, antioxidant, anti-inflammatory skin eruptions; dermatitis; and eczema, explained that glycyrrhizin derived from the root of *G. glabra* induced melanin formation that may be mediated via the activation of a *tyrosinase* gene expression (Liu et al., 2025).

For a long time, *sage* (*Salvia*) species have been used in traditional medicine for the relief of pain, protecting the body against oxidative stress, free radical damages, angiogenesis, inflammation, bacterial and virus infection, etc. *S. officinalis* grows in the form of an outcrossing, perennial subshrub up to 60 cm high. The leaves are opposite and simple with white hairs on the lower leaf surface and greenish or greenish-grey on the upper surface. Stems are erect or procumbent with abundant hairy dark green branches (Copetta & Ruffoni, 2025).

Sage (*Salvia officinalis* L.) is an important medicinal and aromatic herb, used as a raw material for various perfumery, pharmaceutical, food, and cosmetics industries (Copetta & Ruffoni, 2025). It was found that salvianolic acid which is an indistinct form of rosmarinic acid, isolated from the sage leaves have great antioxidant potential with a very significant free radical scavenging property (Tursun et al., 2021).

The essential oil and ethanolic extract of *S. officinalis* show strong bactericidal and bacteriostatic effects against both Gram-positive and Gram-negative bacteria. *Salvia* is well

known in traditional medicine as having antimicrobial properties, it being therefore used as antiseptic, anti-scabies, anti-syphilis, and anti-inflammatory agent, and frequently used in skin (Zeynali et al., 2024).

Ammi majus plant (Kella) belongs to the Apiaceae (Umbelliferae) family and is a wild medicinal herb, widely distributed attaining a height of up to 1.5–2.0 metres. It has whitish tap-roots and an erect stem which is slender and glabrous with fine longitudinal striations. The leaves are alternate with long petiole and the flowers are whitish actinomorphic or zygomorphic, major constituents of *Ammi majus* are the furanocoumarins, which included *xanthotoxin* (methoxsalen,8-methoxypsoralen, *ammoidin*, up to 1.15%), imperatorin (*ammidin*, up to 0.75%) and bergapten (heraclin,majudin, 5-methoxypsoralen , up to 1.88%) , *marmesin* 0.25% , *isoimperatorin* 0.01%, *heraclenin* 0.07% and *isopimpinellin* 0.01%. *Ammi visnagacontained γ -pyrones* (*furanochromone* up to 4%), the principal compounds being *khellin* (0.3–1.2%), *visnagin* (0.05–0.30%), *khellinol*, *ammiol*, *khellol* and *khellinin* (Adımcılar et al., 2023).

Khellin which is the major phytoconstituent of *Ammi visnaga* L. in the treatment of skin is used for the treatment of vitiligo, psoriasis, alopecia areata, and dyshidrotic eczema. The essential oil derived from *A. visnaga* L. has been demonstrated to possess notable antiviral, antibacterial, and larvicidal properties. Furthermore, the antioxidant activity of the plant can be attributed to its *flavonoid* content (Esentürk-Güzel et al., 2022).

Numerous researchers have conducted investigations on the antibacterial activities of *A. visnaga* L. essential oils, and their effectiveness against various pathogens has been demonstrated. These studies have shown that *A. visnaga* L. essential oils exhibit notable efficacy against pathogens such as *E. coli*, *P. aeruginosa*, and *K. pneumoniae* strains (Esentürk-Güzel et al., 2022; Khammassi et al., 2024).

Psoriasis is an autoimmune, chronic inflammatory skin disorder with a strong genetic predisposition. It is characterized by sustained inflammation leading to uncontrolled keratinocyte proliferation and differentiation. According to the World Psoriasis Day consortium, worldwide 125 million people, that is, 2 3% of the population is affected by psoriasis. which is identified by the appearance of erythematous that is clearly demarcated, scaly plaques. It is a skin disease seen regularly around the elbow, scalp, trunk, and also on the knees. Psoriasis is a commonly occurring chronic disease with no cure. Among the

various kinds of psoriasis, plaque is one. It causes raised patches of skin covering scales, itchiness, and dryness, and it is the most common kind of psoriasis (Mleczko et al., 2022).

Guttate psoriasis is also known as ‘teardrop’ or ‘raindrop’ psoriasis. It tends to occur in children, adolescents and younger adults. In the other kind, we see nail psoriasis which causes abnormally grown nails with discoloration and pitting affecting the fingernails and toenails. *Erythrodermic* psoriasis This is a rare form of psoriasis, but medical attention is required quickly. Between 90% and 100% of the skin turns red, or dark, and scaling may be fine and silvery (Kshirsagar et al., 2025).

Psoriasis is characterized by an acceleration of epidermal renewal the epidermal turnover (which is normally 30 days) is only 7 days in psoriasis, this is related to immune disorders (activation of LT and secretion of different cytokines: TNFα, IL12, IL23, etc.) leading to a psoriatic inflammatory reaction responsible for the increased proliferation of *keratinocytes* (Ghoreschi et al., 2021).The exogenous factors which trigger psoriasis or induce flare-ups are poorly understood. A variety of environmental factors such as physical trauma (scratching, insect bites, surgery, sunburn) causing damage to *keratinocytes* (Koebner’s phenomenon. Factors such as obesity, smoking and alcohol consumption, diet, and stressful life events have been suggested to affect the course of psoriasis (Kshirsagar et al., 2025).

Herbal drugs by virtue of their safe nature and easy availability may lend themselves as potential anti-psoriatic moieties. Psoriasis treatment should include skin hydration (regular use of moisturizers and emollients), careful, gentle skin cleansing, and identification and avoidance of Koebner phenomenon triggers (excoriation, maceration) and infectious foci (Streptococcus pyogenes). Moisturizers have been shown to significantly improve skin conditions and quality of life for psoriasis patients (Sarkar et al., 2016).

The success of coal tar has been demonstrated on chronic plaque psoriasis, palmoplantar psoriasis, and scalp psoriasis. Most chronic plaques improve after 1 month and patients remain in remission for longer than that with other psoriasis topical treatments. Using corticosteroids topically is the standard primary treatment for the majority of patients with localized or mild psoriasis; these corticosteroids have anti-proliferative, anti-inflammatory, and locally vasoconstrictive properties through downregulating pro-inflammatory cytokines (Ávalos-Viveros et al., 2023). Phototherapy is often used for the treatment of moderate to severe psoriasis, particularly for psoriasis that is unresponsive to topical agent. In addition, phototherapy can be combined with biologic agents for the treatment of severe psoriasis

(Sarkar et al., 2016). Given patients' concerns about the efficacy and side effects of conventional therapies such as fear of needles, reluctance to use steroids, or difficulties scheduling phototherapy a significant number of individuals with psoriasis turn to complementary and integrative medicine.

