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Pot Marigold Herbal Soap on Antiacne

Gauri Vijay Darekar[1], Prajkta Annasaheb Kate[2]

[1]Research Scholar, Department of Pharmaceutics, Dr. Babasaheb Ambedkar Technological University, Pune, Maharashtra, India – 411039.
Corresponding Author Email: *darekargauri28[at]gmail.com*

[2]Assistant Professor, Department of Pharmaceutical Chemistry, Dr. Babasaheb Ambedkar Technological University, Pune, Maharashtra, India – 414502.
https://orcid.org/0000-0001-5737-288X

Abstract: ***Pot Marigold belongs to the Asteraceae family. It is a fragrant herb that has been used in traditional medicine for many years. Researchers study Calendula because it has many health benefits and different ways of working in the body is This plant is rich in carotenoids, flavonoids, glycosides, steroids, sterols, quinones, essential oils, and amino acids. Calendula oil is still used today as a medicine to help fight tumors and to heal wounds. In this review, we looked at research from the last five years about the medical uses of Calendula officinalis (CO). We explained its many uses in traditional medicine, how it works at the molecular level, and findings from recent clinical studies. Overall, this review aims to summarize what is known, point out what is still missing, and give researchers ideas to test traditional claims. The goal is to help develop the safe and effective use of Calendula in treating different health problems. Calendula can also increase important immune chemicals in the body like IL-1 beta, IL-6, TNF-alpha, IFN-gamma, and C-reactive protein, which help in fighting infections and healing. Because of these benefits, Calendula may play an important role in future cancer treatments. Right now, it is mainly used to reduce the side effects of radiotherapy. the plant's appearance, growth, active chemical compounds, and its effects in lab and animal studies. It shows that Calendula has strong potential to be used as a natural medicine in the future.***

Keywords: Herbal soap, Antimicrobial, Anti-inflammatory

1. Introduction

Calendula officinalis is a well-known medicinal herb that has been used for thousands of years. It belongs to the plant kingdom and the Asteraceae family. It is also called English marigold, pot marigold, Bride of the Sun, bull flower, and butterwort. Calendula grows easily in sunny places and different types of soil. It is a tall plant with upright stems, long narrow leaves, and yellow or orange flowers. The plant contains many active compounds such as carotenoids, flavonoids, saponins, sterols, phenolic acids, lipids, and amino acids found in its leaves and flowers. These parts are used in both lab (in-vitro) and animal/human (in-vivo) studies. Calendula is believed to have anti-inflammatory, pain-relieving, sweat-inducing, and germ-fighting properties. Traditionally, it has been used to treat stomach problems, women's health issues, mouth diseases, eye conditions, skin injuries, and burns. Its flowers are often made into extracts, tinctures, and balms for external use, especially to treat skin inflammations, open wounds, cuts, and bleeding injuries. The use of traditional medicine began in Ancient Greece. According to Greek beliefs, the gods gave people the knowledge of healing. Theophrastus (372–286 BC), a student of Aristotle, was one of the first to create a scientific system for studying plants. Even though people in the past didn't fully understand the chemical makeup of plants, they discovered many health benefits from using them. The same plant components that were helpful in ancient times are still important in traditional medicine today. This knowledge of healing with plants was passed down through generations and spread further during colonial times and with better communication. Nowadays, traditional medicine is becoming more popular, especially for people who prefer self-treatment. Calendula officinalis (CO) is a self-seeding annual plant that grows about 12–18 inches tall and thrives in warm, humid climates. Its flowers are about 5–7 cm wide and sit on top of the stem. Each flower head has several narrow green sepals covered with tiny hairs on both sides, and bright yellow-orange florets in the center. When dried into a powder, CO is yellowish-brown, has a distinct aromatic smell, and a slightly bitter taste. Under a microscope, it shows special features like stomata, parts of the petals, hair-like structures (trichomes), thick plant cells, pieces of ovary walls with brown pigment, pollen grains, stigma fragments, and fibrous tissues.CO is commonly found in Central Europe and the Mediterranean region, and also grows in some Middle Eastern countries such as Cyprus, Turkey, and Iran is The traditional usage and clinical significance of Calendula species are highlighted in this review paper. It is aimed to attract attention of natural product researchers from around the world to the enormous potential and diverse biological activities in treatment aspects. Furthermore, the authors emphasis its key function in both general and oral treatment.

