

## PLANTAS MEDICINAIS E FITOTERÁPICOS PARA TRATAMENTO DE FERIDAS CRÔNICAS: REVISÃO INTEGRATIVA

### MEDICINAL PLANTS AND PHYTOTHERAPICS FOR TREATMENT OF CHRONIC WOUNDS: AN INTEGRATIVE REVIEW

### PLANTAS MEDICINALES Y HIERBAS MEDICINALES PARA EL TRATAMIENTO DE HERIDAS CRÓNICAS: REVISIÓN INTEGRATIVA

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#### ABSTRACT

**Objective:** To identify medicinal plants and herbal medicines with healing effects used to promote the treatment of chronic wounds. **Method:** This is an integrative review conducted from January to November 2024. The articles selected for this study were those published within the last 10 years (2013–2023) in three specific languages: Portuguese, English, and Spanish. The following databases/libraries were used: Biblioteca Virtual em Saúde (Virtual Health Library), Scientific Electronic Library Online (SciELO), Portal de Periódicos da Capes (Capes Journal Portal), Literatura Latino-Americana e do Caribe em Ciências da Saúde (LILACS), and National Library of Medicine (PubMed). The search descriptors included: “Medicamentos fitoterápicos” (Herbal drugs), “Feridas e lesões” (Wounds and injuries), “Plantas medicinais” (Medicinal plants), “Phytotherapeutic drugs”, “Wounds and injuries”, “Medicinal Plants”, “Medicamentos fitoterápicos”, “Heridas y lesiones”, and “Plantas medicinales”. **Results:** The search yielded 325 articles on the topic, 39 of which were available in full. After excluding those unrelated to the theme, eight studies comprised the final sample. Focusing on the healing mechanism and their role in the regeneration process, the review highlighted the positive impacts of medicinal plants and/or herbal medicines in treating diverse wounds, acute or chronic, in individuals of different ages. However, it also underscored the scarcity of studies in this area. **Conclusion:** Medicinal plants with healing properties can be used in various forms and for different purposes depending on their compounds. The analysis of the studies demonstrates their efficacy in treating chronic wounds.

**Keywords:** Wounds; Healing; Medicinal Plants.

#### RESUMEN

**Objetivo:** Identificar plantas medicinales y fitoterápicos con efectos cicatrizantes para el tratamiento de heridas crónicas. **Método:** Esta revisión integrativa se realizó de enero a noviembre de 2024, utilizando artículos publicados en los últimos 10 años (2013-2023), en tres idiomas específicos: portugués, inglés y español, de las siguientes bases de datos/bibliotecas: Biblioteca Virtual en Salud, Biblioteca Científica Electrónica en Línea, Portal de Revistas de Capes, Literatura Latinoamericana y del Caribe en Ciencias de la Salud y Biblioteca Nacional de Medicina, utilizando los descriptores: «Phytotherapeutic drugs», «Wounds and injury», «Medicinal plant», «Phytotherapeutic drugs», «Wounds and injury», «Medicinal plant», «Phytotherapeutic drugs», «Heridas y lesiones» y «Plantas medicinales». **Resultados:** Se encontraron 325 artículos sobre el tema, de los cuales 39 estaban disponibles en su totalidad. Tras excluir aquellos no relacionados con el tema, ocho estudios constituyeron la muestra final. Demostraron los impactos positivos de las plantas medicinales y/o fitoterápicos para el tratamiento de lesiones crónicas en personas de diferentes edades, pero también confirmaron la escasez de estudios en esta área. **Conclusión:** Las plantas medicinales con propiedades curativas pueden utilizarse de diversas maneras y con distintos fines según sus compuestos. El análisis de los estudios demuestra su eficacia en el tratamiento de heridas crónicas.

**Palabras clave:** Heridas; Cicatrización; Plantas Medicinales.

#### RESUMO

**Objetivo:** Identificar as plantas medicinais e fitoterápicos com efeito cicatrizante para o tratamento de feridas crônicas. **Método:** Trata-se de revisão integrativa realizada no período de janeiro a novembro de 2024, utilizando artigos publicados dentro dos últimos 10 anos (2013 - 2023), em três idiomas específicos, português, inglês e espanhol, pelas seguintes bases de dados/bibliotecas: Biblioteca Virtual em Saúde, Scientific Electronic Library Online, Portal de Periódicos da Capes, Literatura Latino-Americana e do Caribe em Ciências da Saúde, e National Library of Medicine, através dos descritores: “Medicamentos fitoterápicos”, “Feridas e lesões”, “Plantas medicinais”, “Phytotherapeutic drugs”, “Wounds and injuries”, “Medicinal Plants”, “Medicamentos fitoterápicos”, “Heridas y lesiones”, “Plantas medicinales”. **Resultados:** Foram encontrados 325 artigos sobre a temática, sendo 39 disponibilizados na íntegra. Após a exclusão daqueles que não se relacionavam ao tema, oito estudos compuseram a amostra final. Exibiu-se os impactos positivos das plantas medicinais e/ou fitoterápicos para o tratamento de lesões crônicas, em pessoas de diferentes idades, no entanto, ratificam a escassez de estudos nesta área. **Conclusão:** As plantas medicinais com ação cicatrizante podem ser utilizadas de várias formas e com diversas finalidades de acordo com seus compostos, a análise dos estudos demonstra sua eficácia no tratamento de feridas crônicas.

**Palavras chaves:** Feridas; Cicatrização; Plantas Mediciniais.



## INTRODUCTION

Human beings can be described as rational beings who, through their actions, constantly seek to improve their developmental process, which depends on the integrity of their mental and physical well-being. The skin is the largest organ of the human body, playing a vital role in defense and in maintaining homeostasis; however, many factors can impair its proper functioning. When addressing the treatment of lesions, the professional must assess the various characteristics presented by the patient and the lesion itself, including the type of lesion, its etiology and cause, the presence of odor, type of tissue (granulation, fibrin, or necrosis), exudate (its color and quantity), and whether the patient reports pain (nociceptive or neuropathic) <sup>(1)</sup>.

