

A Review of Anti-Inflammatory Herbs for Wound Healing: Traditional Knowledge and Insights Applications

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ABSTRACT

Wound healing is a multifaceted biological process involving hemostasis, inflammation, proliferation, and tissue remodeling. The inflammatory phase, while essential for pathogen clearance and tissue repair, must be precisely regulated to prevent chronic inflammation and impaired healing. Medicinal herbs have long been used in traditional medicine for their wound-healing and anti-inflammatory properties. Many contain bioactive compounds such as flavonoids, alkaloids, saponins, and terpenoids that modulate key molecular pathways involved in inflammation and tissue regeneration. Notable herbs such as *Centella asiatica*, *Curcuma longa* (turmeric), *Aloe vera*, *Calendula officinalis*, and *Chamomilla recutita* have demonstrated efficacy in preclinical and clinical studies. Their mechanisms of action include inhibition of pro-inflammatory cytokines (e.g., $\text{TNF-}\alpha$, $\text{IL-1}\beta$), enhancement of collagen synthesis, promotion of angiogenesis, and antioxidant activity. This review summarizes current findings on the phytochemistry, pharmacological actions, and therapeutic potential of selected anti-inflammatory herbs in wound healing. Diseases can be treated with medicinal herbs. Numerous illnesses, including rheumatoid arthritis, immune-mediated disorders, diabetes, heart attacks and more, can be classified as inflammatory. Among the plants discussed in this review are fenugreek, chamomile, ginger, ashwagandha, and turmeric. Since herbal medicine and lifestyle changes are used to alleviate inflammation, it is not a one-dimensional solution. Since the treatment of inflammation is not a single configuration relief, in this review article we tried to introduce to approach multidimensional medicinal access to treat inflammation, with the help of anti-inflammatory plants and by Modification our life style by exercise and diet. Vascular tissues intricate biological reaction to damaging stimuli like infections, damaged cells, or irritants includes inflammation. Redness, swollen joints, joint pain, stiffness and loss of joint function are some of its symptoms. The chemical diversity of natural goods makes them a great source for the development of new medications. The pharmaceutical management of inflammation by substances that vitally balance the inflammatory cascade is the primary topic of this review. Nevertheless, there isn't a single agent that is specifically involved in wound healing that is sold in the healthcare industry. We will examine many agents or factors influencing inflammation in wound healing in this review.

Keywords: Inflammation, NSAIDs, Wound Healing, Medicinal herb, Rheumatoid arthritis, Diabetes, *Curcuma longa*, *Aloevera*

INTRODUCTION

Inflammation: Inflammation is a normal, protective response to tissue injury caused by physical trauma, noxious chemicals or microbiological agents¹ Living tissue's extreme reaction to any type of damage is inflammation. Pain, redness, heat or warmth, and swelling are the four main signs of inflammation. The arterioles in the surrounding tissue widen when any portion of the human body is injured. This results in increased blood flow to the region (redness)² In order to repair tissue damage, wound healing involves a

complex web of overlapping biological processes. Haemostasis, inflammation, tissue proliferation, and maturation are the main stages, and they involve a wide variety of cell types, some of which are local and others that are drawn in after an injury³ Herbal medicine is one of the most important medicines for treating all kinds of diseases. It is best therapy having least side effects and best Curative effects. In this review some plants which their anti-inflammatory effect has been thoroughly evaluated in many research articles and review articles which are of experimental based. *Curcuma long*, *Zingiber officinale*, *Rosa*

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Canina, cassia fistula, salvia officinale, Borago Officinale, Rosmarinus officinale, evening Primrose, Ribesnigrum, Oleaeuropea Herpagophytum, Elaeagnusangustifolia these are the plants which have strong anti-inflammatory activity and have been used for the of many inflammatory disorders such as in the treatment of rheumatoid arthritis, uveitis, Inflammatory bowel disease, ulcerative colitis, dermatitis, bronchitis, meningitis, sinusitis, periodontitis etc. In inflammatory process various mechanisms are involved⁴.

Symptoms:

- It is pain in muscles and joints.
- The person has fatigue.
- It was difficult to sleep.
- Depression and anxiety.
- There are Digestive problems.
- There are frequent infections.

Causes:

Typical causes include:

- Insufficient physical activity.
- Prolonged tension.
- Obesity is defined as having a BMI of 30 or higher, particularly if the additional weight includes visceral fat, which is found deep within the abdomen.
- Dysbiosis, or an imbalance between beneficial and detrimental microbes in your gut.
- Consistently consuming inflammatory foods, such as those high in trans-fat or salt
- Sleep and circadian rhythm disturbances.
- Toxin exposure, such as exposure to industrial chemicals, hazardous waste, and air pollution.
- Making use of tobacco products.
- Consistently consuming excessive amounts of alcohol.