2. Chemical Constituents

Calendula officinalis (CO) contains many important chemical compounds that give it medicinal properties. These include terpenoids, flavonoids, triterpene esters, steroids, phenolic compounds, carotenes, essential oils, quinones, fatty acids, minerals, saponins, carbohydrates, sterols, and vitamin E (tocopherols). In different parts of the plant, scientists have found compounds like ubiquinone, tocopherol, phylloquinone, and proto-quinone (types of quinones). From the flowers, terpenoids have been extracted using petroleum ether. Other substances present are paraffins, calanid, and calendula. These natural chemicals make Calendula very valuable in traditional medicine. Carotenoids and triterpene alcohols (in both free and combined forms) are also present. Pigments made from carotenoids and polyunsaturated fatty acids (like calendric acid) have shown strong anti-inflammatory effects in both lab and animal studies. Additionally, compounds called triterpene Olig glycosides and Calenda saponins (A, B, C, and D) have been found to

help with protecting the stomach, slowing down gastric emptying, and lowering blood sugar levels. Saponins, triterpene esters, and flavonoids were found in the chemical make-up of the Calendula officinalis plant. Calendula officinalis has high carotenoids in its blossom, which is mostly orange in color. Fatty acids, chloroform extracts, triterpenes, and sterols are all present in Calendula officinalis leaf extract. Calendula officinalis water extract contained saponins, phenolic compounds, and tannin [1]. Alkaloids, flavonoids, and saponin were found in ethanolic extract. Flavonoids and saponins were found in aqueous extract. Plastoquinone, phylloquinone, tocopherol, and ubiquinone were isolated from quinone in different sections of Calendula officinalis. Terpenoids were isolated from the petroleum ether extract of Calendula officinalis flowers in general, roughly 5% of amino acids were found in the leaves, 3.5 percent in the stems, and 4.5 percent in the flowers.

Main components	Sub-components
Calenduladiol-3-O-palmitate	
Calenduladiol-3-O-myristate	
Oleanolic acid saponins	Calenduloside AH
Oleanane triterpene glycoside	Calendula-glycoside A
Calendula-glycoside A6'-O-n-methyl ester	
Calendula-glycoside A6'-O-n-butyl ester	
Calendula glycoside B	
Calendula glycoside B 6'-O-n-butyl ester	
Calendula glycoside C	
Calendula-glycoside C 6'-O-n-butyl ester	
Calenduloside F6'-O-n-butyl ester	
Calenduloside G6'-O-n-methyl ester	
3-monoesters of taraxasterol	
Erythrodiol	
Lupeol	
Brein	
Ursadiol	
Faradiol-3-O-palmitate	
Faradiol- 3-O-myristate	
Faradiol-3-O-laurate	
Arnidiol-3-O-palmitate	
Arnidiol-3-O-myristate	
Arnidiol-3-O-laurate	
Glucosides of oleanolic acid I, II, III, VI, VII	
Glucuronides F, D, D2, C, B and A	
Ester of olanane.	

[Table/Fig-1]: Constituents of *Calendula officinalis* flower extract [5].

Anti Inflammatory Benefits of Calendula Ance Soap

1) Active Compounds

The flavonoids and triterpenoids in calendula help block histamine and other inflammatory agents, easing skin irritation. Saponins and carotenoids also aid in skin repair and defense.

2) Skin-Soothing Action

It helps calm redness, swelling, and irritation linked to eczema, acne, dermatitis, or minor rashes. It is also soothing after shaving, waxing, or sun exposure.

3) Supports Healing & Renewal

Calendula boosts collagen production, which promotes faster wound healing while minimizing inflammation.

4) Mild Cleansing

This soap cleanses gently without removing natural oils, preventing dryness and irritation unlike strong chemical soaps.

