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Dentistry

ROLE OF BOTANICAL EXTRACTS IN HEALING OF ORAL MUCOSA : A REVIEW ARTICLE

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ABSTRACT There are numerous causes of oral mucosal lesions, such as bacterial or viral infections, systemic illnesses, local trauma or irritation, and even excessive alcohol and cigarette use. In the treatment of oral mucosal diseases, traditional knowledge about phytochemicals and medicinal plants has drawn particular interest from the scientific community. Therefore, the aim of this review is to give a quick overview of the traditional knowledge about using plants to cure lesions of the oral mucosa.

KEYWORDS : oral mucosal lesions; plant extracts; phytochemicals; Medicinal Plants, Medicinal Herbs, Oral Cavity, Herbal Extract, Oral Tissues, The Treatment of Oral Diseases ,botanical extract

INTRODUCTION

Since ancient times, people have utilized herbs and plants to treat a wide range of illnesses. Their therapeutic and medical value in preventing and treating many pathologies has been shown. Herbs have been prized for their ability to cure and relieve pain since the beginning of time. Similarly, over 75% of our medications still rely on the therapeutic qualities of plants[1].

Any aberrant alteration in the surface of the oral mucosa that manifests as pigmented, ulcerative, red and white characteristics, swelling, or variations of developmental defects is referred to as an oral mucosal lesion (OML) . Multiple conditions can lead to oral mucosal lesions, such as infections (bacteria, viruses, parasites, fungi), physical or thermal trauma, immune system deficits, neoplasia, systemic disease, aging, and chronic habits (such as alcohol, tobacco usage, and betel nut consumption)[2] . The World Health Organization (WHO) ranked OML as one of the major global public health issues in 2003 . Indeed, it has been proposed that the patient's overall health may be reflected in their mouth mucosa[3].

Dental surgeons and stomatologists are qualified professionals to utilize medicinal plants for oral hygiene, treatment, or prevention.

This article is a compilation of research on medications that has been composed and obtained from various meditional plant extract including sage leaf (Salvia officinalis L.), chamomile capitulum (Matricaria recutita L.), arnica herb (Arnica spp.), calamus rhizome (Acorus calamus L.), peppermint herb (Mentha piperita L.), thyme herb (Thymus spp.), Hypericum perforatum, oak bark (Quercus spp),aloe vera (Aloe barbadensis miller) , myrrh (Commiphora abyssinica), tulsi (Ocimum sanctum Linn) , turmeric (Curcuma longa Linn) etc.

CLASSIFICATION[4]

Phytotherapeutic Effects proposes that

1. Antimicrobial: Azadirachta indica, Salvadora percica, and **MATRICARIA CHAMOMILE.**
2. Anti-inflammatory: Propolis, Guaco, Plumeria acuminate, Kalanchoe Brasiliensis
3. Sedatives and anxiolytics: Passiflora incarnale, Piper meythsticum, Melissa officinalis
4. Miscellaneous: medicaments, endodontic retreatment, endodontic irrigants

B. According to its Dental Applications

1. Endodontics – irrigants, intracanal medicaments, retreatment agents, pulp capping agents
2. Dental traumatology
3. Herb based dental materials – zinc oxide eugenol cement , impression material, gutta percha
4. Oral mucosal lesion
5. Surgical uses – haemostatic agents
6. Periodontal uses- Mouthwashes, dentrifices

Synopsis derived from the evaluation of the literature on medicinal plants investigated for their effects on the oral mucosa

Study	Medicinal Plant	Properties	Effect	Author/Year
Comparative assessment of the therapeutic effects of the topical and systemic forms of *Hypericum perforatum* extract on induced oral mucositis in golden hamsters	Hypericum perforatum	Antiinflammatory Antibacterial	Relief in oral mucositis and promote healing of chemotherapy inducuded oral mucositis	Tanideh et al5 / 2014
The effect of extract of *Punica granatum* var. pleniflora for treatment of minor recurrent aphthous stomatitis	*Punica granatum* var. pleniflora	Antioxident	Therapeutic effect on recurrent apthous stomatitis and decrease the entire	S.Gavanji et al[6] / 2014