Risk Factors of Inflammation:

- Obesity
- Autoimmune diseases
- Chronic stress
- Depression
- Sleep disorder
- Diet
- Smoking
- Environmental and industrial toxicants
- Age
- Infection
- Excessive alcohol
- Pharmaceutical drug
- Type 2 diabetes
- Physical activity [5].

Types of Inflammation

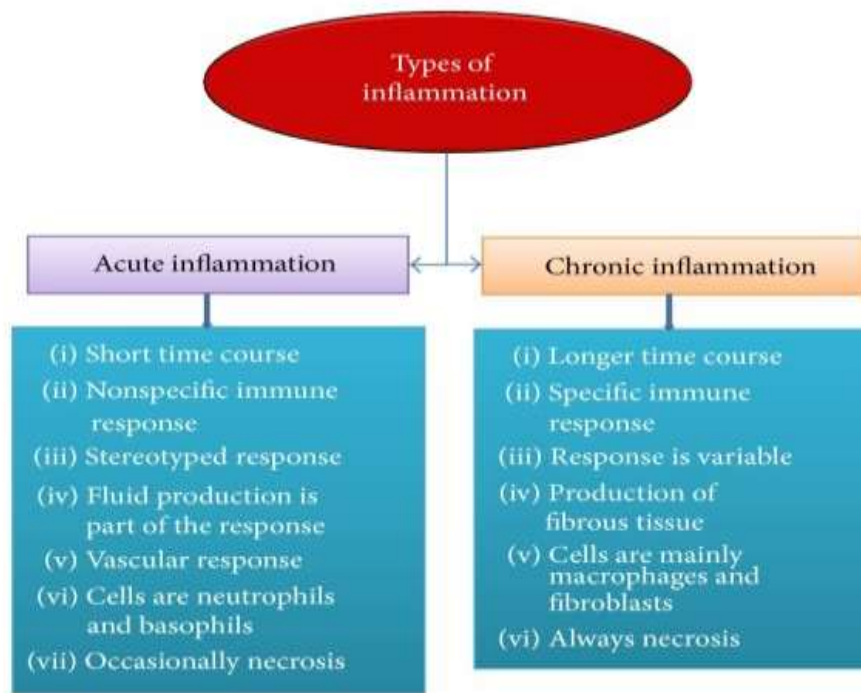


Fig. 1: Types of Inflammation

Would Healing:

Wound healing is an important but complicated process in Human or animal, containing a multifaceted process governed By sequential yet overlapping phases, including hemostasis/Inflammation phase, proliferation phase, and remodeling Phas^[6]. After an injury to skin, the exposed sub-endothelium, Collagen and tissue factor will activate platelet aggregation, which results in degranulation and releasing chemotactic Factors (chemokines) and growth factors (GFs) to form the Clot, and all above-mentioned procedures will achieve successful hemostasis⁷. Neutrophils, the first cells to appear at the Injury site, cleanse debris and bacteria to provide a good Environment for wound healing. In the following, macrophages accumulate and facilitate phagocytosis of bacteria and Damage tissue⁸. Acute and Chronic Wound Healing Acute wounds (such as traumatic and surgical wounds) pass through the normal wound healing stages, resulting in an expectable and organized tissue repair arrangement⁹. On the contrary, chronic wounds involve a disordered repair process and they can be mainly classified into vascular ulcers (such as venous and

arterial ulcers), diabetic ulcers and pressure ulcers¹⁰. Chronic wounds exhibit a persistent inflammation phase, resulting in microorganism recruitment, biofilm development¹¹ and the release of platelet-derived factors, such as transforming growth factor-beta (TGF- β), or Emergent molecules. The pro-inflammatory cytokine cascade, including interleukin-1 β (IL-1 β) and tumor necrosis factor α (TNF α), continues for a prolonged period, leading to important levels ofprotease in the wound bed. In chronic wounds, protease levels go above those of inhibitors, triggering ECM destruction, and boosting proliferative and inflammatory phases¹¹. Inflammatory cellscollected in the chronic wound bed rise to levels of reactive oxygen species (ROS), resulting in EC protein injuries and premature cellular senescence¹³ Chronic injuries are also characterized by phenotypic defects in the cells and dermis, such as reduced growth factor receptor density and mitogen potential, inhibiting resident cells from responding adequately to wound healing signals On thecontrary, proteases are tightly regulated by their inhibitors in acute injuries, avoiding ECM destruction and supporting the proliferation phase.¹⁴