5) Protective Effect

It leaves a light protective layer on the skin, shielding it from allergens and environmental stress, lowering the risk of flare-ups.

Formulation of Calendula Acne Soaps

1) Ingredients

Base Oils / Fats (for soap-making):

- Olive oil – 30–40% (gentle, moisturizing)
- Coconut oil – 20–30% (lather, cleansing)
- Palm oil / Shea butter – 15–25% (hardness, creaminess)
- Lye Solution (NaOH + Distilled Water) – for saponification

Calendula Extract / Infusion:

Calendula petals infused in olive oil or sunflower oil. Alternatively, calendula tincture or essential oil (few drops)

Additives (optional):

- Glycerine (for extra moisturizing)
- Aloe vera gel (soothing)
- Honey (humectant, antibacterial)
- Essential oils (lavender, tea tree, or chamomile for fragrance and added skin benefits)

2) Method of Preparation (Cold Process Soap)

a) Oil Infusion:

Dry calendula petals and infuse them in a carrier oil (like olive oil) for 2–3 weeks, or heat gently for quick infusion.

b) Prepare Lye Solution:

Slowly add sodium hydroxide (NaOH) to distilled water (never the reverse) with stirring, allow it to cool.

c) Mix Oils and Lye:

- Heat oils until melted, let cool to ~35–40°C.
- Add lye solution to oils and blend with a stick blender until "trace" (pudding-like consistency).

d) Add Calendula & Additives:

Stir in calendula-infused oil, extracts, petals, and any fragrance or essential oils.

e) Molding & Curing:

- Pour mixture into molds, cover, and allow to harden for 24–48 hours.
- Remove from mold, cut into bars, and cure for 4–6 weeks in a dry, ventilated area.

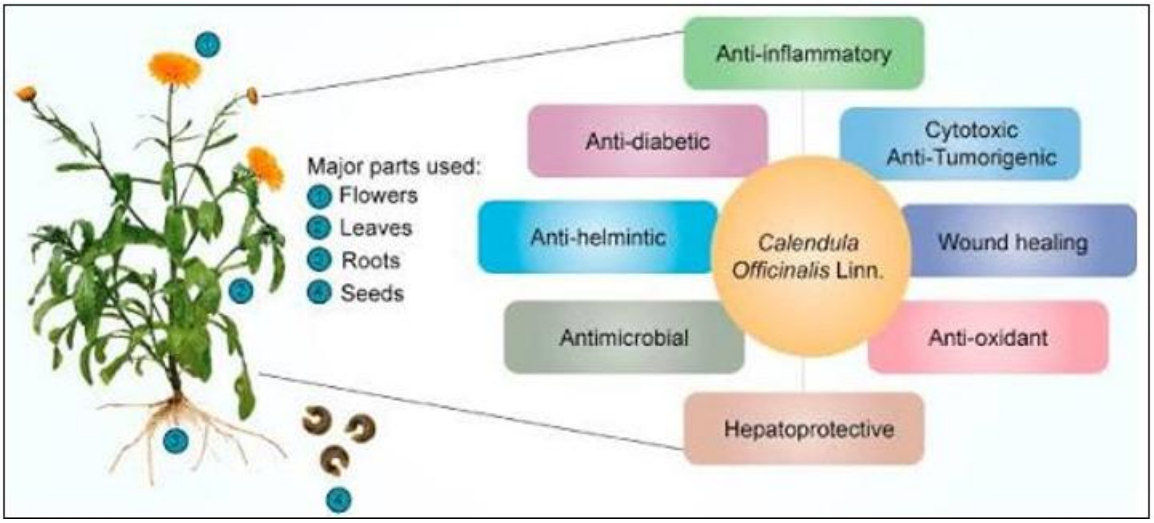
Role in Calandula Soaps

- Provides anti-inflammatory, antimicrobial, and healing benefits.
- Soothes irritated, sensitive, or inflamed skin.
- Adds a natural yellowish tint and mild fragrance.