Proper assessment of a skin lesion allows the professional to decide on the best treatment for wound healing or management aimed at the patient's comfort. Despite scientific advances regarding wound care, many therapies still rely on standard substances such as hydrogel, silver sulfadiazine, or those with antioxidant properties that can be harmful to the formation of healthy granulation tissue. This may occur due to limited access to more appropriate products or improper professional conduct, as in the use of hydrogen peroxide, hypochlorite solution, acetic acid, chlorhexidine, povidone-iodine, and cetrimide, which, although possessing antibacterial properties, are cytotoxic to tissue and impair healing <sup>(2)</sup>.

Factors that negatively impact lesion

repair slow the healing process in terms of both anatomical and functional integrity, hindering the biochemical and cellular processes necessary to maintain skin integrity <sup>(3)</sup>.

Even with the wide range of synthetic substances available for wound application, areas such as phytotherapy and the use of medicinal plants represent innovation in dermatological treatment. Although many health professionals are unaware of the medicinal properties of certain plants, their use is highly diverse and has been adopted since ancient times in different cultures <sup>(4)</sup>.

Research highlights the benefits of using medicinal plants and herbal medicines, commonly associated with the reduction of devitalized tissues, anti-inflammatory and debriding properties, increased collagen fiber deposition and cell proliferation, as well as a reduction in healing time and minimal adverse effects <sup>(5)</sup>.

Medicinal plants have been used for millennia by various cultures to treat diseases, forming an integral part of traditional medical systems. However, studies on their use in wound healing remain scarce. Therefore, it is understood that the population's knowledge about skin lesion care and the use of medicinal plants should be integrated with scientific knowledge to expand research in this field <sup>(6)</sup>.

The use of natural products incorporated into wound care has proven to be a valuable therapeutic resource. Their inclusion in healthcare demonstrates versatility, whether used

individually or in combination with other products, showing synergistic potential with conventional therapies. However, the implementation of such treatments requires professionals to have greater knowledge of the subject, as merging ancestral knowledge with modern scientific evidence can be challenging but contributes significantly to global health <sup>(7)</sup>.

Medicinal plants are those containing substances with healing properties found in their various parts, leaves, roots, while herbal medicines are derived from these plants and undergo laboratory processing for their formulation. Specific substances are extracted for their action, and their presentation is defined, as creams, tablets, and other forms, expanding the range of available natural products <sup>(8)</sup>.

Phytotherapy is one of the approaches promoted by the National Policy on Integrative and Complementary Practices (PNPIC) adopted by Brazil's Unified Health System (SUS). Many essential medicines derive from plants with healing properties and are used in various types of skin lesions such as burns, pressure injuries, and diabetic foot ulcers, among others. The global consumption of natural products has increased over the years, and with it, the adoption of plant-based products with healing action has shown promising effects for the recovery of skin lesions, whether acute or chronic <sup>(8)</sup>.

The main goal of wound dressing application is complete healing, achieved through the deposition of various cells in the lesion area to stimulate granulation tissue

formation, the healthy tissue, while promoting asepsis and protecting the affected area <sup>(8)</sup>.

Therefore, this study aimed to identify medicinal plants and/or herbal medicines with healing action for the treatment of chronic wounds, addressing their forms of use and the effectiveness of their implementation.

## METHOD

This study consists of an integrative review developed through the following steps: formulation of the guiding research question, establishment of inclusion and exclusion criteria, search and evaluation of articles to be included as the basis of the study, selection of relevant material, interpretation of results, conclusion, and references.

Initially, the guiding question was formulated as: "Which medicinal plants and/or herbal medicines are used for the treatment of chronic wounds?" This question directed the research, with the PICO strategy adopted as follows: "P" for the use of herbal medicines and/or medicinal plants, "I" for the intervention by health professionals, and "CO" for existing studies and their outcomes. This strategy enabled the selection of studies with similar themes, ensuring exclusivity, relevance, and reliability of the data collected.

The research was conducted in three languages, portuguese, english, and spanish, across the following databases and libraries: Virtual Health Library (BVS), Latin American and Caribbean Health Sciences Literature



(LILACS), Scientific Electronic Library Online (SCIELO), CAPES Journal Portal, and National Library of Medicine (MEDLINE/PubMed). The descriptors used were: “Medicamentos

fitoterápicos”, “Feridas e lesões”, “Plantas medicinais”, “Phytotherapeutic drugs”, “Wounds and injuries”, “Medicinal Plan”.