Table 1: Anti-inflammatory agents

No.	Herb Name	Botanical name	Family	Chemical Constituents	Uses
1.	Turmeric	Curcuma longa	Zingiberaceae	Curcuminoids Curcumin Demthoxycurcumin	1. Anti-Inflammatory 2. Anti-inoxidant 3. Skin health 4. Neuroprotective
2.	Zinger	Zingiber officinalis	Zingiberaceae	Gingerol Shagol Zingiberene	Anti-microbial Cardiovascular Anti-inflammatory Anti-oxidant
3.	Liquorice	Glycyrrhiza Glabra	Fabaceae	Glycyrrhetic Acid Flavonoids	Anti-bacterial Anti-viral Anti-inflammatory
4.	Rosemary	Rosmarins officinalis	Lamiaceae	Triterpene Flavonoids Phenolic Compound	Anti-inflammatory Anti-oxidant Anti-microbial
5.	Gingseng	Panax Gingseng	Araliaceae	1. Triterpenoid 2. Vitamin 3. Mineral	1. Traditional medicine 2. Immune system support 1. Anti-inflammatory 2. Anti-oxidant
6.	Ashwagandha	Withania somnifera	Solanaceae	1. Flavonoids 2. Saponin 3. Glycoside 4. Steroids 5. Amino acids	1. Stress & anxiety reduction 2. Thyroid support 3. Anti-inflammatory
7.	Garlic	Allium Sativum	Amaryllidaceae	1. Allium 2. Allicin 3. Diallyl sulfides	1. Anti-microbial 2. Anti-inflammatory 3. Nutraceutical
8.	Peppermint	Mentha Piperita	Lamiaceae	1. Menthol 2. Menthone 3. Methyl acetate	1. Anti-microbial 2. Insect repellent 3. Pharmaceutical
9.	Aloevera	Aloe barbadensis	Liliaceae	1. Vit. A, B,C,B12 2. Folic acid 3. Anthroquinone 4. Saponin 5. Sterol 6. B-sitosterol	1. Would healing 2. Anti-inflammatory 3. Anti-oxidant 4. Anti-microbial 5. Digestive health
10.	Cinnamon	Cinnamomum Verim/Cassia	Lauraceae	1. Cinnamaldehyde 2. Cinnamic acid 3. Eugenol 4. Phenolic Compound	1. Food Preservation 2. Cosmetic 3. Modern medicine
11.	Boswellia	Boswellia Serrata	Burseraceae	1. Boswellia A. 2. Volatile oil	1. Anti-inflammatory 2. Pain-relief 3. Gastrointestinal health
12.	Holybasil / Tulsi	Ocimum Sanctum	Lamiaceae	1. Eugenol 2. Ursolic acid 3. Rosmarinic acid 4. Apigenin 5. Carvecrol	1. Anti-oxidant 2. Anti-inflammatory 3. Adaptogenic
13.	Clove	Syzgium gromaticum	Myrtaceae	1. Eugenol 2. B-caryophylline	1. Culinary (Spices) 2. Anti-inflammatory

				3. Terpene 4. Flavonoids	3. Anti-microbial 4. Anti-oxidant 5. Cosmetic
14.	Sage	Salvia officinalis	Lamiaceae	1. Essential oil 2. Phenolic diterpene 3. Flavonoids 4. Phenolic A.	1. Culinary (Spices) 2. Anti-inflammatory 3. Anti-oxidant 4. Anti-microbial 5. Anti-cancer
15.	Cardamom	Elettaria cardamom	Zingiberaceae	1. Essential oil 2. Flavonoids 3. Terpenoids 4. Caretonoids	1. Culinary 2. Fragrance 3. Respiratory disorder 4. Anti-inflammatory 5. Anti-bacterial
16.	Fenugreek/ methi	Trigonella foenum-gracum	Fabaceae	1. Caumarin 2. Isoleucine 3. Galactomanns 4. Trigonelline	1. Culinary 2. Cosmetic 3. Beverages 4. Anti-oxidant 5. Anti-cancer
17.	Calendula	Calendula officinalis	Asteraceae	1. Triterpenoid 2. Flavonoids 3. Caumarin 4. Quinones 5. Volatile oil 6. Caretonoids	1. Would healing 2. Anti-microbial 3. Anti-oxidant
18.	Cat's Claw	Uncaria Tomentos	Rubiaceae	1. Alkaloids 2. Glycoside 3. Organic Acid	1. Immune system support 2. Anti-inflammatory 3. Anti-oxidant

1) Turmeric (*Curcuma longa*):

Turmeric is a widely used Indian rhizomatous therapeutic plant. Turmeric has received a great deal of attention from both the culinary and medical industries. Turmeric is a rhizomatous herbaceous

plant (*Curcuma longa*) belonging to the ginger family (Zingiberaceae). The therapeutic advantages of turmeric are due to the presence of active phytoconstituents known as curcuminoids (curcumin, demethoxycurcumin (DMC) and bisdemethoxycurcumin (BDMC)).