Pharmacological Effects

1) Antimicrobial and Anthelmintic Effects:

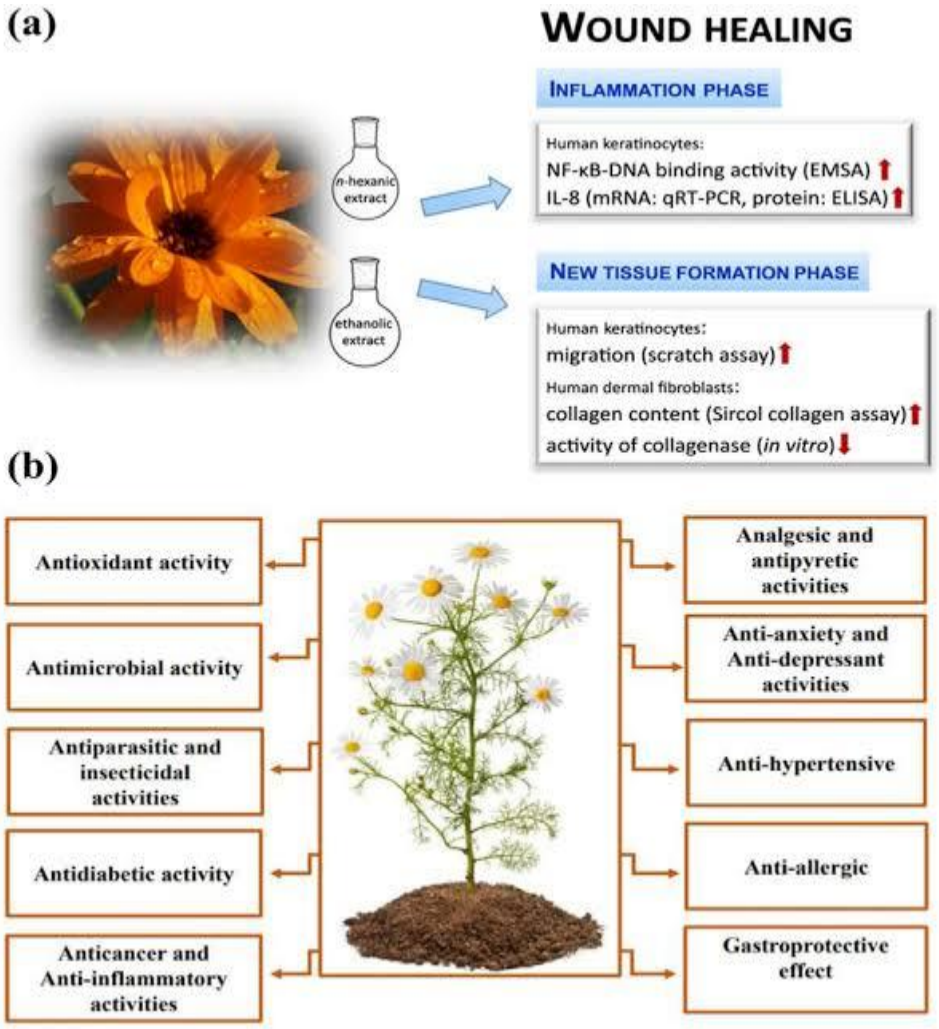
Methyl alcohol (CH3 OH) and ethyl alcohol (C2 H6 O) extracts of common marigold petals show antimicrobial activity in case clinical pathogens including bacteria (Bacillus subtilis and Staphylococcus aureus) and fungi (Candida glabrata, and Candida albicans). Mouthwashes containing common marigold reduce the number of microbes adhered to the molars and premolars. Organic extracts of Calendula officinalis found sensitive against HIV-1 reverse transcriptase.