**Table 1** – Structure of descriptors in databases and libraries used for data search. João Pessoa, PB, Brazil, 2024.

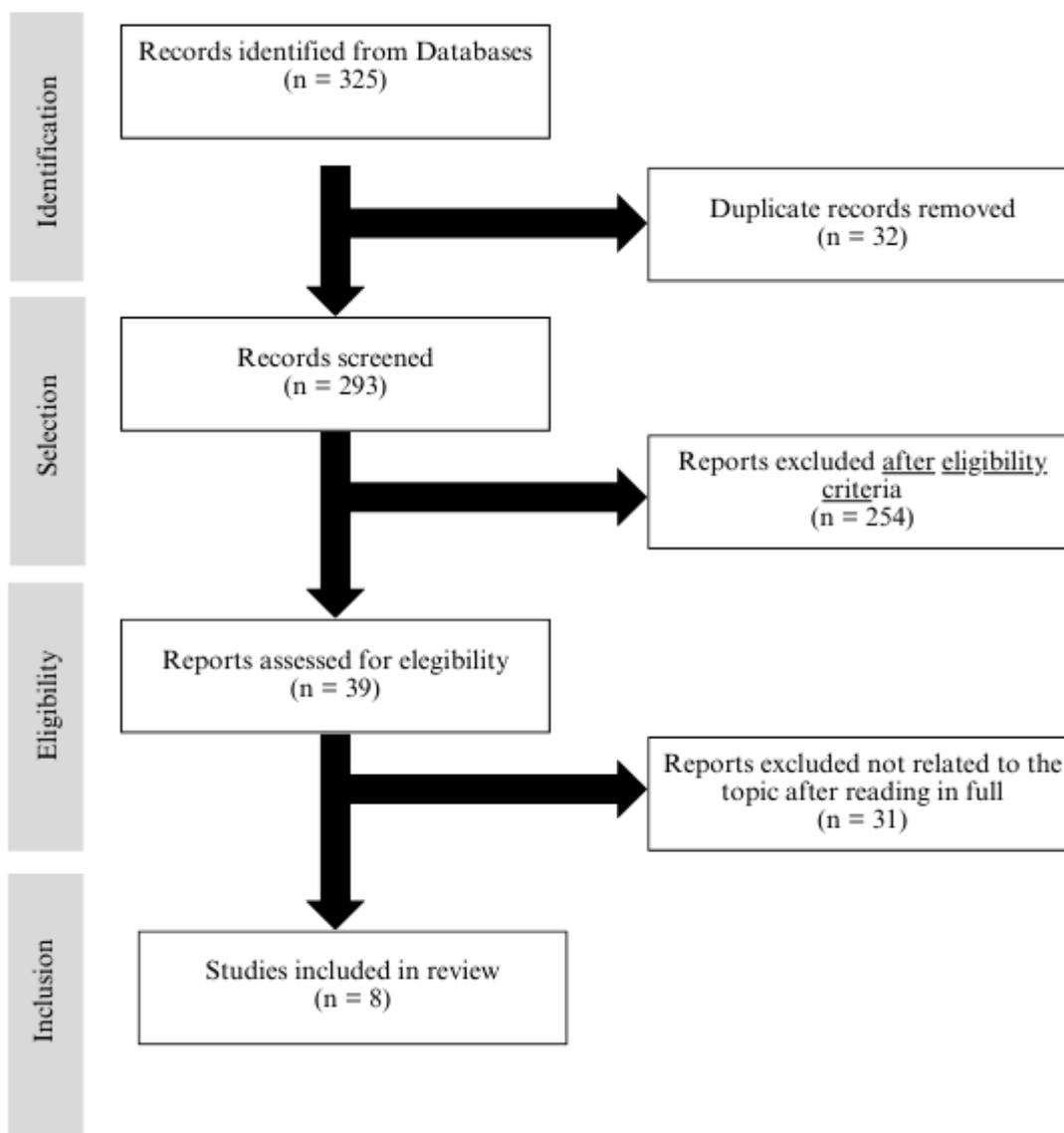
Database	Descriptors	Results found
BVS	<i>(Phytotherapeutic drugs) AND (Wounds and injuries) AND (Medicinal Plants).</i>	100
CAPES	<i>(Phytotherapeutic drugs) AND (Wounds and injuries) AND (Medicinal Plants).</i>	33
SCIELO	<i>(Phytotherapeutic drugs) AND (Wounds and injuries) AND (Medicinal Plants).</i>	17
LILACS	<i>(Phytotherapeutic drugs) AND (Wounds and injuries) AND (Medicinal Plants).</i>	95
MEDLINE/PUB MED	<i>(Phytotherapeutic drugs) AND (Wounds and injuries) AND (Medicinal Plants).</i>	80

The material selection was carried out independently between January and November 2024. Titles and abstracts were reviewed, and only articles published in peer-reviewed journals between 2013 and 2023 were included. The software EndNote was used to identify and remove duplicates and manage references.

The search yielded 325 articles related to the topic, as shown in Figure 1. Articles were

selected based on title and abstract reading, applying inclusion and exclusion criteria, and removing duplicates. Studies that used herbal medicines and/or medicinal plants in skin lesions and were indexed in databases between 2013 and 2023 were included, while theses, dissertations, monographs, and papers not addressing the guiding question were excluded.

**Figure 1** – Flowchart of study identification, selection, and inclusion, using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). João Pessoa, Paraíba, 2024.



## RESULTS

The search yielded a total of eight articles selected for its composition, as described in table 2, which consists of the items: work title, year/country of origin, database, type of study, objective, medicinal plant/herbal medicine, form of use, type of lesion, and results. The description of the bibliographic material that constitutes the present study exhibits scientific productions from different databases and

indexed libraries. From the material selected for the research, relevant information was extracted regarding eighteen types of different medicinal plants and/or herbal medicines, as specified in table 2, highlighting the variety of their use and the types of chronic lesions addressed.