Fig. 2: Turmeric

It displays range of biological functions, including; antibacterial, anticancer, antidiabetic, antivenom, anti-obesity, anti-inflammatory, antiviral, antioxidant, anti-asthmatic, antiarthritis and wound-healing effects in anxiety, depression, and other conditions.

• 2. Ginger (*Zingiber officinalis*):



Fig 3: Ginger

The pharmacological activity of *Zingiber officinale* includes antiviral, anticancer, antioxidant, and anti-inflammatory properties. It is also employed for loss of appetite. Additionally, Ginger is helpful for Digestive disorders and malabsorption disorders. According to both Ayurvedic and contemporary theories, ginger can also help revitalize the body during disease conditions by improving appetite, immunity, and re-boosting impaired physiological functions of the human body. The active phytoconstituents found in ginger, such as Zingerone, Zerumbone, 6-shogaol and 6-Gingerol, are responsible for enhancing enzyme actions and balancing circulation by regenerating the body with physical restrengthening. 19,20

3. Rosemary (*Rosmarinus officinalis*):

Salvia rosmarinus often known as rosemary, is a shrub with aromatic, evergreen, needle-like leaves and blooms that come in white, pink, purple, or blue. Rosemary, which is also known as *R. officinalis* L., is a widely used herb in Brazil. It belongs to the

The rhizome of *Zingiber officinale* is widely used around the world for medicinal purposes because of its ethno-medicinal and nutritional value. Because of its antioxidant and anti-inflammatory properties ^{15,16,17,18} turmeric has been commonly utilized as a medical herb. The Ayurveda literature emphasizes the use of ginger in the treatment of both infectious and non-infectious illnesses.

sage family, Lamiaceae ²¹. Because of its antioxidants, its leaves are employed as a natural preservative and to flavor food. Rosemary is a flexible herb with a wide range of applications, from traditional medicine to cuisine. It is employed in Brazilian traditional medicine to:

- Treat menstrual issues
- Reduce stress and anxiety
- Alleviate muscle spasms
- Treat respiratory problems, such as asthma
- Support heart health - Relieve coughs, colds, and flu
- Soothe digestive issues, such as stomach pain and bloating ²²

Rosemary leaves, which have a pine-like scent that enhances many cooked dishes, are used in Mediterranean cuisine, whether fresh or dried. The leaves can also be used to produce herbal tea²³. The woody stem, with its leaves removed, is occasionally used as a skewer in cooking. *Rosmarinus officinalis* is one of the most well-liked perennial herbs. Rosemary is its popular name²⁴.



Fig 4: Rosemary

Due to its anti-inflammatory properties, it has been used therapeutically in a number of nations. Additionally, it exhibits antibacterial, antidiabetic, and anti-ulcerogenic properties. Diterpenes, carsonic acid, and essential oil all have anti-inflammatory properties. The anti-inflammatory activity of *Rosmarinus officinalis* essential oil is mediated by blocking the intracellular adhesion molecule (ICM-1) at the transcriptional level 25. In the inflammatory

process, carnosic acid also plays an inhibitory role by suppressing the expression of cytokines. Rosemary diterpenes are highly effective at blocking the activation of glial cells, which are key inflammatory cells that release pro-inflammatory cytokines like tumor necrosis factor alpha, interleukin 1beta, and interleukin-6 26.

4. Licorice (*Glycyrrhiza Glabra*):



Fig 5: Liquorice

As seen in Figure 5, Mulethi is the name of the licorice found all over India. Yashtimadhu is another name for it in ayurvedic remedies. Since ancient times, liquorice root has been utilized as an adaptogenic plant because of its anti-inflammatory effects. Its coumarins and stilbenoids give it anti-inflammatory properties, and it is frequently used to treat gastrointestinal problems, coughs, and colds. 27Glycyrrhizin, a compound found in licorice root,

has anti-inflammatory, antibacterial, and antioxidant effects. Licorice extract has traditionally been consumed by adults at dosages of 100–990 mg orally every day for two to twenty-four weeks.

5. Gingseng (*Panax gingseng*):

The therapeutic benefits of ginseng were first recorded in Asia about 2,000 years ago. The

Chinese name for ginseng, which alludes to the root's "man-like" shape, was formerly believed to be beneficial for human health. With the help of Native Americans, Lafitau J.F. discovered the first American ginseng species in North America in 1761²⁹ The Russian botanist Carl A. Meyer gave ginseng the

botanical name *Panax* in 1843, which means "allhealing" in Greek³⁰. The two main classes of the well-known ginseng, according to the cultivation distribution, are Asian ginseng (*Panax ginseng* C.A. Meyer) and American ginseng (*Panax quinquefolius*)³¹.