2) Wound and Burn Healing:

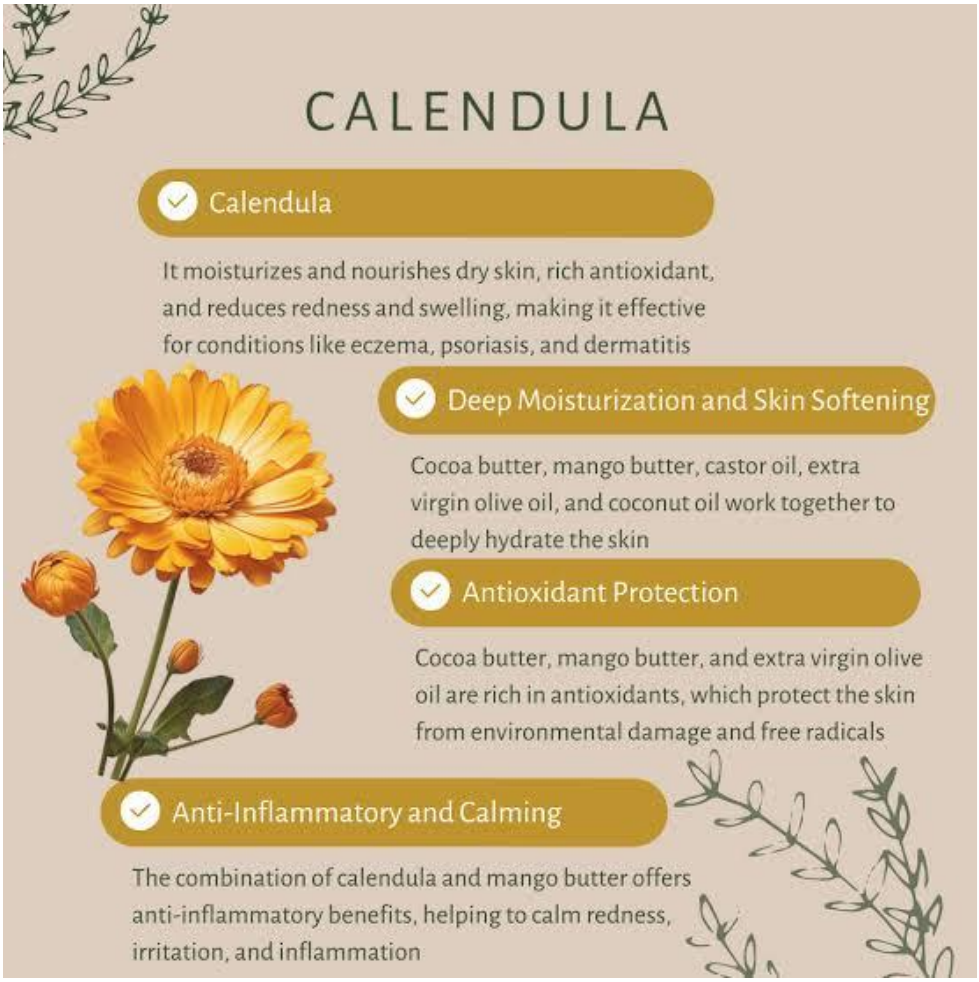
The temporal and oral application of flower extract of Calendula officinalis shows wound and burn healing effects. Increment in hexosamine and collagen hydroxyproline indicates the wound healing with the treated person or animal care the photo-protective effect of the topical formulations containing marigold extract (ME) (common marigold extract) is shown on ultraviolet (UV-B) irradiation-induced skin damage. For the topical delivery of marigold extract, gel formulation is best. This formulation is during a position to

require care of glutathione reduced levels, but it doesn't affect the gelatinase and myeloperoxidase activities which increase by exposure to UVB irradiation. Additionally, gel formulation reduces the histological skin changes induced by UVB irradiations.