**Table 2** - Results of data extracted from the included studies. João Pessoa, Paraíba, 2024

Title	Year/Origin	Database	Type of Study	Objective	Medicinal Plant/Herbal Medicine	Forms of Use	Type of Lesion/Wound	Results
<b>A Prospective, Descriptive Study to Assess the Clinical Benefits of Using Calendula officinalis Hydroglycolic Extract for the Topical Treatment of Diabetic Foot Ulcers (1).</b>	Brazil, 2016.	MEDLINE/ PubMed	Prospective and descriptive study	To evaluate the clinical benefits of <i>Calendula officinalis</i> extract for its use as a means of topical treatment for patients with diabetic foot ulcers.	Phytoplus Plenusdermax®	For 12 weeks, one group was treated complementarily with 1,000 mg of omega-3 fatty acids from flaxseed oil supplements, while the second group used a placebo. All received treatment with ciprofloxacin (400 mg IV) and clindamycin (900 mg IV).	The study was conducted with 41 bedridden and wheelchair-bound patients followed for up to 30 weeks. Lesions included Tunnel Ulcers and Stage II and III Pressure Ulcers, located in the gluteal, sacral, and trochanteric regions.	Due to the anti-inflammatory and antibacterial properties, there was a significant reduction in odor, edema, erythema, and bacterial colonization. A decrease in healing time and the injured area was observed. After 30 weeks, the proportion of completely healed lesions was 88%, with no occurrence of adverse effects.
<b>Low-level laser and Calendula officinalis in repairing diabetic foot ulcers (9).</b>	Brazil, 2016.	LILACS	Clinical case study, experimental, controlled, prospective randomized, interventional with a quantitative nature	To evaluate low-level laser therapy (LLLT), associated with the use of <i>Calendula officinalis</i> oil in the treatment of diabetic foot ulcers.	<i>Calendula officinalis</i> (Calêndula Margarida)	The dry extract of <i>Melilotus officinalis</i> (Semelil/ANGIPARSTM) was administered orally, twice a day. Patients were randomly distributed into two groups: Group A (placebo) and Group B (ANGIPARSTM). Lesion measurement was done by planimetry.	Clients with lower limb ulcers (1-5 cm), involving the foot, medial or distal third of the leg, followed up at the diabetic foot outpatient clinic. Patients were decompensated type II diabetics (fasting glucose 150-350 mg/dL), aged 40-70.	Hydration of ulcers with <i>Calendula officinalis</i> oil accelerated the tissue repair process (intra-group and inter-group). The complementary use of <i>Calendula officinalis</i> oil associated with LLLT was effective in pain relief (anti-inflammatory action) and in reducing the total area of ulcers (stimulus of neovascularization and cellular proliferation).
<b>A plant-derived wound therapeutic for cost-effective treatment of post-surgical scalp wounds with exposed bone (10).</b>	New Zealand, 2014.	PubMed	Not specified	To evaluate the efficacy and cost-effectiveness of a plant-derived dressing, made from a mixture of Neem and Hypericum oil, applied to scalp wounds with	Holoil® - Creme de extrato combinado de <i>Hypericum perforatum</i> (Erva-de-são-joão) e <i>Azadirachta indica</i> (Neem indiano)	Divided into two groups. The intervention group received standard treatment (saline irrigation, oral antibiotics) combined with <i>O. europaea</i> olive oil in a topical dressing. The control group received standard therapy only.	Patients with post-operative scalp wounds with exposed calvarial bone, following excision of skin tumors, at the Department of Dermatology, University Hospital of Zurich, Switzerland, from January to December 2011.	100% epithelialization was achieved, with treatment maintained until complete wound closure (4 to 20 weeks). Rapid formation of granulation tissue was observed, covering the exposed bone surface in 73% of cases after 4 weeks. Dressing changes were simple, with no pain reported. No infection or other complications occurred.



				exposed bone.				
Evidence for Natural Products as Alternative Wound-Healing Therapies <sup>(1)</sup> .	Brazil, 2023.	PubMed	Systematic review	Evidenciar a administração de produtos naturais como terapias alternativas para cicatrização de feridas.	Plantavera 10% gel - <i>Aloe vera</i> (L.), <i>Burm.f. (A. vera)</i> e <i>Plantago major</i> L.	Part of African folk medicine. Treatment lasted 8 weeks and involved G lyophilization with kola supplementation, complementing conventional treatment (metformin, glibenclamide, or insulin). Participants were divided into three subgroups: Subgroup-1 (250 mg <i>G. kola</i> ), Subgroup 2 (500 mg), and Subgroup 3 (no supplementation).	Application of an active gel and a placebo was carried out on diabetic foot ulcers to compare the induction of healing.	Treatment with the Plantavera gel induced a significant improvement in the ulcer within 4 weeks. It demonstrated 70% complete recovery in the treatment group and no complete recovery in the placebo group.
		PubMed	Systematic review	Evidenciar a administração de produtos naturais como terapias alternativas para cicatrização de feridas.	Pycnogenol® - <i>Pinus pinaster aiton</i> (Pinheiro)	Patients were randomly divided into two groups. The medication group used a topical gel of 10% <i>P. major</i> extract, applied to the wound once a day for two weeks. The control group used a standard dressing.	Clinical study with 30 participants to evaluate the healing response in diabetic ulcers.	The herbal medicine showed the ability to reduce blood glucose levels in patients with type 2 diabetes. There was a significant reduction in ulcer area within 6 weeks in the three groups that used the extract. The combination of oral and topical application had the highest healing response (89%), compared to 61% in the untreated group.
		PubMed	Systematic review	Evidenciar a administração de produtos naturais como terapias alternativas para cicatrização de feridas.	<i>Symphytum uplandicum Nyman</i> (Confrei) - Creme de extrato de <i>Symphytum herba</i>	Individuals were randomly separated into two groups: 12 patients treated with the topical cream containing <i>P. amboinicus</i> and <i>C. asiatica</i> (L.) and 12 others treated with a hydrocolloid fiber dressing. The observation time was 12 weeks.	Application of the cream was carried out on pressure ulcers and bedsores in 151 participants.	At the end of the study, out of 184 pressure ulcers, 170 were considered completely healed. Only 1.2% of patients showed local irritation.