			time of complete treatment	
Clinical efficacy of new aloe vera- and myrrh-based oral mucoadhesive gels in the management of minor recurrent aphthous stomatitis: a randomized, double-blind, vehicle-controlled study Study	Aloe vera Myrrh Medicinal plant	Analgesic Properties	Aloe vera Complete ulcer healing Subside erythema and exudation Myrrh Absence of pain at day 6 in apthous stomatitis Effect	Mansour G, Ouda S, Shaker A, Abdallah HM.[7] /201 4 Author/ Year
High-Level Antimicrobial Efficacy of Representative Mediterranean Natural Plant Extracts against Oral Microorganisms	*Olea europaea*, Mastic gum, *Inula viscosa*	Antimicrobial activity	Active against oral pathogens, especially Gram-negative anaerobic bacteria, and could therefore be considered as alternative natural anti-infectious agents which could be used against periodontitis.	Karygianni L, Cecere M, Skaltsounis AL, et al[8]. /2014
Clinical evaluation of the role of tulsi and turmeric in the management of oral submucous fibrosis: A pilot, prospective observational study	Tulsi (*Ocimum sanctum Linn*) Turmeric (*Curcuma longa Linn*)	Tulsi Enhance immunity and metabolic functions Antiinflammtory Turmeric Antioxidant Anti-mutagenic Anti inflammatory Increase blood circulation	Safe and efficacious remedy for the treatment of all grades of OSMF in all age groups with no limitation	Srivastava A, Agarwal R, Chaturvedi TP, Chandra A, Singh OP.[9] /2015
Study	Medicinal Plant	Properties	Effect	Author/Year
Clinical Effectiveness of Aloe Vera in the Management of Oral Mucosal Diseases- A Systematic Review	Aloe Vera	antibacterial, antifungal, anti-inflammatory, antioxidant, antitumor, hypoglycaemic properties and immune boosting	Therapeutic uses in the management of oral lesions such as oral lichen planus, oral submucous fibrosis, radiation induced mucositis, burning mouth syndrome, xerostomia, recurrent apthous ulcers.	Nair GR, Naidu GS, Jain S, Nagi R, Makkad RS, Jha A[10]/ 2016
Evaluation of the efficacy of a polyherbal mouthwash containing *Zingiber officinale*, *Rosmarinus officinalis* and *Calendula officinalis* extracts in patients with gingivitis: A randomized double-blind placebo-controlled trial	Zingiber officinale, Rosmarinus officinalis Calendula officinalis	Antibacterial Antibacterial Antioxidant Improve wound healing and bleeding gums Antiinflammatory Prevent gingival bleeding	Effective in treatment of gingivitis	S Mahyari et al[11] /2016
Holistic Healing Through Herbs: Effectiveness of Aloe Vera on Post Extraction Socket Healing	Aloe vera	Economical, effective, powerful nutritional supplement,Antiinflammatory and antioxidant that protects and promotes wound healing.	Promote healing of extraction socket	Nimma VL et al[12]/2017
Study	Medicinal Plant	Properties	Effect	Author/Year
Antimicrobial Effects of Mastic Extract Against Oral and Periodontal Pathogens	Mastic Extract	Antimicrobial	Inhibition of periodontal pathogen, beneficial effect on cell viability	Koychev S et al [13]/2017
Thymus essential oil extraction, characterization and incorporation in phospholipid vesicles for the antioxidant/antibacterial treatment of oral cavity diseases	*Thymus* capitatus essential oil	Antibacterial, Antioxidant	Inhibitory effect against cariogenic bacteria	M Manconi et al [14]/2018
Wound Healing Effect of Essential Oil Extracted from Eugenia dysenterica DC (Myrtaceae) Leaves	Eugenia dysenterica DC (Myrtaceae) Leaves	Antiinflammatory	Promote cell regeneration during wound healing	SM Mazutti da Silva el al [15]/ 2018

