RESEARCH PAPER

From Tradition to Evidence: Sesame in the Management of Oral Ailments – A Scoping Review

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ABSTRACT

Background: Sesame, often referred to as the "Queen of oilseed crops," is recognized for its anti-inflammatory, antioxidant, and antimicrobial properties.

Objective: This review aimed to evaluate the role of sesame in the management of oral diseases.

Methods: A literature search was conducted across PubMed, Cochrane, Google Scholar, and through hand searching, utilizing MeSH terms. A total of 129 records were identified, and only 13 articles that met the inclusion criteria were included for review.

Results: Sesame was reported to be beneficial in the management of various oral conditions, including dentinal hypersensitivity, gingivitis, periodontal problems, aphthous ulcers, oral mucositis, and oral submucous fibrosis. In most of the included studies, sesame was applied in the form of oil pulling. The outcomes demonstrated sesame to be equally effective compared to available gold standard treatments.

Conclusions: Sesame can be considered an effective and safe natural option for managing oral diseases, with no reported side effects. Its therapeutic properties highlight its potential as a valuable adjunct in oral healthcare.

Keywords: Sesame, Sesamum Indicum, oil pulling, dental problems, oral diseases.

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INTRODUCTION

Management of oral diseases and infections poses major challenges for clinicians and impacts patients well-being. Although various drugs have been used for these conditions, most are chemical or synthetic derivatives associated with adverse effects. Numerous in vitro and in vivo studies worldwide have demonstrated the efficacy of natural products in treating oral diseases. Their main advantage over synthetic agents is their

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minimal or no side effects. Natural substances, such as tea, green tea, honey, berries, Sesame, licorice, propolis, and coconut oil, have shown effectiveness in managing oral illnesses in laboratory and clinical studies.[1, 2] The secondary metabolites of these natural products possess antioxidant, anti-inflammatory, and antimicrobial properties. [3]

Sesamum indicum (Sesame) is an ancient oilseed crop, often termed the "queen of oilseeds".[4, 5] Cultivated worldwide, its roots, leaves, seeds, stems, and flowers exhibit antioxidant, anti-inflammatory, and antimicrobial activities. Compounds such as sesaminol, sesamol, sesamin, sesamolin, naphthoquinone, hydroxysesamone, and anthrasesamones A–F contribute to these effects.[6-10] Considering these benefits, the present scoping review aimed to explore the clinical applications of sesame in various dental problems.

Materials and methods

The scoping review was performed following PRISMA (Preferred Reporting Items for Systematic Review) guidelines. This study was carried out to answer whether Sesame can be a promising medication in the management of various oral diseases compared to available gold standards or standard medications being used. The in vivo studies where Sesame was used as one of the interventions in comparison to other medications in the management of various oral diseases were used. An electronic search was undertaken for English language articles published till September 2021 in various databases like PubMed, Cochrane, and Google Scholar. A hand search was also carried out to find the relevant articles. A literature search was carried out with the following keywords: "Sesame, Sesamum Indicum, oil pulling, dental problems, dental caries, aphthous ulcer, oral potentially malignant disorders, oral mucositis, gingivitis". Filters like time limit, author's name, etc., were not used to restrict the search for the article.

Eligibility criteria

Inclusion criteria

1. Randomized clinical trials and pilot studies published to date
2. Full-text articles available in the search engine mentioned
3. Studies in which sesame extracts are used as one of the interventions

Exclusion criteria

1. Reviews, dissertations, unpublished articles
2. Studies in which sesame extracts were used for conditions other than oral problems

Results:

A total of 129 records were identified and screened through successive stages to determine eligibility for inclusion. Duplicate articles, those excluded after title and abstract screening, and two studies for which full texts could not be obtained (despite email requests to the authors) were excluded. The selection process is illustrated in Figure 1.