<p><b>Acknowledging the use of botanicals to treat diabetic foot ulcer during the 21st century: A systematic review</b> <sup>(12)</sup>.</p>	<p>Not specified, 2023.</p>	<p>PubMed</p>	<p>Systematic review</p>	<p>To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.</p>	<p><i>Olea europaea</i> (Oliveira)</p>	<p>Main component of the Ayurvedic paste called "Nimbadi Kalka". The topical mixture was administered daily to the wounds for a period of 45 days.</p>	<p>Chronic lesions in patients with diabetic foot ulcers. The study involved 60 patients divided into two groups.</p>	<p>The intervention group showed visible improvements in ulcers during observation at weeks 2, 3, and 4 (changes in color, drainage, and surrounding tissue), with notable healing. The topical olive oil dressing aided in the cure of diabetic foot ulcers, demonstrating benefits when used in conjunction with standard care.</p>
		<p>PubMed</p>	<p>Systematic review</p>	<p>To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.</p>	<p><i>Linum usitatissimum</i> (Linhaça)</p>	<p>The safety and efficacy of using <i>T. polium</i> in ointment form were investigated in two groups (1 and 2). Group 1 received the topical ointment in conjunction with standard therapy for 4 weeks. Group 2 received a topical placebo ointment.</p>	<p>Study conducted with 60 participants with grade 3 diabetic foot, randomly distributed into two groups.</p>	<p>After the study period, patients who supplemented with flaxseed oil showed a significant reduction in the length, width, and depth of the ulcer. There was also a decrease in blood insulin levels when compared to the placebo group.</p>
		<p>PubMed</p>	<p>Systematic review</p>	<p>To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.</p>	<p><i>Melilotus officinalis</i> (Honey clover, Sweet clover, or White clover)</p>	<p>A dressing containing 0.1% of PIG10, a proteolytic compound obtained from <i>V. cundinamarcensis</i>, was used. Participants were divided into a control group (hydrogel regimen) and the PIG10 group.</p>	<p>Research conducted on individuals with diabetic foot ulcers, with a total of 40 patients included.</p>	<p>The observation time was 12 weeks. The efficacy of the dry extract was demonstrated: Group B's average improvement rate was 95.8%, compared to 79.2% for Group A. There was a significant reduction in the injured area, with wounds totally healed within the 12-week period.</p>



		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<i>Garcinia kola</i> (Orobô)	A gel composed of 5% hydroalcoholic extract of <i>P. major</i> and 5% mucilage of <i>A. vera</i> was administered. One group used the Plantavera 10% gel; the second group used a placebo gel.	The study participants included 30 diabetics with foot/leg ulcers, 30 diabetics without ulcers (DM2), 30 diabetics with chronic foot/leg ulcers, and 30 diabetics without ulcers.	At the end of the eighth week, Subgroups 1 and 2 showed reduced total plasma peroxide (TPP) and oxidative stress index and plasma glucose. Improvement in wound healing was noticeable, along with a higher concentration of total antioxidant (TAS) and antioxidant micronutrients.
		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<i>Plantago major</i> (Plantain, Taioba, or Deer Ear)	An oral capsule, Pycnogenol®, was developed from the French maritime pine bark extract ( <i>Pinus pinaster aiton</i> ). Patients were divided into three treatment groups and one untreated control group. Group 1 (oral capsule), Group 2 (topical powder), Group 3 (oral + topical), and Group 4 (untreated control).	Used to treat patients with diabetic foot ulcers and pressure ulcers.	The <i>Plantago</i> gel extract, compared to the control group, demonstrated a decrease in lesion size, and accelerated the healing of diabetic foot ulcers and pressure ulcers.



		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<p><i>Plectranthus amboinicus</i> Spreng. (<i>Lamiaceae</i>) (Thick-leaf mint)</p> <p><i>C. asiatica</i> (L.) urban (<i>Umbelliferae</i>)</p> <p><i>Centella. asiatica</i> (Centela)</p>	Dressings containing Symphytum herba extract cream and allantoin were performed. Wounds were disinfected every 2-3 days during dressing changes, for a period of 25 to 30 days.	The research included 24 patients with type I and II diabetes, aged over 20 years, and with grade 3 diabetic foot ulcers (Wagner scale) after surgical debridement.	It was shown that 10 out of 12 patients treated with the cream showed improvement in a higher proportion (total of 90.2%) than the patients treated with the hydrocolloid fiber dressing.
		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<p><i>Sesamum radiatum</i> (Sesame)</p>	Divided into two groups. The intervention group received standard treatment (saline irrigation, oral antibiotics) combined with <i>O. europaea</i> olive oil in a topical dressing. The control group received standard therapy only.	15 patients with diabetic foot ulcers, with baseline levels of glycated hemoglobin (HbA1c), participated in the study.	The plant's richness in nutrients and antioxidant capacity (native to Africa) resulted in a significant decrease in lesion size and reduced the amount of exudate. The appearance of granulation tissue was noted after 15 days of use.



		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<i>Teucrium polium</i> (Zamarilla)	For 12 weeks, one group was treated complementarily with 1,000 mg of omega-3 fatty acids from flaxseed oil supplements, while the second group used a placebo. All received treatment with ciprofloxacin (400 mg IV) and clindamycin (900 mg IV).	Study conducted with 70 patients, all with non-infected diabetic foot ulcers scoring 1 or 2 on the Wagner scale.	The result showed a reduction in the mean surface area of the ulcer in Group 1, accelerating its healing process when compared to Group 2, demonstrating the efficacy of <i>T. polium</i> included in standard therapy.
		PubMed	Systematic review	To discuss the plants used for the treatment of patients with diabetic foot ulcers, and the different forms of use and variation in administration during the 21st century.	<i>Vasconcellea cundinamarcensis</i> (Carica candamarcensis)	The dry extract of <i>Melilotus officinallis</i> (Semelil/ANGIPARSTM) was administered orally, twice a day. Patients were randomly distributed into two groups: Group A (placebo) and Group B (ANGIPARSTM). Lesion measurement was done by planimetry.	The research gathered 50 patients with diabetes who had diabetic foot ulcers.	P1G10 group observed that 11 of 25 participants showed lesion healing. In comparison, the control group had 5 of 25 participants achieve 100% healing.