Plant-Derived Bioactives in Oral Mucosal Lesions: A Key Emphasis to Curcumin, Lycopene, Chamomile,Aloe vera, Green Tea and Coffee Properties	Aloe vera	Antiulcer Antiseptic Antioxidant Anti inflammatory	Wound healing effect	B Salehi el al2 / 2019
	Centella asiatica	Antioxidant activity Collagen synthesis Angiogenesis promotion	Wound healing and promote connective tissue growth	
	Curcuma longa	Antioxidant Anti inflammatory Antibacterial	Wound healing effect	
	Emblica officinalis	Antioxidant Astringent	Effective in apthous stomatitis And other type of mouth ulcers	
	Tinospora cordifolia	Antioxidant Anti inflammatory Immunomodulary	Reduce mucositis severity in radiotherapy patients	
	Jasminum grandiflorum	Antioxidant properties	Treatment of ulcerative stomatitis and oral wounds	
	Chamomile	Antimicrobial effects Antiplatelet activity Anti-inflammatory activity Antimutagenic hypolipidemic effects	Effective for treating or preventing mouth ulcers triggered by chemo or radiotherapy	
	Green Tea and Coffee	Antioxidant Anti-inflammatory effects	Treatment of oral mucous lesion	
Evaluation of the In Vitro Oral Wound Healing Effects of Pomegranate (*Punica granatum*) Rind Extract and Punicalagin, in Combination with Zn (II)	Punica granatum	Antimicrobial Antioxidant Anti-inflammatory effects	Promote oral healing in periodontal disease or traumaand gingival wound healing effect	V Celiksoy el al 16/ 2020
The Japanese herbal medicine Hangeshashinto enhances oral keratinocyte migration to facilitate healing of chemotherapy-induced oral ulcerative mucositis	hangeshashinto (HST) ameliorates	HST decreased interleukin 1β-induced prostaglandin E2 production in human oral keratinocytes	Healing of chemotherapy induced oral ulcerative mucositis	K Miyano et al17 / 2020
Effectiveness of composed herbal extract in the treatment of gingivitis and oral and pharyngeal mucosa – review of studies	chamomile capitulum (Matricaria recutita L.)	Antioxidant Antibacterial Antiparasitic Antifungal Antiviral Anti-inflammatory	inhibits neoplastic angiogenesis	Schönknecht K et al[18] /2021
	oak bark (Quercus spp.)	Strong astringent Bactericidal Anti-inflammatory properties	influence on capillaries, they minimize vascular permeability and microbleeding	

	sage leaf (Salvia officinalis L.)	Disinfectant Bactericidal Fungicidal (mostly against Candida) Antiviral Anti-inflammatory Astringent Tanning properties		
	arnica herb (Arnica spp.)	anti-inflammatory effects due to its sesquiterpene lactone	inhibit cyclooxygenase activity, reduces swelling, promotes granulation and improves local blood circulation	
	calamus rhizome (Acorus calamus L.)	Antibacterial Antifungal effect		
	peppermint herb (Mentha piperita L.)	antifungal but also antiviral, antioxidant, anti-inflammatory and immunomodulatory properties		
	thyme herb (Thymus spp	Antibacterial, Antifungal,strong antiseptic	Local anaesthetic effect on mucosa and reduce congestion	
Anti-Inflammatory Activity and Wound Healing Effect of *Kaempferia galanga* L. Rhizome on the Chemical-Induced Oral Mucosal Ulcer in Wistar Rats	*Kaempferieoa galanga* L. Rhizome	Antiinflammatory Promote wound healing	Effective recovery of chemical induced oral mucocal ulcer	Wahyuni IS et al[19]/2022
Anti – inflammatory and wound healing effect of copaiba oleoresin on the oral cavity: A systemic review	Copaiba oleoresin	Healing Antiinflammatory properties Antioxidative Bone formation stimulant Cytotoxic Gastroprotective Nociceptive Antimicrobial Antileishmanial Antiedema Antifungal Antiseptic	Wound healing effect Help in bone formation	dos Santos Menezes AC et al [20]/2022
Flaxseed (*Linum usitatissimum*), Chamomile (*Matricariae flos*) and Marshmallow (*Althaea officinalis*) Mouth Rinses in the Therapy of Oral Mucosa Diseases – A Review	Flaxseed (*Linum usitatissimum*) Chamomile (*Matricariae flos*) Marshmallow (*Althaea officinalis*)	Antioxidant Antiinflammatory Antiinflammator Antibacterial Antispasmodic Angiogenesis Wound healing Anti-inflammatory Immunomodulating effect	Burning mouth syndrome, Xerostomia, Sjörgen's syndrome , oral lichen planus, leukoplakia, tonsillitis and during radiotherapy in oncological treatment of head and neck	Kręgielczak A et al [21]/2023
Evaluation of clinical, histology, TNF-α, and collagen expressions on oral ulcer in rats after treatment with areca nut and chrysanthemum oral gel	Areca nut and chrysanthemum oral gel	Ulcer size reduction Reepithelization over the ulcer base Formulation of granulation tissue around the ulceration	wound healing activities	Meutia Sari L et al [22]/2023
Evaluation of caffeic acid mucoadhesive tablets on minor recurrent aphthous stomatitis: a randomized, double-blind, placebo-controlled clinical trial	Caffeic acid mucoadhesive tablets	Antioxidant Antibacterial Carcinogenic inhibitor Anti-inflammatory	Reducing aphthous lesions' diameter and pain intensity	Salehi M et al[23]/2024
Effect of Chewing Gum Containing *Glycyrrhiza glabra*, Honey, and Vitamin E on Oral Health	Honey, *Glycyrrhiza glabra*, and vitamin E	Antibacterial Anti-inflammatory Antioxidant properties	reduction was related to gingival inflammation	Ahmadi Motamayel F et al [24]/2024