Fig 6: Ginseng

They display a variety of antibacterial, antiviral, antifungal, antioxidant, and anti-inflammatory characteristics. Furthermore, they have demonstrated potential in the treatment of stress, high blood pressure, and several neurological disorders, such as Alzheimer's, Parkinson's, and Huntington's disease.

6. Ashwagandha (*Withania somnifera*):

This known to help lower cortisol levels in the body and counteract its negative effects^{32,33} Ashwagandha (*Withania somnifera*): Ashwagandha has been shown

to help reduce cortisol in the body and fight the negative effects. Ashwagandha lowers inflammation, which helps to balance blood sugar, calm anxiety, calm the adrenal glands, and strengthen the immune system. Research suggests that the herb may help prevent skin inflammation. Ashwagandha is a common ingredient in sleep aids and is well-known for its ability to alleviate stress and anxiety. Withaferin A is in charge of preventing pro-inflammatory and oxidative substances. Adults have most frequently taken up to 1000 mg of ashwagandha daily for up to 12 weeks³⁴



Fig 7: Ashwagandha

7. Garlic (*Allium Sativum*)



Fig 8: Garlic

Poor Man's Treacle is another name for garlic (*Allium Sativum*), which is a member of the Liliaceae family. Garlic is a traditionally cultivated plant that has been used in folklore medicine and in everyday life for centuries for food preparation. Garlic is an herb that has long been used for culinary flavor enhancement and therapeutic purposes. One of the therapeutic herbs that has anti-cancer properties is garlic. Its effects have been demonstrated in numerous studies on carcinomas as well as on the cardiovascular and immune systems. To determine which component of garlic has a positive impact, the role of each one was examined. Garlic contains a number of active phytoconstituents, including volatile oil with sulfur-containing compounds like ajoene, alliin, and allicin, as well as enzymes like peroxidase, myrosinase, and allinase, in addition to other substances like vgeraniol,

α -phellandrene, β -phellandrene, linalool, and citral. In addition to minerals like calcium, magnesium, germanium, copper, iron, potassium, selenium, zinc, and vitamins A, B1, and C^{35,36} it also has at least 33 sulfur compounds. Garlic has a very strong flavor and scent. Garlic has an extremely strong flavor and aroma. For centuries, it has been used as a traditional remedy by many individuals to treat a wide range of ailments. Studies have demonstrated that garlic's anti-inflammatory effects can alleviate the symptoms of arthritis. One of the advantages of the Spice is that it gives food flavor ³⁷ Diallyl disulfide, an anti-inflammatory ingredient found in garlic, inhibits the effects of pro-inflammatory cytokines. The dosage of garlic powder varied between 300 and 2,400 mg daily for two to twenty-four weeks³⁸

8. peppermint (*Mentha Piperita*):



Fig 9: peppermint

Aloe vera is widely recognized for its antioxidant, anti-inflammatory, antidiabetic, sunburn relief, immune boost, anti-ageing, and anticancer

capabilities (Langmead et al., 2004). Because of its distinctive makeup, aloe vera has found use in a number of commercial sectors. Aloe vera is used in

several applications as aloe vera juice, concentrate, and powder. Due to its reliable therapeutic qualities, aloe vera has grown in significance as a result of aloe

vera investigations, and it has been used to make pharmaceutical items like ointments, tablets, and capsules (Eshun and He, 2004; He et al., 2005).



Fig 10: Aloevera

Aloe vera gel is widely used in the cosmetic industry, where it has established itself as a key selling component, and it has been discovered that a variety of its constituents are effective against a number of illnesses. It serves as a base ingredient in a variety of preparations, such as moisturizers and suntan lotions, which are used as humectants in skin treatments (Iwu, 2014). Due to its beneficial moisturizing and relaxing properties in goods like shampoos, soaps, cleansers, and moisturizing lotions, aloe vera gel and powder have several additional uses in the cosmetics business. Aloe vera possesses anti-ulcer, anti-inflammatory, anti-cancer, anti-diabetic, antioxidant, wound healing, and laxative qualities [40].

10. Cinnamon (Cinnamomum Zeylanicum):

Many members of the Lauraceae family, to which cinnamomum (cinnamon) belongs, are used as spices. The two major varieties of cinnamon are Ceylon or true cinnamon (*Cinnamomum zeylanicum* Blume), which is cultivated in Sri Lanka and Southern India, and cassia (*Cinnamomum aromaticum* Ness), which is grown in China, Indonesia and Vietnam. When dried, cassia turns into a tubular form known as a quill or cinnamon stick. ^{41,42} Since antiquity, Egyptians and Chinese have utilized cinnamon in traditional medicine and food preparation. In addition to its potent antioxidant, antibacterial, antipyretic and anti-inflammatory effects, which are essential for tissue healing, this spice has been discovered to have these properties.