<p><b>Current scenario of traditional medicines in management of diabetic foot ulcers: A review</b> (13).</p>	<p>Not specified, 2023.</p>	<p>PubMed</p>	<p>Literature review</p>	<p>To analyze and study the literature regarding the current scenario of traditional medicine, the main plants and their components, broadly used in the management of diabetic foot ulcers.</p>	<p><i>Aloe vera</i> (Babosa)</p>	<p>Individuals were randomly separated into two groups: 12 patients treated with the topical cream containing <i>P. amboinicus</i> and <i>C. asiatica</i> (L.); and 12 others treated with a hydrocolloid fiber dressing. The observation time was 12 weeks.</p>	<p>Diabetic foot ulcers, in patients with type I or II diabetes, who presented microangiopathy and neuropathic compromise.</p>	<p>Efficient in cell proliferation, re-epithelialization, the remodeling phase, and in wound healing. Showed good antibacterial activity with an inhibition zone &gt; 13 mm.</p>
<p><b>Peristomal dermatitis: treatment with green banana peel (Musa sapientum) powder / Dermatite periestomal: tratamento com pó de casca de banana verde (Musa sapientum)</b> (14).</p>	<p>Brazil, 2021.</p>	<p>BVS</p>	<p>Observational study</p>	<p>To develop the compound powder from the peel of <i>Musa sapientum</i> (green banana) for the treatment of peristomal dermatitis, evaluating efficacy and healing time.</p>	<p><i>Musa sapientum</i> (Banana Verde)</p>	<p>Part of African folk medicine. Treatment lasted 8 weeks and involved G lyophilization with kola supplementation, complementing conventional treatment (metformin, glibenclamide, or insulin). Participants were divided into three subgroups: Subgroup-1 (250 mg <i>G. kola</i>), Subgroup 2 (500 mg), and Subgroup 3 (no supplementation).</p>	<p>Treatment of peristomal dermatitis in patients with intestinal ostomy. A total of 44 volunteers (under 18 years old) participated, 22 used the banana powder.</p>	<p>The healing time observed in the group that used the powder containing <i>Musa s.</i> (average 13 days) was relatively shorter than the control group. Patients reported pain relief, comfort, and skin protection with effective moisture absorption.</p>
<p><b>A utilização de fitoterápicos no tratamento de feridas diabéticas: relato de caso</b> (15).</p>	<p>Brazil, 2022.</p>	<p>BVS</p>	<p>Case study</p>	<p>To evaluate the effectiveness of hyaluronic acid associated with papain in wound healing in a diabetic patient.</p>	<p><i>Carica papaya L.</i> (Mamão)</p>	<p>Patients were randomly divided into two groups. The medication group used a topical gel of 10% <i>P. major</i> extract, applied to the wound once a day for two weeks. The control group used a standard dressing.</p>	<p>Chronic lesion on the left foot of a patient with <i>Diabetes Mellitus</i>, resulting from left foot amputation.</p>	<p>There was acceleration of the healing process, reduction of maceration of the wound edges, and reduction of exudate quantity. The lesion area was significantly reduced, from 24 cm initially to 1.5 cm, achieving 100% epithelialization in a period of 33 days.</p>

Source: Research data, 2024.



## DISCUSSION

This research addresses the treatment of chronic wounds, which significantly impact the patient's quality of life. Because they are complex wounds, they may require multifocal care, meaning that the lesions must be evaluated in all their aspects. This is one of the benefits of medicinal plants and phytotherapeutic products, as their properties do not involve only one aspect of the pathology <sup>(1)</sup>.

Chronic wounds are those that are difficult to heal, and their healing process is more complex compared to that of acute lesions. Comprehensively, it involves evaluating the patient's nutritional aspects, infection control, adequate asepsis, wound bed preparation, infection prevention, debridement, and preservation of the wound bed, stimulating the emergence of healthy granulation tissue and its epithelialization <sup>(2)</sup>.

In the health field, there is much discussion regarding the benefits and harms of using medicinal plants and/or herbal remedies. Given that the population regularly uses these natural products, it is up to the professional to have knowledge of the subject in order to provide guidance, as well as to contribute to effective research for clinical use.

Throughout the research, the use of various medicinal plants and herbal medicines was observed, both in isolation and as a complementary therapy in the healing process. The composition of these natural products is usually complex, due to the variety of active

ingredients that confer their medicinal properties.

An example is *Calendula officinalis* oil, a plant originating in the Mediterranean and popularly known as Marigold (Calêndula in Portuguese), which is rich in Essential Fatty Acids (EFAs). Due to its anti-inflammatory, therapeutic, and healing effects, the National Health Surveillance Agency (ANVISA) recommends its topical use in the treatment of chronic lesions <sup>(2)</sup>.

The consumption of natural products has gained prominence due to its association with a healthy lifestyle. However, the use of medicinal plants is an ancient practice, employed not only in the treatment of wounds but also for various health conditions, such as neoplasms, conjunctivitis, hyperglycemia, and dyslipidemia.

Among these plants, *Aloe vera* (popularly known as Aloe) stands out in the treatment of skin lesions. Widely known in Brazil, it presents anti-inflammatory, antioxidant, healing, bactericidal, and laxative effects. This is thanks to its rich composition of vitamins, enzymes, minerals, sugars, salicylic acid, and amino acids. Scientific evidence demonstrates that its use can reduce pain in chronic lesions and accelerate the healing process <sup>(5)</sup>.

Medicinal plants and/or herbal medicines used to restore tissue integrity may share some common effects, such as anti-inflammatory, antimicrobial, wound-healing, and analgesic actions, as seen in the previous examples with *Aloe vera* and *Calendula officinalis*. However,

their form of presentation varies, based on the extraction method used and the type of plant. In a case study involving an ointment made from 0.2% Hyaluronic Acid extracted from fruits, 10% glycolic Papain extract, *Aloe vera* extract, Andiroba extract, Rosemary oil, Tea Tree oil (*Melaleuca*), and Copaiba oil, it was demonstrated that, despite its complex composition, it was capable of epithelializing a traumatic, chronic, complex, and difficult-to-heal wound <sup>(4)</sup>.

Given the function of the healing process, the application of natural products and improvements in their use are described in studies that indicate fast-acting products, some with an efficacy of 90% to 100% epithelialization, with monitoring mostly performed by nurses. Control is achieved through the use of patient records, clinical progression, and nursing progress notes, which monitor the healing process with the aim of conducting appropriate treatment, planning, and interventions based on the specific needs of the patient and their lesion <sup>(6)</sup>.