DISCUSSION

There are many different oral mucosal diseases, each with its own set of systemic and local causes. These conditions are usually accompanied with erosions, bullae, vesicles, erythema, or red and white areas on the oral mucosa, as well as pain. Pain is frequently treated with phytochemicals and can be a sign of the main illness process, secondary to an associated process (e.g., infection), or due to oral mucosa injury (e.g., chewing food, mouth motions, thermal, chemical)[25]. It's not new to believe that plants can heal. Since ancient times, people have utilized herbs as a traditional form of medicine. It has been demonstrated that the natural products obtained from medicinal plants are a plentiful supply of physiologically active molecules, many of which have served as the foundation for the creation of novel compounds for the pharmaceutical industry. Phytodentistry refers to the direct or indirect use of plants and plant-derived products in the treatment of illness. When treating stomatological issues, phytotherapy is quite important. India, aptly dubbed the world's botanical garden, is the world's largest producer of medicinal herbs. There is a lot of potential for a more "Natural and Green Dental Practice" when this easily accessible, safe, and natural resource is used in dentistry[26]. Plant-based materials have long been utilized in dentistry, ranging from impression materials to eugenol, which is a necessary component of the dental office. The application of herbs in dentistry extends beyond the field of material sciences. Many different effects, including anti-inflammatory, antibacterial, and antifungal activities, can be attributed to a single herb. Therefore, using these herbs in dentistry will prove to be a beneficial addition to dental care[27].

Tanideh et al [5](2014) investigated the oral and topical administration of H. perforatum in the treatment of oral mucositis in golden hamsters. With the use of H. perforatum, they saw a decrease in oral mucosal damage and inflammatory response; the oral extract worked better than the topical gel. The results of this study indicate that oral administration or gel application of H. perforatum extract can alleviate the oral mucositis that 5-FU caused in the hamsters' cheek pouch mucosa on a regular basis. S. Gavanji et al[6] found that P. granatum var. pleniflora flowers have higher levels of phenolics, which leads to stronger antioxidant activity, in their investigation on the effectiveness of extract of P. granatum var. pleniflora for the treatment of mild recurrent aphthous stomatitis. Patients reported significant improvement in their level of satisfaction with the treatment, and the duration of treatment was shortened by the water and alcoholic extracts of P. granatum var. pleniflora. A study was undertaken by Mansour G, Ouda S, Shaker A, and Abdallah HM[7] to assess the clinical effectiveness of new oral mucoadhesive gels based on aloe vera and myrrh in the treatment of mild recurring aphthous stomatitis. Whereas 76.7% of patients treated with myrrh reported nearly no pain on day six, 86.7% and 80% of patients using aloe gel demonstrated complete healing of their ulcers, and 76.6% of patients using myrrh gel showed subsidence of erythema and exudation, respectively, especially at the day 6 visit. None of the three gels caused any negative side effects during use. They came to the conclusion that newly developed gels with an aloe and myrrh basis worked well for topical MiRAS control. Myrrh produced more pain relief, while aloe was better at reducing ulcer size, erythema, and exudation. Karygianni L, Cecere M, Skaltsounis AL, et al[8]. carried out research to evaluate the antimicrobial activity of typical natural plant extracts from the Mediterranean Ten microorganisms and a single strain of Candida albicans were tested against five different extracts derived from mastic gum, Inula viscosa, and Olea europaea.This study demonstrated that the studied O. europaea extracts were particularly efficient against anaerobic, Gram- negative periodontal pathogens such Fusobacterium nucleatum, Prevotella intermedia, and Porphyromonas gingivalis. Moreover, the extract from table olives exhibited a comparatively lower level of antistaphylococcal activity, indicating a possible influence on Gram-positive bacteria. Mastic gum is a resinous secretion generated from the stem of Pistacia lentiscus var. chia, a Mediterranean tree. All of the mastic gum extracts under study showed high susceptibility to P. gingivalis, P. intermedia, F. nucleatum, and P. micra.In this study, *I. viscosa* was highly effective against not only Gram-negative anaerobic pathogens, but also streptococci (*S. mutans*, *S. oralis*). Although its advantageous effects in the oral cavity were demonstrated here for the first time, there are many reports appraising its general antibacterial, antifungal, and antiviral properties.