Three medicinal plants licorice, sage, and *Ammi visnaga* were selected based on their well-documented therapeutic properties and bioactive compositions. Licorice contains powerful compounds such as glycyrrhizin, known for its anti-inflammatory and antimicrobial effects, which help reduce pain and swelling commonly associated with psoriasis. *Sage*, on the other hand, is rich in antioxidants and has traditionally been used as a natural antiseptic. Its soothing effect on the skin and ability to neutralize free radicals make it valuable in managing oxidative stress that contributes to the worsening of skin conditions. *Ammi visnaga* is notable for its active compound *khellin*, which has been studied for its role in treating various dermatological disorders, including vitiligo, psoriasis, *Alopecia areata*, and sweating-induced eczema, due to its influence on pigmentation and regulation of abnormal cell growth (Esentürk-Güzel et al., 2022). Based on scientific evidence and integrated research on these plants, combining their oil extracts into a single topical formulation shows strong potential for relieving psoriasis symptoms. This approach reflects the growing global trend towards natural remedies, driven by the desire to avoid the side effects of synthetic medications and reduce healthcare costs. As a result, we developed a topical cream incorporating the oils of licorice, sage, and *Ammi visnaga.* Each ingredient contributes a specific therapeutic benefit: licorice oil reduces inflammation and supports healing, sage oil soothes the skin and provides antioxidant protection, and *Ammi visnaga* oil helps minimize pigmentation and control cell proliferation. Together, this herbal blend may significantly alleviate common symptoms of psoriasis such as itching, flaking, and redness and ultimately enhance the physical comfort and emotional well-being of individuals affected by the condition (Esentürk-Güzel et al., 2022; Usmani et al., 2021).

MATERIALS AND METHODS:

I. MATERIALS

I.1. Plant collection and preparation

- **Source of herbs:**

The cream's composition featured 15% Herbal oils (Licorice, Sage, Ammi visnaga), each selected based on traditional herbal medicine practices and their recognized dermatological benefits as mentioned in the introduction. The cream included Oil extracted from *Glycyrrhiza glabra* roots, *Ammi majus* fruit, and *Salvia officinalis* leaves. The plant materials were sourced from National herbal markets Provided by Ibn Al Zahra Center, including reliable suppliers. Their identification and authentication were conducted in consultation with traditional herbalists to ensure the correct species and plant parts were used.

The identification process involved morphological analysis and, when necessary, comparisons to herbarium specimens. These plant materials were intricately blended into the cream, forming the basis of its therapeutic efficacy.

I.2. Scientific Classification of Medicinal Plants:

- **Botanical classification of *Ammi majs* L.:**

The spicy plant to the *Apiaceae* family, and the full classification of this plant is shown in the table this plant species is classified according to (GBIF, n.d.)

Table 1 : Classification of *Ammi majs* L.

Rank	Classification
Kingdom	Plantae
Phylum	Tracheophyta
Class	Magnoliopsida
Order	Apiales
Family	Apiaceae
Genus	Ammi
Species	*Ammi majus* L.

- **Botanical classification of *Glycyrrhiza glabra* L. *(Licorice)***

The spicy plant to the *Fabaceae* family, and the full classification of this plant is shown in the table this plant species is classified according to (PlantFAdb, n.d.)

Table 2: Classification of *Glycyrrhiza glabra* L. *(Licorice)*

Rank	Classification
Kingdom	Plantae
Phylum	Spermatophyta
Class	*Magnoliopsida*
Order	*Fabales*
Family	*Fabaceae*
Subfamily	*Papilionoideae*
Genus	*Glycyrrhiza*
Species	Glycyrrhiza *glabra* L.

- **Botanical classification of Salvia officinalis L. *(Sage)***

The spicy plant to the *Lamiaceae* family, and the full classification of this plant is shown in the table this plant species is classified according to (Hamidpour et al., 2014)

Table 3: Classification of *Salvia officinalis* L. *(Sage)*

Rank	Classification
Kingdom	Plantae
Phylum	*Spermatophyta*
Class	*Magnoliopsida* (*Eudicots*)
Order	*Lamiales*
Family	*Lamiaceae*
Subfamily	*Nepetoideae*

I.3.For the geographical location of the collection of medicinal plants:

The study's medicinal plants were collected from the Oran region (western Algeria), where wild" *Khalla (Ammi majus*), *Liquorice (Glycyrrhiza glabra*), and Sage (*Salvia officinalis*) were all selected due to their wide traditional use in folk medicine and their potential ability to

relieve symptoms of skin conditions such as psoriasis. The essential oils were extracted from the active parts of each plant using appropriate extraction techniques to ensure that the active compounds were preserved

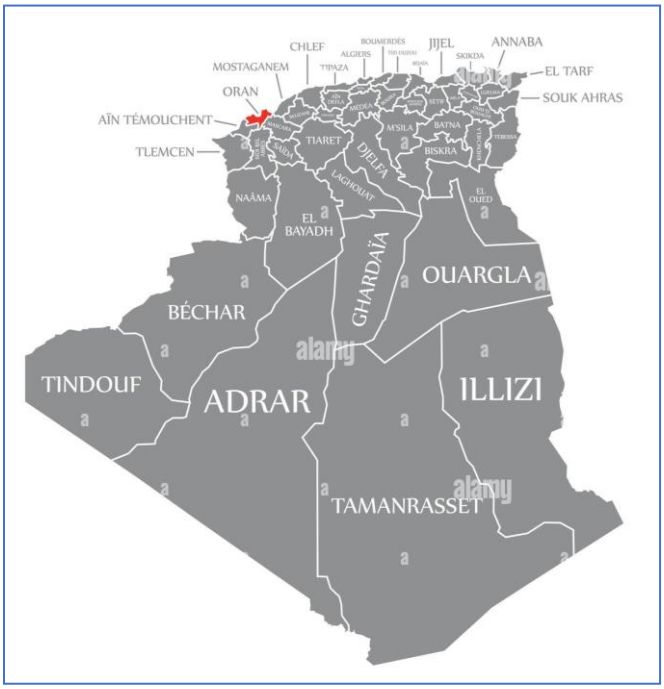

Figure 1: The picture represents the Oran region, the source of the plants studied

(Wikimedia Foundation. (n.d.)

Figure 2. Salvia officinalis L. (Alaghawani, W., & Naser, I. (2019)

Figure 3 .***Glycyrrhiza glabra*** **plant and roots** (Abraham & Florentine, 2021).

Figure 4 Plant picture of Ammi majus (Hossain & Al Touby, 2020)

I.4. Classification of bacteria and fungi studied:

Table 4: Classification of *Escherichia coli*

The bacteria belong to *Enterobacteriaceae* family, and the complete classification of these bacteria is shown in the table these bacteria are classified according to Kaper et al. (2004) – *E. coli*

Classification	**Name**
Domain	*Bacteria*
Phylum	*Proteobacteria*
Class	*Gammaproteobacteria*
Order	*Enterobacterales*
Family	*Enterobacteriaceae*
Genus	*Escherichia*
Species	*Escherichia coli*

Table 5: Classification of *Staphylococcus aureus*

The bacteria belong to the *Staphylococcaceae* family, and the complete classification of these bacteria is shown in the table these bacteria are classified according to (Lowy, 1998).