The research analyzed in this 10-year period (2013-2023) highlights several plant species with extracts of proven efficacy in therapeutic applications, including *Aloe vera* (L.) Burm.f. (Aloe), *Calendula officinalis* L. (Pot Marigold), the oil extracted from the seeds of *Rosa canina* L. (Rosehip), and *Carica papaya* L. (Papaya). In a study with patients in the postoperative period of open hemorrhoidectomy, the use of an *Aloe vera*-based cream resulted in

less pain, accelerated healing, and reduced analgesic consumption. Furthermore, its efficacy in the treatment of second-degree burns, in a group of 30 individuals, was proven in a comparison with 1% silver sulfadiazine (standard treatment); a cream containing 0.5% *Aloe vera* promoted faster re-epithelialization and reduced lesion size compared to the control group, reinforcing its potential as an effective therapeutic alternative <sup>(5)</sup>.

The literature reviews, clinical trials, and other research analyzed in this study show the good acceptance of medicinal plants and/or herbal medicines used not only for superficial lesions, such as peristomal dermatitis, but also for varied chronic wounds, such as diabetic wounds, pressure ulcers, and even lesions with bone exposure. As we can see, the observed lesions are quite varied, and one of the innovations found was the use of Neem and Hypericum oil (Holoil), in cream form, to treat skin ulcers related to calcinosis in systemic sclerosis. Patients who applied the cream daily showed reduced pain and prevalence of infections, as well as the crushing and complete resolution of calcium deposits, facilitating their excision during wound treatment sessions. This efficacy demonstrated the complete healing of 15 out of 33 patients <sup>(6)</sup>.

Despite their proven efficacy, a major barrier to the implementation of medicinal plants and/or herbal medicines for the treatment of skin lesions, such as wound healing, arises when health professionals do not seek contact or

improvement of phytotherapy knowledge in this field, which results in reduced innovations, even though this treatment option has shown, according to research, relevant results in the recovery of injured tissue, and also presented lower cost and few adverse effects<sup>(8)</sup>.

Similarly, another reported limitation involves some research where, before using medicinal plants and/or herbal medicines, health professionals use standard therapies, that is, products commonly known for use in the area, already recommended substances (depending on the lesion), such as Activated Charcoal, Hydrogel, Silver Sulfadiazine—making the effectiveness of the herbal medicine inconclusive, which is detrimental to data collection for future research in the area<sup>(8)</sup>.

In contrast to the barriers identified through the study, there are still innovative developments in the health field related to the use of medicinal plants and/or herbal medicines as viable treatment options for chronic lesions. A study involving the application of a spray composed of Neem oil and *Hypericum perforatum* L. in patients with postoperative scalp wounds with exposed bone, developed in Switzerland, showed results with positive impacts on lesion healing. The herbal medicine, with antimicrobial effect, prevented the secondary dressing from adhering to the wound bed, preserving wound moisture. In a sample containing 15 patients, 7 had the exposed area 100% covered, due to the high potential for granulation tissue emergence at the site, with no

reports of intense pain or adverse effects recorded<sup>(10)</sup>.

Such research highlights how medicinal plants with wound-healing action can be used in various ways and for different purposes according to their compounds, potentially leading to herbal medicines that potentiate their effects. Plants rich in tannins favor epithelialization and cell proliferation, which justifies the high potential for promoting the emergence of granulation tissue, while species rich in quinones, naphthoquinones, and flavonoids have antibiotic and anti-inflammatory action. Furthermore, knowing the proper handling and use shows that different parts of the plant can be used, such as leaves, roots, or stems, and these have varied preparation forms, being found as decoctions, tinctures, and even ointments<sup>(16)</sup>.

The discussed research reports different types of treatment for skin lesion care, and that the regeneration process is intensified by focusing on increasing the deposition of cells that restore the tissue. The wound healing process has three distinct phases: the inflammatory process, where damaged cells and pathogens undergo phagocytosis; the cell proliferation process for new tissue formation and angiogenesis, aiming for the emergence of granulation tissue; and finally, the tissue remodeling stage, through collagen deposition<sup>(16)</sup>.

The healing process of a chronic lesion differs from an acute lesion due to its

complexity, especially in the inflammatory phase of the lesion, which is more prolonged due to the high and unbalanced deposition of monocytes and pro-inflammatory M1 macrophages, which directly impacts epidermal re-epithelialization. That said, the professional must take into account the high complexity of the lesion and all the barriers that slow down healing when performing the dressing, ensuring patient safety. Despite this, many conventional techniques and dressings do not meet these demands, leading researchers to focus on natural products <sup>(11)</sup>.

The plant genera used topically found in the research, such as *Aloe*, *Anacardium*, *Rosa*, *Calendula*, among many others cited, have wound-healing, bactericidal, and anti-inflammatory action, which is due to their composition rich in tannins, flavonoids, and phenolic acids. Their diverse mechanisms of action, stemming from these varied compounds, show that they can be as efficient as pharmaceutical products like antibiotics, even without their therapeutic selectivity <sup>(11)</sup>.

The understanding of the positive impact that the use of phytotherapy can provide for the care of skin lesions raises the question of why its products are so little utilized. Studies on medicinal plants and/or herbal products for topical use on skin wounds are still scarce, the vast majority being limited to animal use, despite studies showing scientific evidence for use in humans, making this an area that needs to be explored to improve the treatments used and the quality of healthcare for patients <sup>(11,16)</sup>.

Possessing the appropriate knowledge related to physiology, the mechanism of wound healing, exudate, signs of infection, and biofilms is essential to treat a lesion adequately. Difficult-to-heal wounds often result from the increased incidence of preventable problems, such as Diabetes Mellitus and rising obesity, becoming a public health issue that affects countless people and a challenge for health professionals <sup>(11,12)</sup>.