Srivastava A, Agarwal R, Chaturvedi TP, Chandra A, Singh OP[9]. conducted a study to assess the therapeutic effectiveness of herbal remedies for treating oral submucous fibrosis (OSMF), containing 1 gram of tulsi and 1 gram of turmeric combined in a glycerine basis. The study's findings demonstrated that these two herbs work in concert to produce a more effective and potent anti-OSMF treatment. Clinically and statistically, treatment with these medications results in an early, prolonged, and considerable reduction in burning sensation, sometimes within a month. There was also a noticeable improvement in mouth opening. Nair GR, Naidu GS, Jain S, Nagi R, Makkad RS, Jha A[10]. Compile research with supporting data showing how well aloe vera works to treat a range of oral conditions. In light of this research Of the fifteen studies, five focused on patients with oral lichen planus, two on patients with oral submucous fibrosis, and four on minor recurrent apthous stomatitis. Other studies included patients with radiation-induced mucositis, burning mouth syndrome, candida-associated denture stomatitis, xerostomic patients, and other conditions. The majority of research produced statistically significant results proving aloe vera's efficacy in treating oral illnesses. Mahyari S. et al[11] conducted a study to assess the effectiveness of a polyherbal mouthwash in patients with gingivitis that contained extracts from Zingiber officinale, Rosmarinus officinalis, and Calendula officinalis. They came to the conclusion that Polyherbal mouthwash, which contained 5% hydroalcoholic extracts of Z. officinale, R. officinalis, and C. officinalis, was just as efficient as chlorhexidine mouthwash in treating gingivitis. Nimma VL et al [12]carried out a study to determine whether aloe vera is beneficial for mending sockets damaged after extraction. They come to the conclusion that aloe vera has a special quality that has been demonstrated to be associated with better healing than other groups without any negative side effects. Aloe vera is a cheap, potent, antioxidant- rich dietary supplement that shields and speeds up the healing of wounds.

Koychev S et al[13] undertook an investigation in which the antimicrobial qualities of mastic extract against commensal and pathogenic oral bacteria, as well as its potential cytotoxic effect on cells originating from the epithelium and mesenchymal niche, were assessed and contrasted with those of H2O2 and CHX, two common antimicrobial agents. They came to the conclusion that mastic extract could be used as an alternate antibacterial agent in the treatment of periodontal disease due to its inhibition of periodontal pathogens and positive effects on cell viability when compared to H2O2. T. capitatus essential oil was discovered to be integrated into liposomes, glycerosomes, and PG-PEVs by M. Manconi et al[14]. The vesicles—PG-PEVs in particular—displayed favorable physical-chemical characteristics, strong stability during storage, ideal antioxidant and regenerative activity in vitro, and an inhibitory effect on the most significant cariogenic bacteria. They conclude that these formulations might be used as antibacterial-antioxidant mouthwash for the treatment of oral cavity diseases. SM Mazutti da Silva el al[15] demonstrated that the essential oil extracted from E. dysenterica leaves contains extremely active phytochemicals that contain sesquiterpenes. These phytochemicals may have a significant function in both the toxicological assessment of oEd and human health as a powerful natural wound healing agent. Furthermore, it provides protection against inflammation by inhibiting the overproduction of intracellular nitric oxide. Punicalagin and PRE were found by V Celiksoy et al[16]. to have strong antioxidant properties, and punicalagin in combination with Zn (II) increased human gingival fibroblast migration and wound repopulation responses without stimulating fibroblast proliferation. Consequently, as a natural compound-based therapy, pure punicalagin combined with zinc (II) may have advantages in promoting oral cavity wound healing mechanisms. K Miyano et al[17] evaluated, through both in vitro and in vivo investigations, the impact of HST on wound healing. First, they used human oral keratinocytes (HOKs) to analyze the effects of HST on scratch-induced wound healing. They then screened the seven constituents and their major components to determine which active medicinal herbs were present in HST and which of them significantly promoted scratch- induced wound healing in a time- and dose-dependent manner. Second, they assessed the pharmacokinetics of these active compounds in rat plasma as well as the impact of various inhibitors, including those that block intracellular signaling molecules, on HST-mediated scratch-induced wound healing in order to uncover the actions of these active ingredients via the blood. They proposed that HST primarily promoted HOK migration, which improved scratch-induced wound healing.