Classification	**Name**
Domain	*Bacteria*
Phylum	*Firmicutes*
Class	*Bacilli*
Order	*Bacillales*
Family	*Staphylococcaceae*
Genus	*Staphylococcus*
Species	*Staphylococcus* aureus

Table 6: Classification of *Candida albicans*

The bacteria belong to the *Staphylococcaceae* family, and the complete classification of these bacteria is shown in the table these bacteria are classified according to (Calderone & Fonzi,2001)

Classification	Name
Domain	*Eukaryota*
Kingdom	*Fungi*
Phylum	*Ascomycota*
Class	*Saccharomycetes*
Order	*Saccharomycetales*
Family	Saccharomycetaceae
Genus	*Candida*
Species	*Candida albicans*

- **Pictures of the bacteria studied:**

Figure 5. of *Escherichia coli* bacteria Getty Images. (n.d.)

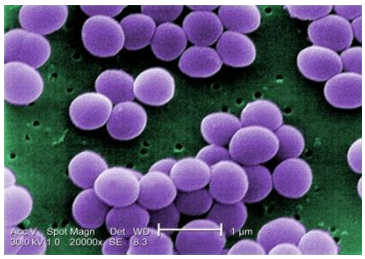

Figure 6 of *Staphylococcus aureus* (Arab Scientific Community Organization)

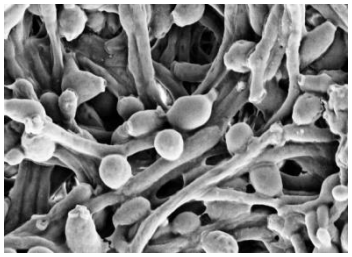

Figure 7of *Candida albicans* bacteria NCBI. (n.d.)

II. METHODS

II.1. Laboratory tests:

II.1.1. Plant extraction:

Water plant extracts were prepared from dried plant parts by grinding them into a fine powder. 6g of the powdered material were macerated in 60 mL of distilled water with shaking. The mixture was then filtered through Whatman filter paper, and the filtrate was concentrated using a rotary evaporator under reduced pressure at 40°C (Yeoh, S. C., & Goh, C. F. 2022).

The antioxidant and antibacterial activity tests were selected due to the critical role that oxidative stress and microbial infections play in the progression of psoriasis. Studies have shown that increased levels of free radicals contribute to inflammation and damage to skin cells, highlighting the importance of antioxidants in mitigating this damage. Moreover, the presence of skin cracks in psoriasis patients increases their susceptibility to bacterial infections, making it essential to assess the antibacterial potential of plant extracts to support skin healing and prevent secondary infections (Yeoh, S. C., & Goh, C. F. 2022)

II.1.2. Antioxidant activitie:s

Evaluation of Antioxidant Activity of Botanical Extracts Using the DPPH Free Radical Method: For the antioxidant activity assessment, a 0.8 mg DPPH solution in methanol was prepared. Various concentrations of the plant extract (20,40,60,80,100,120 µg/mL) were prepared. (980, 960 ,940, 920, 900, 880 mL) of each concentration was mixed with 1 mL of

the DPPH solution. The mixtures were incubated in the dark at room temperature for 30 minutes. Absorbance was measured at 517 nm using a spectrophotometer, with methanol used as a blank. *Ascorbic acid* was used as a standard antioxidant for comparison (Valdivieso-Ugarte et al.,2019).

II.1.3. Oil extraction by Hydrodistillation:

- **Principle of Hydrodistillation of essential oils**

Hydrodistillation is a method for extracting essential oils from plant materials using the principle of vaporizing and condensing plant components in the presence of steam. It involves boiling plant material in water or exposing it to steam, causing the volatile essential oils to evaporate and condense. The resulting condensate, containing both the essential oil and water, is then separated to yield the oil (Aziz et al.,2018).

- **Oil extraction:**

The oils were extracted in the laboratory by Hydrodistillation 1.5 kg was extracted for the whole experiment so we got 28 mg for each oil. The oil component of the formulation comprised a carefully balanced mix of Herbal oils (*Licorice, Sage*, *Ammi visnaga*): 15%. These oils were specifically chosen for their beneficial effects on skin health and their combined efficacy in treating psoriasis (Aziz et al.,2018).

II.1.4. Antimicrobial Activity of *Salvia officinalis*, *Ammi majus*, and *Glycyrrhiza glabra* Essential Oils Using the Agar Well Diffusion Method

The antimicrobial potential of three essential oils—*Salvia officinalis, Ammi majus*, and *Glycyrrhiza glabra* L.—was assessed using the agar well diffusion method against three standard reference microbial strains: *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, and *Candida albicans* ATCC 10231. Antibacterial testing for E. coli and S. aureus was conducted on Mueller-Hinton Agar (MHA), while antifungal activity against C. albicans was evaluated on Sabouraud Dextrose Agar (SDA) supplemented with 2% glucose.

Microbial suspensions were prepared from fresh 24-hour cultures and standardized to a concentration of 10^6 CFU/mL. Each agar plate was uniformly inoculated using a sterile cotton swab to ensure consistent microbial distribution. After the agar surface had dried, wells of uniform size were aseptically created using a sterile Pasteur pipette.

Each well was filled with 50 µL of one of the essential oils, tested at four different concentrations: 100%, 50%, 20%, and 10%. Plates inoculated with bacterial strains were incubated at 37 °C for 24 hours, whereas those inoculated with *C. albicans* were incubated under the same temperature for 48 hours. Post-incubation, antimicrobial efficacy was determined by measuring the diameter of the inhibition zones around each well. Inhibition zones greater than 6 mm were considered indicative of significant antimicrobial activity. All assays were performed in triplicate to ensure reproducibility (Bonev et al., 2008; Kiehlbauch et al., 2000).

II.1.5. Cream preparation:

- **Chemical composition of the cream:**

The cream's chemical composition is structured in three phases.

- Phase A (Oil Phase) consists of Salicylic Vaseline at 5% (originally used at 5% from a 10% concentration), sweet almond oil at 6%, beeswax at 3%, and triethanolamine at 1%.
- Phase B (Aqueous Phase) includes distilled water at 56% and glycerin at 21.5%.
- Phase C (Final Additives) contains vitamin E at 0.5%, a preservative at 1%, and a blend of herbal oils—licorice, sage, and *Ammi visnaga*—making up 15% of the formula. Each of these ingredients was carefully selected for their specific roles in improving the cream's texture, stability, and therapeutic properties.

- Salicylates have a long history of use for pain relief. Salicylic acid and methyl salicylate are among the widely used topical salicylates namely for keratolytic and anti-inflammatory actions, respectively.
- The formulation design of topical salicylic acid targets the drug retention in and on the skin based on the different indications including keratolytic, antibacterial and photoprotective actions, while the investigations of topical delivery strategies for methyl salicylate are limited.
- Petrolatum has an immediate barrier-repairing effect in delipidized stratum corneum. and decreased transepidermal water loss. So, at the suggestion of the doctor, it was added Salicylic Almond oil have many properties including anti-inflammatory, immunity-boosting effects. Almond oil has emollient and sclerosant properties and, therefore, has been used to improve complexion and skin tone. Further, it is through anecdotal evidence

and clinical experiences that almond oil seemingly reduces hypertrophic scarring post-operatively, smoothes and rejuvenates skin.