Table 1 presents the characteristics of the included studies, detailing author, publication year, sample size, blinding, mode of sesame use, and participant characteristics. Among the 13 included studies, participants comprised healthy adolescents in 10 studies, children aged 10–12 years in 1 study, patients undergoing chemotherapy in 1 study, and pregnant women in 1 study.

The various oral conditions investigated in the review included plaque-induced gingivitis and plaque regrowth inhibition (5 studies), halitosis (3), oral submucous fibrosis (OSMF) (1), oral mucositis (1), aphthous ulcer (2), and dentinal hypersensitivity (1).

Quality assessment was performed using the Risk of Bias 2 (ROB 2) tool (Figure 2). [11] Among the 13 studies, 2 had a high, and 11 had a low risk of bias in the randomization domain.

Table 1: Characteristics of the included studies

AUTHOR NAME	YEAR	SAMPLE SIZE	GROUPS	BLINDING	METHOD OF USE OF SESAME	PATIENT CHARACTERISTICS
Asokan S et al [12]	2009	20	Group 1- 10 subjects (Sesame oil pulling) Group 2- 10 subjects (chlorhexidine mouthrinse)	Triple blinded	Oil pulling	16-18 years old boys having plaque induced gingivitis
Asokan S et al [13]	2011	20	Group 1- 10 subjects (Sesame oil pulling) Group 2- 10 subjects (chlorhexidine mouthrinse)	Single blinding	Oil pulling	Adolescents aged between 17-19 years who have atleast 24 permanent teeth with gingival probing depth <3mm and having a gingival and plaque index score=1mm in more than 10% of the sites
Singla N et al [14]	2014	40	1.Control group- 10 individuals (Chlorhexidine gel) 2. Test group 1- 10 individuals (pure form of sesame oil) 3. Test group 2- 10 individuals (pure form	Triple blinded	Topical massage with gel and oils	House keeping personnel aged between 18-55 years, having one or two carious teeth and moderate to severe gingival inflammation