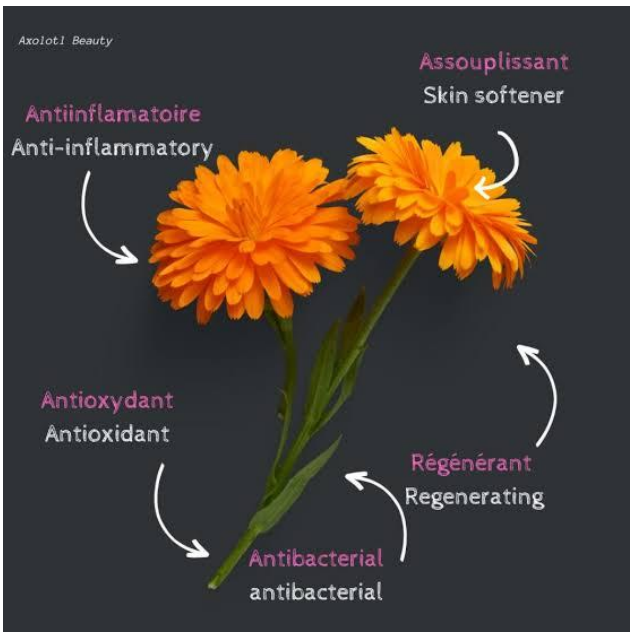


3) Anti-inflammatory and Palliative Effect:

Calendula officinalis flower extract possesses significant anti-inflammatory activity against carrageenan and dextran induced acute paw edema. The hydroalcoholic extracts of plant of common marigold suppress the cell free systems activities if lipoxygenase (5-LO) and cyclooxygenase-2 (COX-2), the key enzymes within the formation of proinflammatory eicosanoids from arachidonic acid. Nine Oleane-type triterpene Glycosides isolated from common marigolds show O-tetradecanoylphorbol-13-acetate (TPA) induced inflammation.



4) Antioxidant Effect:
Calendula extract is found to scavenge radicals of superoxide generated by Fenton reaction and forbid lipid peroxidation. Superoxide generation in macrophages is inhibited by oral administration of Calendula extract. The extract produces a big escalation in glutathione levels in blood and liver. The enzyme, glutathione reductase was increased, however declination in peroxidase is found after administration of calendula extract.



5) Cardiovascular Effect:
Calendula officinalis might be cardio protective in case of ischemic heart condition. Two groups of hearts were used: the treated rat hearts were perfused with common marigold solution at 50mM in KHB buffer (in Mm common salt 118mM, potassium chloride 4.7mM, salt 1.7mM, bicarbonate of soda 25mM, potassium biphosphate 0.36mM, sulfate 1.2mM, and glucose10mM) for 15 min before subjecting the guts to ischemia, when the control group was perfused with the buffer only. Calendula achieved cardio protection by stimulating left ventricular developed pressure and aortic flow as by reducing myocardial infarct size and cardiomyocytes apoptosis. Cardiac protection appears to be achieved by reforming ischemia reperfusion mediated death signals into a survival signal by modulating antioxidant and anti-inflammatory pathways.

6) Effects on Oral Health:
Flowers extracted from Calendula officinalis are used in mouthwashes such as in oral gel, showing effects on radiation induced oropharyngeal mucositis (OM) in patients head and neck cancer. Chemotherapy induced in oral mucositis evaluated the therapeutic effect of common marigold gel.

7) Toxicology:
Calendula preparations on rare contact with skin may cause an allergy to the herb as during a study the extract was found to cause allergy in 9 patients out of 443(2.03%) when assessed by patch testing method .Hence, it is recommended that the persons who have a longtime allergy to the Asteraceae (daisy) family should use it with caution and Sensitization to

Calendula and allergic contact reactions are observed. Infusion of Calendula after gargling shows anaphylaxis is incidents.