- Background: Beeswax is a naturally occurring product secreted from worker bees that has varied uses in modern day. In skincare, its function ranges from its role as an occlusive, helping to create a semi-occlusive skin barrier that minimizes transepidermal water loss; as a humectant, locking in hydration; and an emollient to soften and soothe the skin. As a natural substance, its use has been shown to help alleviate symptoms associated with common cutaneous conditions like dermatitis, psoriasis, and overgrowth of normal skin flora.
- Triethanolamine acts as an emulsifying agent in the cream, helping to blend the water and oil into a homogeneous, stable emulsion. It also adjusts the cream's pH to suit the skin, improving the product's texture and preventing its components from separating over time, without having a direct therapeutic effect on the skin.
- Glycerol is a trihydroxy alcohol that has been included for many years in topical dermatological preparations. In addition, endogenous glycerol plays a role in skin hydration, cutaneous elasticity and epidermal barrier repair. The diverse actions of the polyol glycerol on the epidermis include improvement of stratum corneum hydration, skin barrier function and skin mechanical properties, inhibition of the stratum corneum lipid phase transition, protection against irritating stimuli.
- Vitamin E is an important ingredient in many cosmetic products. It protects the skin from various deleterious effects due to solar radiation by acting as a free-radical scavenger.

This formulation was designed to achieve a balance between efficacy and safety, ensuring a gentle yet effective treatment for psoriasis.

- **Cream preparation method:**

- Prepare phases A and B separately: Place phase A ingredients in a heat-resistant container. Place phase B ingredients in another container.
- Heat both containers in a bain-marie until the temperature reaches 70°C.
- Emulsification: Gradually add the oil phase (A) to the aqueous phase (B) while stirring continuously using a suitable mixer. Continue stirring until the temperature drops to 40°C.
- Final Additives (Phase C): Add phase C ingredients to the mixture once it has cooled to 40°C. Mix well until a homogeneous cream is obtained.

- **Cream storage**

Packaging and Storage: Packed in airtight containers or boxes to minimize exposure to air and refrigerated on less than 25°C.

II.1.6. The properties of moisturizing cream:

- **Determining color, smell, and texture**

Some people's senses, specifically sight, smell, and touch, were used to determine the properties of a cream.

- **Homogeneity Determination**

- Touch Consistency Testing:

A small amount of the cream was taken and its texture was assessed manually by finger touch. This test allowed the evaluation of the smoothness and flexibility of the cream and helped detect any roughness or grainy particles, reflecting the formulation's uniformity. A smooth and cohesive texture indicated a homogeneous preparation, while roughness or particle presence suggested incomplete homogenization.

- **Microscopic Examination:**

A small sample of the cream was placed between a microscope slide and a coverslip and observed under 10x and 40x magnifications. Microscopic analysis enabled the observation of oil droplet distribution and the detection of any aggregates. A uniform distribution of components indicated good homogeneity, whereas the presence of clumps or variations suggested heterogeneity in the formulation.

Using a light microscope, a sample of the ointment was placed between a slide and a coverslip and viewed under 10x40 magnification. This allowed the ointment to be viewed and its structure and homogeneity determined, including oil droplets and the presence of certain aggregates, such as additives or plant extracts that had not dissolved.

II.1.7. Sun protection factor test (SPF)

The in vitro method used to evaluate the photoprotective activity of the cream based on plant extracts is based on the spectrophotometric measurement of absorbance in the UVB range (290–320 nm), according to the method described by Sayre et al. (1979), with recent adaptations according to ISO 24443. A standard DPPH solution was used to verify the antioxidant stability, but the SPF assessment was based on the following formula:

$$\mathbf{SPF = CF \times \Sigma\ (E(\lambda) \times I(\lambda) \times Abs(\lambda))}$$

where CF is the correction factor (usually 10), E(λ) is the erythemal efficiency spectrum, I(λ) is the solar irradiation intensity and Abs(λ) is the absorbance measured at each wavelength λ.

For analysis, a thin layer of the cream was applied evenly to a quartz plate, allowed to dry for 15 minutes, and then the absorbance was measured at 5 nm intervals between 290 and 320 nm using a UV-Vis spectrophotometer. The values obtained were entered into the formula to calculate the SPF.

II.2. Applying to patients

Patients were selected after being diagnosed by doctors, and the disease and skin reaction to the cream were monitored.Samples were collected from the scalp, face, hands and feet of the patients. The periods of using the cream were at daily night for a period of three to four weeks (about 20 days) and this because it is advisable that patients receiving Khella treatment are not exposed to direct sun light.

III. RESULTS AND DISCUSSION

III. 1. RESULTS

III. 1. 1. Antioxidant activities

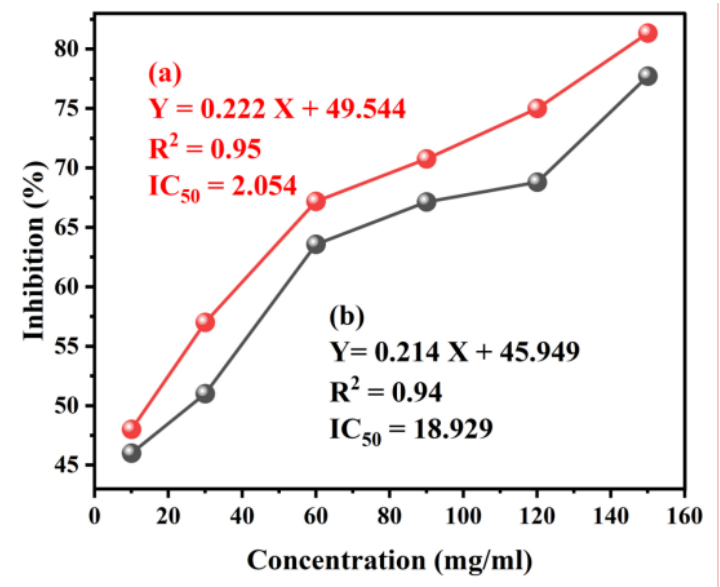

Figure .8 graph of the percentage of inhibition of the studied plant extract of the free radical DPPH through the standard curve equation for ascorbic acid

The antioxidant activity of the aqueous herbal extract, evaluated using the DPPH free radical scavenging assay, demonstrated a notable inhibitory effect compared to the standard antioxidant ascorbic acid, as shown in Figure 1. The extract (curve b) exhibited a progressive increase in inhibition percentage, reaching approximately 70% at the highest tested concentration (160 mg/ml), with an IC_{50} value of 18.929 mg/ml. In contrast, *ascorbic acid* (curve a) showed significantly stronger activity, with an IC_{50} of 2.054 mg/ml. Despite this difference, the similarity in the linear regression slopes ($Y = 0.214X + 45.949$ for the extract and $Y = 0.222X + 49.544$ for ascorbic acid) indicates a consistent and dose-dependent response of the plant extract toward *DPPH radicals*, highlighting its potential as a natural antioxidant source.