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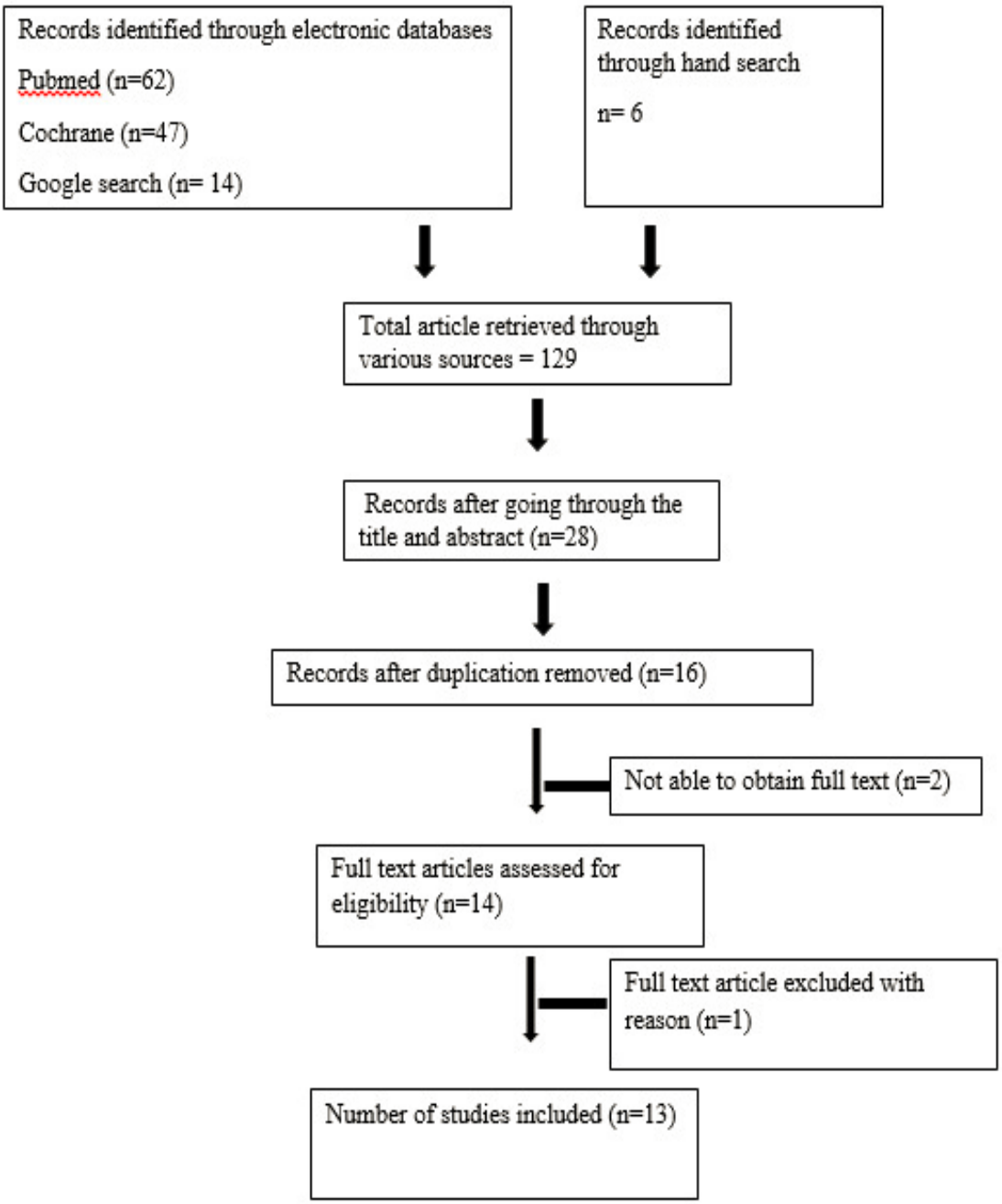
			of coconut oil) 4. Test group 3 - 10 individuals (pure form of olive oil)			
Sood P et al[15]	2014	60	1.Group 1- 20 individuals (Chlorhexidine) 2. Group 2- 20 individuals (sesame oil) 3. Control Group - 20 individuals (placebo)	Double blinded	Oil pulling	Students aged 18 years and above and those who had atleast 24 permanent teeth gingival probing depth of <3mm, gingival and plaque score of >=1 in 10% of the sites and intrinsic malodour of oral origin 2 or 3 hours after eating, drinking or brushing of teeth or any other oral activity
Dharmavaram AT et al [16]	2015	30	Group 1- 10 subjects (Ozonated oil) Group 2- 10 subjects (sesame oil) Group 3- 10 subjects (Placebo- distilled water)	Single blinded	Topical application over the ulcer	Patients of both sexes aged above 16 years having 1-5 ulcers of less than 48 hours duration. The most painful ulcer identified by the patient was selected as the index ulcer

Okada S et al[17]	2015	11	Group 1- 7 subjects (sesame oil) Group 2- 4 subjects (without sesame oil)	Single blinded	Topical application of sesame oil over the gingiva, palate, tongue	Hematopoitic cancer Patients admitted for chemotherapy
Sheik FS et al [18]	2016	30	Group 1- 10 subjects (Rice bran oil) Group 2- 10 subjects (sesame oil) Group 3- 10 subjects (chlorhexidine)	Double blinded	Oil pulling	Healthy pregnant women who were willing to participate
Saravanan SK et al [19]	2018	45	Group 1- 15 subjects (Probiotic mouthwash) Group 2- 15 subjects (chlorhexidine mouthwash) Group 3- 15 subjects (sesame oil)	None	Oil pulling	School children aged between 10-12 years with no recent (within 4 weeks) antibiotic therapy
Vadhana VC et al [20]	2019	75	Group 1- 25 subjects (sesame oil) Group 2- 25 subjects (ozonated sesame oil) Group 3- 25 subjects	Triple blinded	Oil pulling	Adolescents aged 12-14 years with decay-missing-filled index<3 and who had not underwent any dental treatment in the past I