Fig 11: Cinnamon

The bark of cinnamon has been used in traditional oriental herbal medicine as a spice, to make tea, and as an herbal treatment for coughs, cardiovascular illnesses, and persistent gynecological and gastrointestinal problems. Cinnamon has also been used to treat sore throats, coughs, indigestion,

abdominal cramps, intestinal spasms, nausea, flatulence, and diarrhea. Furthermore, it has been discovered that cinnamon has antifungal qualities and slows down food spoilage⁴³

11. Boswellia (Boswellia Serrata):



Fig 12: Boswellia

Trees in the genus *Boswellia* are prized for their aromatic resin. It grows in arid highland region of the middle east North Africa, & India. Within the *Boswellia* genus, *Boswellia Serrata* is a medium to large sized branching tree. (*Boswellia serrata*): *Boswellia*, sometimes known as Indian Frankincense (*Boswellia serrata*), is an herbal extract obtained from the resin of the *Boswellia* tree. Its usage in conventional Ayurvedic medicine is well-documented, particularly for its anti-inflammatory effects. The earliest written mention of *boswellia* as a medicine may be found in the papyrus Ebers, which dates to about 1500 BC. Ayurvedic medicine employs several components of the *boswellia* tree to treat ailments such as asthma, rheumatism, dysentery, skin disorders, ulcers, blood purification, and more. It was

also used as a perfume and in religious rituals. The term “Indian frankincense” refers to *boswellia* oil.

12. Holybasil/Tulsi (Ocimum Sanctum):

The most well-known species of the genus is *Ocimum sanctum* Linn (Os), also known as *Ocimum teniflorum* L. (Lamiaceae), which is grown worldwide for its importance in medicine, perfumery, religion, ceremonies, food, and essential oils. In Ayurveda and Siddha, as well as in the Greek, Roman, and Unani systems of medicine, the therapeutic potential of Os has been thoroughly documented for its ability to treat skin conditions, the common cold, headaches, coughs, malarial fever, diarrhea, constipation, and snake bites.



Fig 13: Holybasil

This plant's significance in industry, medicine, and cooking prompted research into its pharmacological and chemical characteristics. Here, we present a thorough analysis of scientific research on the chemical components of *O. sanctum* and their associated anti-inflammatory, anti-cancer, antioxidant, anti-stress, γ -irradiation protection, antidiabetic, and antileishmanicidal properties.⁴³

13. Clove (*syzygium aromaticum*):

The fragrant dried flower buds of the tree *Syzygium aromaticum* are known as cloves. The Myrtaceae family includes the subfamily Myrtoideae, tribe Syzygieae, and genus *Syzygium*. It is classified in the order Myrtales, which belongs to the superorder Rosids, under Eudicots of Dicotyledonae. The kingdom Plantae includes the division of Magnoliophyta, which includes the angiospermic plant clove. The tree is mostly found in Indonesia, India, Madagascar, Zanzibar, Pakistan, and Sri Lanka.



Fig 14: Clove

Clove has a wide range of health benefits, including antibacterial, anti-inflammatory, and antioxidant properties. They can help digestion, strengthen the immune system, and encourage oral hygiene.

Furthermore, cloves may have positive effects on respiratory health, help regulate blood sugar levels, and perhaps promote liver and bone health⁴⁴

14. Sage (*salvia officinalis*):



Fig 15: Sage

In ancient Latin, sage is referred to as a medicinal herb (*Salvare* means "cure, save"). The Mediterranean, Europe, and North America are among the regions where this member of the Lamiaceae family is cultivated around the globe. Sage, which hails from the Mediterranean region, is cultivated in Turkey at sea view and on calcareous hills and islands. Extracts

from *Salvia officinalis* have diverse pharmacological effects due to their antioxidant, anti-inflammatory, and antimutagenic properties. Sage has anti-inflammatory, estrogenic, and sedative properties and is also said to aid with the treatment of Alzheimer's disease (Mohammad, 2011). Sage might be beneficial for relieving chronic stress, muscular discomfort, or

mental strain. Sage has been a significant culinary and medicinal herb since antiquity. Instead of synthetic antioxidants, sage can be used as a natural antioxidant in the food and pharmaceutical sector. Sage can be used as a flavor in food, to extend its shelf life, and to preserve materials like food and seeds. Sage is employed as an antibacterial and antifungal agent.

Sage is essential to the production of honey. Sage can be used to combat pests, such as insects. The essential oil and essence of sage can be used in the cosmetic and pharmaceutical industries.