III.1.2. Antimicrobial Activity of *Salvia officinalis*, *Ammi majus*, and *Glycyrrhiza glabra* Essential Oils Using the Agar Well Diffusion Method

Table 7. Results of antimicrobial tests of *Salvia officinalis*

Microbial inhibition (mm) *Salvia officinalis*					**Co .**
Strains used	**100%**	**50%**	**20%**	**10%**	**Neg.**
Escherichia coli ATCC 25922	**26**	**17**	**8**	**NI**	**NI**
***Staphylococcus aureus* ATCC 25932**	**NI**	**NI**	**NI**	**NI**	**NI**
		Anti-Candida activity			
Candida albicans ATCC 10231	**NI**	**NI**	**NI**	**NI**	**NI**

NI = No Inhibition

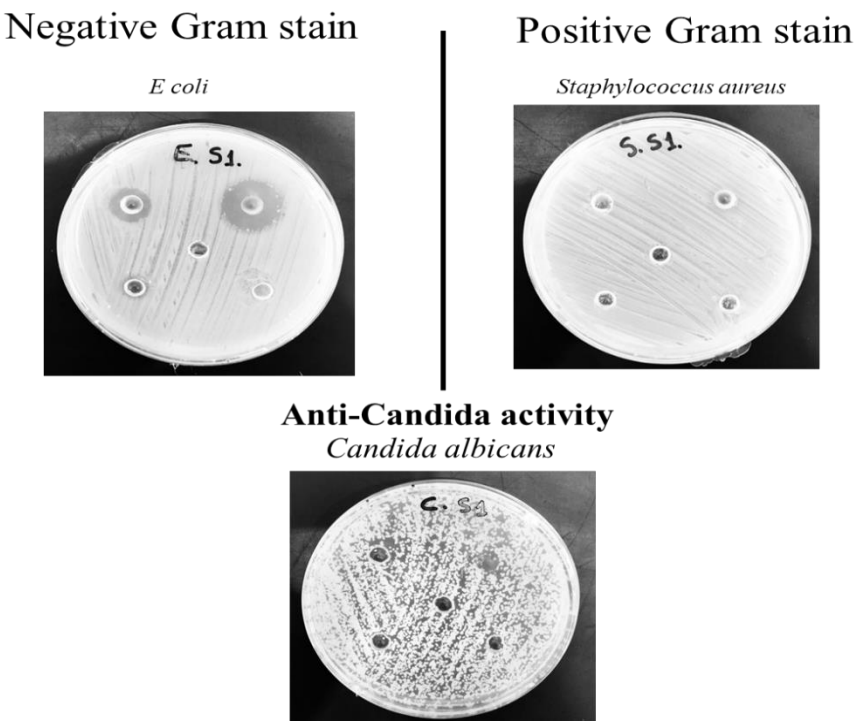

Figure .9. Results of antimicrobial tests of *Salvia officinalis*

The antimicrobial assessment of *Salvia officinalis* essential oil demonstrated selective activity among the tested microbial strains. Notably, the oil exhibited significant inhibitory effects against *Escherichia coli* ATCC 25922, with a maximal inhibition zone of 26 mm at 100% concentration, decreasing progressively with dilution to 17 mm at 50%, and 8 mm at 20%, while no inhibition was observed at 10% or in the negative control. In contrast, no inhibitory activity was recorded against *Staphylococcus aureus* ATCC 25923 or *Candida albicans* ATCC 10231 at any concentration tested. Based on the inhibition zone diameter, *Salvia officinalis* demonstrated its highest efficacy against *E. coli*, particularly at the undiluted level, confirming its potential antibacterial effect against Gram-negative bacteria under the given experimental conditions.

Table 8. Results of antimicrobial tests of *Ammi majus*

Microbial inhibition (mm) *Ammi majus*					**Co .**
Strains used	**100%**	**50%**	**20%**	**10%**	**Neg.**
Escherichia coli ATCC 25922	**27**	**11**	**9**	**NI**	**NI**
***Staphylococcus aureus* ATCC 25932**	**25**	**16**	**9**	**NI**	**NI**
		Anti-Candida activity			
Candida albicans ATCC 10231	**NI**	**NI**	**NI**	**NI**	**NI**

NI = No Inhibition

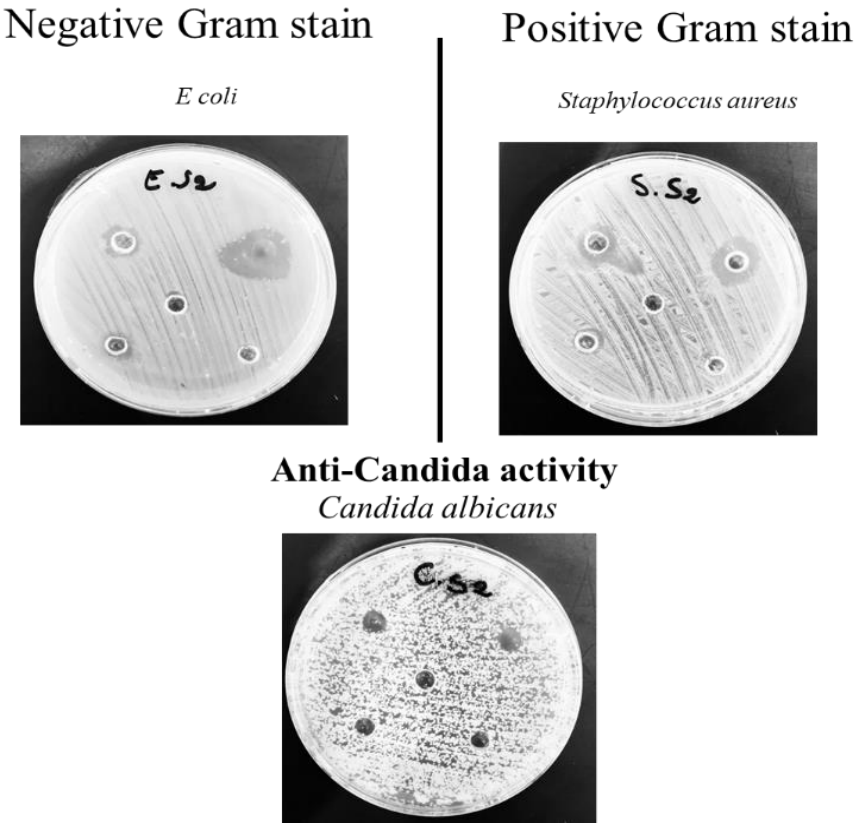

Figure 10. Results of antimicrobial tests of *Ammi majus*

The antimicrobial evaluation of *Ammi majus* essential oil revealed notable inhibitory effects against both Gram-negative and Gram-positive bacterial strains, while showing no antifungal activity. The oil exhibited the strongest antibacterial activity against *Escherichia coli* ATCC 25922, with a maximum inhibition zone of 27 mm at 100% concentration, followed by moderate inhibition at 50% (11 mm) and 20% (9 mm). Similarly, significant inhibition was observed against *Staphylococcus aureus* ATCC 25923, with a 25 mm zone at 100%, decreasing to 16 mm and 9 mm at 50% and 20% concentrations, respectively. No inhibition was recorded at 10% for either strain or in the negative control, and no antifungal activity was detected against *Candida albicans* ATCC 10231. Among the tested strains, *E. coli* demonstrated the highest sensitivity to *Ammi majus*, particularly at full concentration, indicating the oil's broad-spectrum antibacterial potential under the tested conditions.