3. Future Perspectives

For many centuries, Calendula officinalis (CO) has been used by humans for a wide range of therapeutic purposes. The herb contains numerous bioactive compounds, including terpenoids, steroids, phenolic compounds, carotenes, triterpenoids, essential oils, quinones, fatty acids, minerals, saponins, carbohydrates, and tocopherols, with α-cardinal (a sesquiterpenoid) being one of the major components. Owing to these secondary metabolites, CO has demonstrated various pharmacological activities such as anti-inflammatory, antidiabetic, antioxidant, anticancer, antibacterial, anti-ulcer, antifungal, antiviral, antithrombogenic, neuroprotective, antiprotozoal, skin-protective, and antifatigue properties. Given its diverse applications, it is essential that future research explores the non-floral parts of the plant, such as seeds, roots, leaves, and stems. There is also a pressing need to study the genus chemistry in greater detail. Due to limited available literature, other species of CO—such as C. arvensis, C. tripterocarpa, C. stellata, and C. suffruticose—should be further investigated to better understand their biochemical profiles and pharmacological activities. In addition, more comparative studies are required to assess variations in bioactivity based on factors such as the age of the plant, methods of extraction, and processing techniques. With the advancement of extraction technologies, it is anticipated that new phytochemicals will be discovered, potentially expanding the pharmacological potential of CO and opening up exciting new research opportunities. Another promising direction lies in the development of novel drug delivery systems using CO. Research in this field is still in its early stages, but it is expected to progress rapidly. Techniques such as molecular docking and molecular dynamics hold significant potential for identifying novel therapeutic candidates. Likewise, modern bioinformatics approaches are helping to identify critical amino acids under similar physiological conditions, which supports and validates computational findings. This approach not only enhances the efficiency of drug discovery but also reduces cost and time. Looking ahead, CO-based micro- and nano-formulations present excellent prospects for the treatment of a wide range of diseases. Furthermore, combining CO with other therapeutic agents may enhance its pharmacological activity, offering a promising strategy for improved health outcomes.

Thepeutic Application of Calendula Offinalis (CO)

Antidiabetic Activity:
In albino Wistar rats, administration of CO extract at 200 mg/kg/day significantly reduced glucose and insulin levels in a dose-dependent manner compared to the control group ($p < 0.05$) Another study on diabetic Wistar rats showed that CO normalized enzyme levels such as creatine kinase (CK-MB and total CK), amylase, and lipase, thereby helping to reduce the harmful effects of diabetes.

Polycystic Ovary Syndrome (PCOS):
In Sprague–Dawley rats, CO administered alongside subcutaneous DHEA injections successfully induced PCOS within 21 days (about 3 weeks), establishing a model for further studies.

Wound Healing:
In excision wound models using Swiss albino mice, CO leaf extract significantly accelerated wound closure and reduced epithelization time.

Similarly, in Wistar rats, application of 10% CO gel improved wound contraction and promoted faster healing.

Another study found that CO flower extract incorporated into hydrogel sheets enhanced wound recovery, with lesion healing ranging between 7.69% and 87.01%.

Anti-Aging and Photoprotection:
In albino rats, pre-treatment with vesicular cream formulations containing GEO/CEO-encapsulated CO extracts reversed harmful biochemical changes and protected the skin against UVB-induced damage.

Antifungal Effect:
Studies in Swiss albino rats showed that CO essential oils, either alone or in combination, significantly reduced the risk of fungal infections caused by chemotherapy with cyclophosphamide.

4. Conclusion

Calendula officinalis is widely incorporated into herbal formulations used in clinical practice for the treatment of numerous health conditions. Although only a few species of Calendula have been partially studied for their phytoconstituents, findings from ethnopharmacological, phytochemical, and pharmacological research, combined with its low toxicity and long history of use, highlight its strong therapeutic potential. This plant is available in multiple forms—such as gels, creams, ointments, mouth rinses, and systemic infusions—and shows promise for further investigation. With deeper research, C. officinalis could serve as a source of active compounds for new drug synthesis,

disease prevention, and management of different pathologies. The present review discussed its botanical features, traditional uses, pharmacological actions, and study outcomes with various preparations and applications. Importantly, the evidence emphasizes its potential role in both medical and dental care. Given its proven efficacy and safety, Calendula officinalis represents a valuable candidate for developing novel therapeutic agents to address a wide range of human diseases. From ancient times to the modern era, Calendula officinalis (CO) species have been recognized for their remarkable health benefits. This review has explored and summarized the current state of knowledge on CO within the health sciences, offering insights into its underlying molecular mechanisms. Furthermore, various CO-based drug delivery systems and patents have been developed to enhance solubility, targeting, and stability, and the active constituents of the plant have been discussed in this context .Overall, this work is intended to serve as a valuable resource for researchers, agronomists, and small-scale herbal industries, helping them consolidate existing knowledge on CO and unlock its full pharmacological, agricultural, and industrial potential as a medicinal plant.

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