Schönknecht K et al[18] demonstrate the great utility of preparations that contain an ethanolic extract that has been composed from the following sources: thyme herb (Thymus spp.), calamus rhizome (Acorus calamus L.), age leaf (Salvia officinalis L.), chamomile capitulum (Matricaria recutita L.), oak bark (Quercus spp.), peppermint herb (Mentha piperita L.), calamus rhizome (Acorus

calamus L.), and chamomile capitulum (Matricaria recutita L.). Wahyuni IS et al[19] found that, based on the percentage recovery of the ulcer area, the percentage recovery of the inflammation sign score, and the histopathology score, the ethanol extract of K. galanga L. rhizome has confirmed its anti-inflammatory activity by speeding the healing process on the chemical-induced oral mucosal ulcer. dos Santos Menezes AC et al[20] revealed the early reduction of the wound area, increased development of juvenile bone in the rats' mandibles, and wound-healing effects. The early formation of collagen fibrils, with greater quantity, thickness, and better organization, and more expressive anti-inflammatory activity, as well as a reduction in the intensity of edema and the concentration of CD68 + macrophages, were reported to have anti-inflammatory effects, along with a reduced acute inflammatory reaction and a more advanced tissue repair stage.

Kręgielczak A et al[21] conclude that patients with a variety of mucous membrane issues may find that oral mouth rinses containing flaxseed, chamomile, and marshmallow work well.The ability of human saliva to moisten and lubricate the structures of the oral cavity is currently unattainable; therefore, herbal rinses with antibacterial, antiviral, antifungal, and wound- healing properties provide a viable substitute. These rinses are readily available, affordable, and natural, and they have all the required qualities. Above all, they include a wealth of healthy elements like dietary fiber, proteins, and unsaturated fatty acids that are essential for human nutrition. Meutia Sari L et al[22] presents the activity of the chrysanthemum and areca nut combination's therapeutic effect. By utilizing TNF-α and collagen, this oral gel might enhance the healing of ulcer wounds, yielding comparable outcomes to topical steroid therapy. Salehi M et al[23] stated that When caffeic acid-containing mucoadhesive tablets were compared to a placebo, the results showed that the caffeine significantly reduced the diameter of the patients' aphthous lesions and the intensity of their pain. Additionally, the caffeine- containing tablets were recommended for palliative oral aphthous lesions treatment because they significantly reduced inflammation and provided analgesia for recurrent aphthous stomatitis. Ahmadi-Motamayel F et al[24] concluded Oral health is improved by chewing gum that contains G glabra, honey, and vitamin E. Following the intervention, salivary bacterial counts drop in every group.

CONCLUSION

This review provides information on the traditional usage of phytochemicals, matching extracts, and medicinal plants to treat OML. The effectiveness of plant-derived bioactive molecules—which are frequently employed in traditional Chinese, Ayurvedic, Indian, and Persian medicine—in the treatment of OML has been evaluated in a number of papers. The effectiveness of various herbal formulations has been well studied because of their traditional applications[25]. Numerous reasons can lead to oral mucosal lesions, and plant-based remedies can intervene through a variety of modes of action, including anti-inflammatory, antioxidant, analgesic, antifungal, antiseptic, and anticarcinogenic properties[26]. For malignant or possibly malignant oral disorders, the in vitro and in vivo effectiveness of specific herbal treatments and phytochemicals, such as curcumin, lycopene, chamomile, and Aloe vera, has been extensively documented. In this way, the review discussed here serves as a foundation for the development of novel, safe, and effective natural anti-oral mucosal lesion medications that hold tremendous potential for the treatment of OML[27]. Therefore, more effective clinical trials are needed for additional validation, and more work is needed to identify the active components of medicinal plants in the treatment of OML.

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