Table 9. Results of antimicrobial tests of *Glycyrrhiza glabra L.*

Microbial inhibition (mm) *Glycyrrhiza glabra L.*					**Co .**
Strains used	**100%**	**50%**	**20%**	**10%**	**Neg.**
Escherichia coli ATCC 25922	**NI**	**NI**	**NI**	**NI**	**NI**
***Staphylococcus aureus* ATCC 25932**	**17**	**NI**	**NI**	**NI**	**NI**
		Anti-Candida activity			
Candida albicans ATCC 10231	**NI**	**NI**	**NI**	**NI**	**NI**

NI = No Inhibition

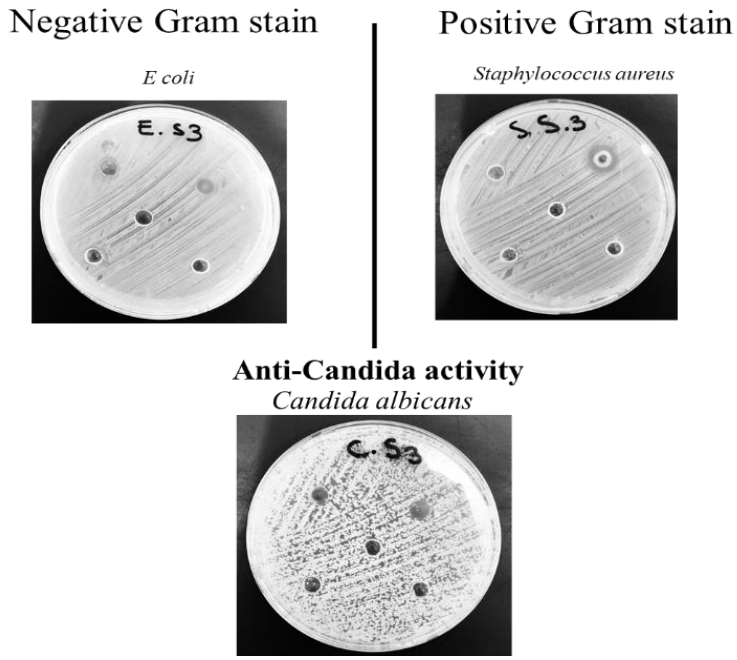

Figure .11. Results of antimicrobial tests of *Glycyrrhiza glabra* L.

The antimicrobial testing of *Glycyrrhiza glabra* L. essential oil revealed limited activity restricted to *Staphylococcus aureus* ATCC 25923, with an inhibition zone of 17 mm observed exclusively at the 100% concentration. No inhibitory effects were recorded against *Escherichia coli* ATCC 25922 or *Candida albicans* ATCC 10231 across all tested concentrations, including the highest. Likewise, no activity was detected in the negative control. Based on the results, *Staphylococcus aureus* was the only responsive strain, indicating a narrow antibacterial spectrum for *Glycyrrhiza glabra* oil, with activity observed solely at full strength.

III. 1. 3. Physicochemical properties of the moisturizing cream

A moisturizing cream was formulated using equal proportions of oil extracts derived from *Glycyrrhiza glabra* (licorice), *Salvia officinalis* (sage), and *Ammi visnaga*. The key physicochemical characteristics of the resulting formulation are presented in Table 4, including pH, odor, color, texture, and homogeneity.

The cream exhibited a slightly acidic pH of 6.92, which is within the acceptable range for dermal application. The product had a white color, a smooth texture, and a herbal fragrance due to the combination of plant extracts. Homogeneity was evaluated using optical microscopy, as shown in Figure 5, where the micrograph reveals uniformly distributed circular oil droplets without any visible signs of aggregation or phase separation, indicating a stable and homogeneous formulation.

Additionally, an image of the cream immediately after preparation (Figure 5) and a photo of the final product .

Table 10. Physicochemical properties of the moisturizing cream.

Criteria used	Detection results
pH	6.92
odor	A mixture of herbal scents
color	white
texture	smooth
Homonymy	Homogeneous

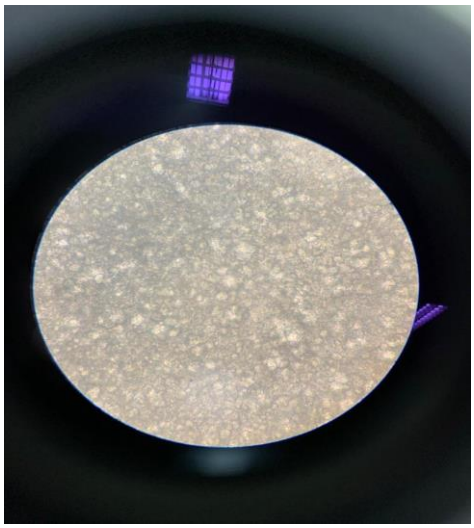

Figure .12. An optical microscope image of the ointment showing the homogeneity (X40).

III. 1. 4. Sun protection factor test (SPF)

The sun protection potential of the topical formulation containing plant extracts of *Salvia officinalis*, *Ammi majus*, and *Glycyrrhiza glabra* L. was assessed using an in vitro SPF determination method. This test remains one of the most reliable approaches to evaluate the photoprotective efficiency of natural and synthetic sunscreen formulations.

According to the results summarized in Table 5, the SPF value obtained for the tested herbal cream falls within the “weak protection” category, which corresponds to SPF values ranging between 2 and 15. Although the formulation demonstrates a measurable ability to absorb ultraviolet radiation, the level of protection remains modest. Such formulations may be better suited for complementary dermal care or nighttime applications rather than serving as a primary defense against intense sun exposure.

Table 11. Classification of sun protection levels based on SPF values

Protection categories	Value SPF
Maximum protection	> 50
Supreme protection	30 - 50
Medium protection	15 - 30
Weak protection	2 - 15

III. 1. 5. Result of real experience (Applying to patients)

An herbal cream consisting of a mixture of natural plant oils (*Salvia officinalis ,Ammi majus* , and *Glycyrrhiza glabra* L) was applied to 8 different cases of psoriasis, ranging from mild to moderate in severity. Each case was tracked over a period of 20 to 30 days, with pictures documented and clinical improvement shown in the table.