15. Cardamom (*Elettaria Cardamom*):



Fig 16: Cardamom

It may be purchased either as whole pods or in the ground state. It may be purchased as Cardamom powder alone or as a component of the Indian spice known as garam masala when in its ground form.⁴⁵ Besides its culinary uses, cardamom also aids in healthy digestion, breath freshening, blood pressure and diabetes management, tooth decay prevention,

bacterial infection inflammation reduction, cancer prevention, anxiety relief, liver disease treatment, respiratory dynamics maintenance, and weight loss promotion⁴⁶

16. Fenugreek/methi (*Trigonella foenum – granum*)



Fig 17: Methi

Methi often known as fenugreek, is one of the oldest traditional medicinal plants belonging to the fabaceae family. One of the greatest anti-inflammatory herbs, fenugreek has a lot of health benefits. It has been demonstrated that fenugreek can alleviate stomach inflammation and improve inflammatory diseases such as bronchitis, persistent coughs, and metabolic

disorders. Fenugreek tea is available and may be used on the skin and hair. Fenugreek seed has flavonoids, saponin, and alkaloids, all of which have antioxidant and anti-inflammatory properties. Adults have frequently used fenugreek seed powder orally in doses of 5–10 grams daily for up to three years ⁴⁷

17. Calendula (*calendula officinalis*)



Fig 18: Calendula

Calendula is one of the greatest anti-inflammatory herbs available. The linoleic acid content of calendula is what gives it its anti-inflammatory properties, and this acid has been demonstrated to be effective in treating ailments such as dermatitis, ulcers, sore throat, and diaper rash. It's also utilized to treat infections and improve oral health. The anti-inflammatory properties of calendula blooms are attributed to acid esters. In a chronic anti-inflammatory model using formalin, 250 and 500 mg/kg body weight were administered. Calendula officinalis is thought to have originated in the southwest Mediterranean area and belongs to the Asteraceae family's calendula genus, which has 15 species. It can grow to a height of 70 cm and is either

annual or perennial with a woody base. Calendula has a long history as a therapeutic plant, and the species is gynomonoecious and capable of both insect and self-pollination. Its medicinal use can be traced back to the 12th century, and the Egyptians, Greeks, Hindus, and Arabs all grew it. Its name comes from the Latin word *calends*, which means the first day of the month, because it blooms for a long period of time. Calendula is recognized by the European Medicines Agency (EMA) as a traditional herbal medicinal product for the symptomatic treatment of minor inflammations of the mouth or throat, as well as minor inflammations of the skin, such as sunburn, and as an aid in healing minor wounds. 48

18. Cat's Claw (*Uncaria Tomentos*):



Fig 19: Cat's claw

Cat's claw (*Uncaria Tomentos* & *Uncaria guianensis*) is a tropical vine mostly found in the Amazon rainforest, where it has been used by indigenous communities as a traditional medicine for a variety of illnesses. It is now also available as a dietary supplement. Cat's claw is a potent herb from the

Amazon that also has anti-inflammatory properties. Cat's claw is currently available in Capsule and liquid extract, and it is well recognized for its capacity to alleviate inflammatory digestive disorders. It can be used to alleviate pain in muscles and joints [48]. Cat's claw Sterols, tannins, and other plant compounds

included in this product help to lessen inflammation and combat infections. Depending on the preparation, the typical dosages range from 30 to 300 mg of extract taken once day. Cat's claw is a vine that thrives in the Peruvian Amazon and has been used for generations to cure inflammation in traditional medicine. The two most common species of cat's claw are Uncaria

tomentosa and Uncaria guianensis, which are used interchangeably for their anti-inflammatory benefits in traditional South American medicine⁴⁹

• Marketed products Contain Anti-inflammatory Herbs:

Sr. No.	Marketed formulation	Company name
1	Turmeric •Turmeric Capsule/Tablet • Turmeric Gummies • Turmeric powder • Turmeric Tea & Golden Milk • Turmeric Infused Drinks • Face mask & cream • Turmeric Soap & Serum	1. Baidyanath 2.Himalayan organics 1.Himalaya wellness 1.Ramdev 2.Vasant masala 3.Tata sampann 1.Neel beverages pvt.ltd. 1.Xotic frujs pvt.ltd 1.Jishin Herbal,rajkot 1.HCP wellness
2.	Zinger: •Herbal tea zinger • Zinger Capsules hematinic • Cough syrup • Transdermal Patches	1.Surajmukhi 2.Pranasutranature 1.Dahila pharmaceutical 2.Appolo pharmacy 1.Swadeshi ayurved 1.Sparsh pharma international pvt ltd
3.	Rosemary: • Rosemary Capsule/Tablet • Liquid extract • Skin cream	1.Healthhey Nutrition 2.Health4all 1.Kemin industries 2.Vedareen Herbals 1.Adhunik ayurved 2.xiemann Rosemary biotechnology co.ltd.
4.	• Dabur mulethi churna • Himalaya Koflet Lozenges • Charak kofot syrup	1.Dabur india ltd. 1.Himalaya wellness 1.Himalaya wellness 2.Apollo Pharmacy
5.	Ginseng: •Triple ginseng root • Korean ginseng • Ginseng Mother Tincture	1.GNC Herbal plus 1.Health veda organic pvt. Ltd. 1.Willman Schwalbe india pvt ltd
6.	Ashwagandha: • Ashwagandha Stress relief • Ashwagandha KSM-66 • Ashwagandha root capsule	1.Himalaya 2.General wellness 1.Rasayanam 1.Organic india A TATA product
7.	Garlic: • Fresh garlic in carton • Fresh garlic khakra • White garlic bulb	1.OMAS enterprises 1.Maharaja Traders 1.Trading
8.	Peppermint: • Peppermint extract • Peppermint hydrosol • Peppermint organic pepar-flakes	1.kshipra biotech.pvt.ltd 1.Paras Perfumes 1.Aum agri freeze foods
9.	Aloevera: • Aloevera Gold vera gel • Aloe vera Cold cream • Aloe Vera Tablet	1.shridi mirra impex 1.Ayur 1.Baidyanath

10.	Cinnamon: • Cinnamon Capsule • Cinnamon Tablet	1.Organic india A TATA product 1.Shriji herbal product
11.	Boswellia: • Boswellia extract • Boswellia Tablet • Boswellia Supplement	1.United laboratories 1.Himalaya 1.Humming Herbs
12.	Holybasil: • Holybasil Powder • Tulsi Fertilizer • Tulsi elixir	1.Bixa botanical 1.evana organic fertilizer 1.Veda
13.	Clove: • Clove oil • Neem+Clove toothpaste • Clove Tablet •Clove extract	1.Herbins 1.KUDOS 1.CARLYLE 1.Nutricost
14.	Sage: • Sage extract • Sage leaf • Sage leaf • Menoforce Sage Tablet	1.Swanson 1.Etanics 1.Live well 1.A. Vogel
15.	Cardamom: • Cardamom Drops • Cardamom Agrohhomeopathy medicine • Cardamom Capsule	1.TYMON 1.Homfert truly organic ltd. 1.DR. WARDE's
16.	Fenugreek: • Fenugreek extract • Methi powder • Methi lactation support	1.ZAZZEE 1.Indus valley 1.Healthfarw
17.	Calendula: • Calendula ointment • Calendula Capsule • Calendula Flower	1.Multimedicos 1.Vinny Herbal 1.Horbaach
18.	Cat's Claw: • Liquid extract Cat's claw tablet • Capsule	1.Horbaach 1.Biotrex 1.Vinny Herbal

CONCLUSION:

Herbal medicine continues to play a significant role in modern wound care due to its rich history, accessibility, and proven therapeutic potential. Numerous plant-derived compounds possess potent wound healing and anti-inflammatory properties, often acting through mechanisms such as promoting collagen synthesis, modulating cytokine production, enhancing angiogenesis, and reducing oxidative stress. Herbs like *Aloe vera*, *Centella asiatica*, *Curcuma longa* (turmeric), *Calendula officinalis*, and *Chamomilla recutita* have demonstrated efficacy in both traditional and clinical contexts. While existing

evidence supports their therapeutic use, standardization of herbal extracts, detailed mechanistic studies, and rigorous clinical trials remain necessary to ensure safety, consistency, and efficacy. Integrating herbal therapies with conventional treatments could offer synergistic benefits, paving the way for more holistic and patient-friendly approaches to wound management and inflammation control. In alternative medicine, traditional herbal medicines are significant. Ginger possesses anti-inflammatory, antiviral, and antioxidant properties. A common ayurvedic medicinal herb, garlic has been utilized as a culinary flavor enhancer and treatment. Coriander was used to

treat gastrointestinal disorders in ancient medicine. Numerous biological effects, including anti-inflammatory, antiviral, antioxidant, anti-cancer, antibacterial, anti-arthritic, and anti-diabetic properties, are demonstrated by turmeric. The volatile and nonvolatile chemicals in fennel have spasmolytic, carminative, and stimulating properties. As a home treatment, cardamom can treat a number of conditions, including headaches, nausea, and indigestion. Clove is a stimulant, carminative, flavoring agent, antiseptic, and antibacterial. It is also utilized as an anodyne and an antiemetic. Clove oil is used by dentists as an oral anesthetic and to disinfect root canals. In summary, the knowledge on medicinal herbs will serve to generate interest in this medicinal species by defining new pharmacological and clinical applications, and it might be useful in the future for creating new medication formulations.

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