Taking common comorbidities as an example, *Diabetes Mellitus*, a disease associated with insulin deficit resulting in high blood sugar levels (hyperglycemia), if not properly treated, has the development of Diabetic Foot Ulcers (DFU) as one of its main consequences. Understanding this daily problem is fundamental for the professional who provides care for skin lesion treatment, with diabetic foot ulcers being the most explored type of lesion in ethnobotanical research. Such studies are due to common actions such as the antioxidant effect (neutralizing free radicals and reducing oxidative stress); improvement of angiogenesis; acceleration of healing (stimulating greater collagen deposition); and antimicrobial effect (preventing colonization), these actions being respective of plants like *Calendula officinalis*, *Teucrium polium*, *Actinidia deliciosa*, and *Aloe Vera* <sup>(12)</sup>.

Another common type of lesion identified in the research was pressure ulcers or pressure injuries (PU), which result from friction or pressure in a localized area, associated with medical devices or the need for repositioning,

leading to compromised dermal integrity. A study using Neem and Hypericum oil, which was used to produce an herbal medicine in the form of an ointment for three bedridden patients in an ICU (Intensive Care Unit), was conducted over a period of 42 consecutive days. The ointment was applied once a day. Due to histological monitoring, it was possible to observe that the lesioned patients showed total healing of the lesion in an average time greater than or equal to 42 days. By exhibiting its potential, the herbal ointment proves to be an effective alternative for the treatment of these lesions. However, the research sample was relatively small, which again raises the issue of the need for more research in the area, confirming its viability<sup>(17)</sup>.

The research analyzed in this work highlighted the positive impact of using medicinal plants and herbal medicines in the topical treatment of wounds, demonstrating the evolution of their application throughout history. Originally, their main purpose was to stop hemorrhages and promote healing, being mostly administered orally for systemic absorption. In discussing the range of benefits in the production of herbal medicines and the use of traditional plants, the research also portrays their relevance from a socioeconomic perspective, as the cost of implementing more natural products to treat chronic lesions represents a more viable alternative, justifying the rise in their use. Currently, these substances present various pharmaceutical forms, including innovative formulations such as oils, powders, and sprays,

which expand their therapeutic efficacy and convenience<sup>(13,18)</sup>.

A study involving *Rosa aff rubiginosa* or *Rosa canina* L, popularly known as Rosehip, highlighted the therapeutic potential of the agent, which has anti-inflammatory, immunomodulatory, cardioprotective, antimicrobial, and antioxidant actions. In Brazil, the plant is mainly used in the form of oil, extracted from the seed for the production of herbal medicines, with a composition rich in polyphenols, carotenoids, ascorbic acid (Vitamin C), unsaturated fatty acids, and transretinoic acid, contributing to the maintenance of skin integrity and its healing. Studies affirm that skin lesions treated with *Rosa canina* L. oil showed greater deposition of collagen and fibroblasts, reduced edema, and the rapid emergence of granulation tissue, corroborating the reduction of the lesion area in a shorter time<sup>(19)</sup>.

Innovations in the area have allowed the treatment of various types of lesions, such as peristomal dermatitis, a common chronic lesion in patients with intestinal ostomies, characterized by inflammation, pain, and compromised skin integrity around the stoma. In this context, a study investigated the therapeutic use of *Musa sapientum* (green banana), through the application of an herbal powder containing 10% of the fruit peel, formulated with the addition of gelatin and carboxymethylcellulose. The product was applied directly to the lesion, once a day, in adult ostomy patients. The results showed that the group that used the powder had a

significantly shorter healing time compared to the control group ( $p=0.022$ ), in addition to reporting pain relief, a sensation of comfort, and skin protection with effective moisture absorption. These findings highlight the efficacy of the green banana-based herbal medicine as a viable and low-cost alternative for the treatment of peristomal dermatitis, demonstrating its wound-healing and anti-inflammatory potential (14).

The improvement of the functionality of the various compounds present in medicinal plants allows the development of herbal medicines, and although research affirms the scarcity of studies related to this theme, there are some consolidated herbal medicines on the market, among them, those whose formulation includes papain, a proteolytic enzyme used primarily for the treatment of lesions with the presence of devitalized tissue. In this regard, a study with a patient containing a DFU, with an extent of 24 cm<sup>2</sup>, granulation tissue in the wound bed, and macerated edges, using an herbal ointment applied once a day, over a period of 1 month and 3 days, composed of 10% papain and hyaluronic acid, its use provided chemical debridement, helped combat colonization due to antimicrobial properties, promoting the emergence of healthy tissue and stimulating healing (15).

The construction of the research highlighted that other studies addressing this theme reveal that medicinal plants and/or herbal medicines used for skin lesions demonstrate

efficiency in their healing potential, acting in the recovery of the individual's physiological and anatomical functions, in addition to presenting benefits related to ease of production and low cost (20).

Addressing the topic of medicinal plant use, broadly, from the perspective of improving human quality of life, brings up how the knowledge of the benefits of phytotherapy practices is intertwined with social knowledge. Some research addressing the theme of medicinal plant and herbal medicine use surveys different types of plants used in different regions by the population. Ethnobotanical resources hold great relevance in the treatment of various diseases and skin lesions, meeting the basic needs of a population as an alternative form of treatment to conventional methods (21).

From this analysis, such information and its uses must be perpetuated and are enhanced thanks to technical-scientific advances. The professionals responsible for providing care for skin lesions, and who are directly related to the function of performing dressings, are of utmost importance for the lesion to achieve good healing and for the patient to be cared for holistically (22).

## CONCLUSION

The use of medicinal plants and/or phytotherapeutic products in the treatment of skin lesions demonstrates a beneficial potential in the tissue repair mechanisms of individuals.

The research discussed not only recovers the age-old use of these methods, but also presents studies that demonstrate innovation in the area, their use in chronic lesions, and how they facilitate the process by accelerating the appearance of granulation tissue, due to their active ingredients that contribute to the appearance of healthy tissue. This work defines the importance of adopting phytotherapy for use in skin lesions, as a way to promote its use in current practices. The understanding of this complementary treatment by health professionals can result in several benefits, thus contributing to scientific advancement in the development of advanced methods for treating skin lesions in humans.

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