Table 12. pictures of different cases of psoriasis

patients	Before	after
Patients1	 Figure13: Patients 1 Psoriasis on the fingers hand (Originalfigure.,2025)	 Figure13: Patients 1 Psoriasis on the fingers hand (Originalfigure.,2025)
Patients2	 Figure14: Patients 2 Psoriasis in the leg area	 Figure14: Patients 2 Psoriasis in the leg area (Originalfigure.,2025)

	(Originalfigure.,2025)	
Patients3	 Figure15: Patients 3 Scalp psoriasis (Originalfigure.,2025)	 Figure15: Patients3 Scalp psoriasis (Originalfigure.,2025)
Patients4	 Figure16: Patients 4 Psoriasis of face (Originalfigure.,2025)	 Figure16: Patients 4 Psoriasis of face (Originalfigure.,2025)
Patients5	 Figure17: Patients 5 Scalp psoriasis (Originalfigure.,2025)	 Figure17: Patients 5 Scalp psoriasis (Originalfigure.,2025)

Patients6	 Figure18: Patients 6Scalp psoriasis (Originalfigure.,2025)	 Figure18: Patients 6Scalp psoriasis (Originalfigure.,2025)
Patients7	 Figure19: Patients 7 on the fingers hand (Originalfigure.,2025)	 Figure19: Patients 7 on the fingers hand (Originalfigure.,2025)
Patients8		

	Figure20: Patients 8 Scalp psoriasis (Originalfigure.,2025)	Figure20: Patients 8 Scalp psoriasis (Originalfigure.,2025)

- **Patient condition 1:**

Before treatment: The patient's image shows changes in the color of the fingers, some areas showing inflammation, and we also notice severe dryness and peeling of the skin.

After treatment: There is an improvement in the appearance of the skin. Inflammation begins to disappear, dryness and crusts decrease slightly, and the skin gradually begins to heal and improve in appearance.

- **Patient condition 2:**

Before treatment: We notice in the patient's leg clear redness and skin irritation, indicating high-degree inflammation and skin cracks, indicating dry skin and the presence of some crusts.

After treatment: the disappearance of crusts and a significant decrease in the degree of redness. We also notice an improvement in the condition of the skin, moisturizing the area, and the disappearance of skin cracks.

- **Patient condition 3:**

Before treatment: Notice inflammation of the head area, density of crusts, dry skin in the area, and redness, indicating that the area is inflamed.

After treatment: complete disappearance of white scales The rate of inflammation and redness in the area decreased by a very large percentage, and the area returned healthy, hair grew, and returned to a normal condition.

- **Patient condition 4:**

Before treatment: We notice the presence of red, inflamed skin spots and clear crusts in the center of the spot in the image, and irritation appears indicating high inflammatory activity.

After treatment for an estimated period of 30 days: the redness disappears significantly and very slight peeling is almost non-existent. We also notice a unification of the skin color and the return of the skin tissue to its almost normal shape.

- **Patient condition 5:**

Before treatment: The image appears to show redness, skin irritation, scales on the scalp, and dryness.

After treatment: complete disappearance of redness and inflammation, as we noticed moisture in the scalp and the disappearance of crusts.

- **Patient condition 6:**

Before treatment: We notice on the patient's head the presence of crusts and a large red, inflamed area throughout the image. The image also shows dry skin.

After treatment: We notice a gradual decrease in the area of the inflamed area, a slight disappearance of crusts, area moisture, and decreased skin irritation.

- **Patient condition 7:**

Before treatment: The image shows an area with a rough, scaly appearance and a reddish color. These are symptoms that indicate skin infections and a bad skin condition.

After treatment: There is a noticeable improvement in the decrease in thickness and protrusion of the skin surface. We also notice a decrease in peeling, and the skin appears smoother, less peeling, and the color changes, and the degree of redness is reduced.The skin color has become normal and less inflammatory.

- **Patient condition 8:**

Before treatment: The image shows abnormally thick scales in the hair.

After treatment: Skin condition improved, dandruff decreased, and scalp moisture increased.

III. 2. DISCUSSION

III. 2. 1. Antioxidant activity

The results showed the antioxidant activity of the plant extract, which contains a mixture of natural plant oils (*Salvia officinalis ,Ammi majus* , and *Glycyrrhiza glabra* L)It had a significant value in inhibiting free radicals, although it was less than that recorded by ascorbic acid.These results indicate that the extract contains biologically active compounds that have an antioxidant effect and effectiveness, according to previous studies and through phytochemical screening of *Glycyrrhiza glabra* studied showed that the rootswere rich in flavonoids, alkaloids, terpenoids, saponins, tannins, steroids and glycosides. They were known to show medicinal activities This study has proven that licorice extract has a great ability to inhibit free radicals. This result supports the effect of licorice as an active ingredient in topical preparations for psoriasis due to oxidative stress the presence of *Glycyrrhiza glabra* extract which soothe and calm the skin.

Through results obtained in previous experiments with sage plants, it was found that sage plants are a rich source of polyphenol compounds. *Salvia* plants and their individual constituents possess strong antioxidant activity. In an analysis of 10 Salvia species, it was confirmed that all species exhibited significant antioxidant activity as measured by oxygen radical absorbance capacity, radical scavenging capacity.

This highlights its potential in treating chronic skin conditions such as psoriasis As for the results of a previous study of the vine plant, where it was done Should a significant content of total phenols and flavonoids be found in the crude extracts, this would strengthen the evidence for antioxidant activity. *A.majus* had exhibited strong free radical scavenging activity.

This indicates that this plant has the ability to reduce oxidative stress by scavenging DPPH free radicals The results confirm that three prominent and influential plants contribute to free radicals and confirm their role in reducing oxidative stress, which is considered one of the factors that exacerbate the symptoms of psoriasis. This gives the herbal cream therapeutic effectiveness, alleviating the symptoms of psoriasis, and improving the quality of life.

III.2.2. Antimicrobial Activity of *Salvia officinalis*, *Ammi majus*, and *Glycyrrhiza glabra* Essential Oils Using the Agar Well Diffusion Method

The comparative analysis of the antimicrobial activity of the tested essential oils, as presented in Tables 1–3, reveals distinct differences in spectrum and potency. Among the three oils, *Ammi majus* exhibited the broadest and most potent antibacterial activity, showing significant inhibition zones against both *Escherichia coli* and *Staphylococcus aureus* at multiple concentrations, with maximum inhibition of 27 mm and 25 mm, respectively, at 100% (Table 2). This aligns with previous findings by (Al-jumaili; Usmani et al., 2021), which reported strong antibacterial efficacy of *Ammi majus* oil due to its high content of bioactive coumarins and phenolic compounds.

Salvia officinalis demonstrated selective activity, inhibiting only *E. coli* with a maximum zone of 26 mm at full concentration, in agreement with studies by (Vuković-Gačić et al., 2006) emphasizing its antibacterial effect against Gram-negative strains through mechanisms involving terpenoid constituents (Table 1). In contrast, *Glycyrrhiza glabra* L. showed limited efficacy, inhibiting only *S. aureus* at 100% with a zone of 17 mm (Table 3), which supports

observations by) Wahab et al., 2022 (regarding its moderate action against Gram-positive bacteria.

Overall, *Ammi majus* was the most effective across strains, followed by *Salvia officinalis*, while *Glycyrrhiza glabra* L. displayed the weakest activity, suggesting a narrower spectrum of antimicrobial effectiveness.

III.2.3. Physicochemical properties of the moisturizing cream

The formulated moisturizing cream exhibited physicochemical characteristics aligned with dermatological formulation standards. The pH value of 6.92 falls within the physiologically acceptable range for topical products, ensuring skin barrier integrity and minimizing acid–base imbalance (Elias, 2022; Rajkumar et al., 2023). Its white coloration and smooth rheological profile reflect proper emulsification and colloidal stability, while the herbal aromatic profile enhances organoleptic appeal (Lakićević et al., 2022). Optical microscopy (Figure 5) confirmed structural homogeneity, with uniform lipid droplet dispersion and absence of phase separation hallmarks of a kinetically stable emulsion. Among the three bioactive oils, *Glycyrrhiza glabra* demonstrated superior dermocosmetic relevance due to its potent anti-inflammatory and humectant phytoconstituents, followed by *Salvia officinalis* with strong antioxidant and antimicrobial effects, and *Ammi visnaga*, noted for its photomodulatory and pigmentation-regulating activity. As presented in Table 4, these parameters validate the formulation's potential as a functional phytocosmetic with promising cutaneous tolerability and bioactivity.

III.2.4. Sun protection factor test (SPF)

The in vitro SPF assessment of the formulated herbal cream, composed of *Salvia officinalis*, *Glycyrrhiza glabra*, and *Ammi visnaga*, revealed a photoprotection value of SPF = 3.38, placing it within the “low protection” category according to standard sunscreen classification systems (Sayre et al., 1979; ISO 24443:2012). This limited UVB-blocking capacity indicates that the cream is not suitable for daytime use under sun exposure. Instead, it is more appropriate for night-time application, or as an adjunctive treatment in photoprotected environments.

This consideration is particularly important in the case of *Ammi visnaga*, a plant known to contain furocoumarins such as khellin, which are associated with photosensitizing effects

upon exposure to UV light (Udrea et al., 2023). Clinical studies have previously advised that patients undergoing khellin-based therapy should avoid direct sunlight to reduce the risk of phototoxic reactions (Nielsen et al., 2010). Moreover, special caution is recommended when handling fresh plant material, as its sap, rich in photoreactive compounds, can induce phytophotodermatitis upon skin contact followed by sun exposure.

In summary, although the cream presents therapeutic value due to its natural bioactive compounds, its low SPF value and photosensitizing potential justify its exclusive use in non-sunlight conditions, as clearly supported by both SPF data and phytochemical risk profiles

III.2.5. Clinical evaluation: Application of the herbal cream in psoriasis patients

To assess the clinical efficacy of the formulated herbal cream, a real-world observational study was conducted involving several psoriasis patients over a treatment period of 20 to 30 days. Baseline clinical characteristics were documented before application, followed by continuous monitoring of symptom progression throughout the study. Significant clinical improvements were observed starting from day 20 of application, including a noticeable reduction in erythema, crust formation, and lesion thickness. These outcomes were visually confirmed through patient photographs and reinforced by patients' positive feedback and continued demand for the cream, reflecting enhanced quality of life and psychological well-being.

The observed therapeutic effects are attributed to the synergistic combination of plant-derived compounds in the cream. *Glycyrrhiza glabra* (licorice), rich in glycyrrhizin, has been shown to suppress STAT3 signaling in keratinocytes and reduce IL-22-mediated inflammation, which plays a critical role in psoriasis pathogenesis (Wang et al., 2021). Additionally, Compound *Glycyrrhizin* therapy has been reported to improve PASI scores and neutrophil regulation in psoriatic patients (Zhou et al., 2020).

Salvia officinalis (sage) contributes potent anti-inflammatory and antifungal effects. Recent studies have demonstrated that sage extracts can reduce inflammation in a dose-dependent manner by modulating the synthesis of pro-inflammatory mediators such as TNF-α and IL-6 (Ali et al., 2022).

Ammi visnaga (*A. majus*) adds complementary antioxidant, antimicrobial, and photoprotective properties, supported by its content of khellin, a compound associated with pigmentation regulation and mild immunomodulatory activity (Martinez et al., 2023).

Moreover, a 2023 meta-analysis by Jo et al. highlighted that integrated herbal therapies significantly improve inflammatory symptoms in psoriasis when used alongside conventional treatments, suggesting a synergistic effect between bioactive phytochemicals from multiple plant sources.

Although the findings from this study are promising, long-term clinical trials are required to validate the sustained efficacy and safety of the cream and to further elucidate the underlying molecular mechanisms. Future investigations could also explore its application in other chronic inflammatory skin conditions such as eczema and seborrheic dermatitis.

CONCLUSION

This study successfully demonstrated the development and evaluation of a natural topical cream formulated with oil extracts from *Glycyrrhiza glabra*, *Salvia officinalis*, and *Ammi visnaga*, targeting the symptomatic relief of psoriasis. The formulation was scientifically validated through a series of in vitro assays including antioxidant activity via DPPH, antimicrobial efficacy using the agar well diffusion method, and SPF assessment. The cream showed moderate antioxidant capacity and selective antibacterial effects, particularly notable in Ammi visnaga, which exhibited the broadest spectrum of inhibition. The physicochemical evaluation confirmed appropriate pH, texture, and emulsion stability. Although the SPF value (3.38) classified the product under low protection, its use as a nighttime or supplementary dermatological treatment was supported. Clinical application on patients over 20–30 days revealed visible improvements in skin condition, inflammation reduction, and psychological well-being. The therapeutic potential of the formulation lies in the synergistic effect of its phytoconstituents, offering anti-inflammatory, antioxidant, and antimicrobial actions with minimal adverse effects. These findings support the integration of plant-based topical formulations as complementary therapies in managing chronic skin conditions such as psoriasis, while recommending further studies on long-term safety and mechanism of action

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Suffixes:

Participants in the progress of this work :

- Dr. Tabbouche Buchra skin clinic

Figure21: Dr. Tabbouche Buchra skin clinic(Originalfigure.,2025)

- laboratoire d'analyses medicales EL_Medjed

Figure22: laboratoire d'analyses medicales EL_Medjed (Originalfigure.,2025)

- sand flower clinic

Figure23: sand flower clinic (Originalfigure.,2025)

- Dr.bakkar clinic

Figure24: Dr.bakkar clinic (Originalfigure.,2025)

- Ibn El_Zahra center

Figure25: Ibn El_Zahra center (Originalfigure.,2025)

- pharmacist Ikram Djeber