			(chlorhexidine mouthwash)			month, not used any mouthwash for the past 3 months and without any systemic diseases
Khaira S et al [21]	2020	20	No comparison with any intervention. Only sesame oil was used	None	Oil pulling	20 clinically and histopathologically proven subjects of oral submucous fibrosis(OSMF) with mouth opening ranging from 11-38mm and those who are willing to quit the habit
Qahtani W et al[22]	2020	100	Group 1- 50 subjects (sesame oil) Group 2- 50 subjects (desensitizing tooth paste)	Single blinded	Topical application on the affected tooth	100 randomly selected patients who visited the dental department with consent to participate in the study were selected
Sharquie KE et al[23]	2020	45	Group 1- 20 subjects (sesame oil) Group 2- 25 subjects (pumpkin seed oil)	Single blinded	Topical application on the surface of ulcer	Patients with early onset ulceration (<3 days) and had little or no benefit from other conventional therapy in previous attacks
Sezgin Y et al[24]	2021	24	Sesame oil followed by coconut oil given to all subjects at a	Single blinded	Oil pulling	Healthy adults aged between 18-64 years with presence of more than 22

			wash out period of 14 days			natural teeth and absence of any systemic diseases

Figure 1: PRISMA Flow diagram showing the steps involved in article selection for the systematic review



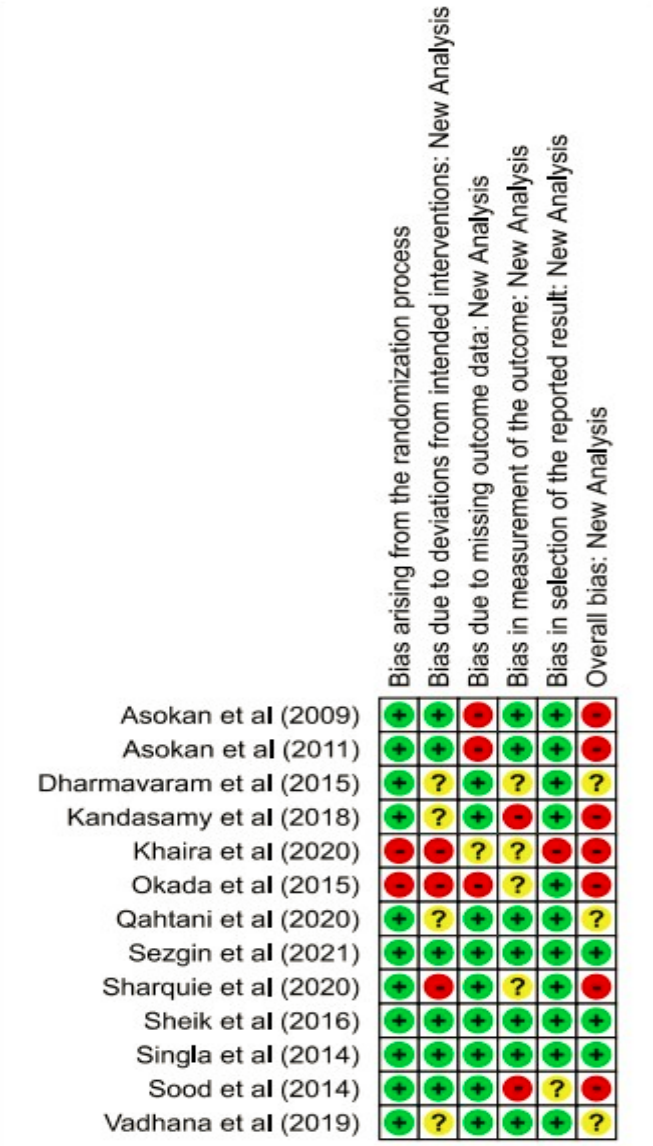


Figure 2: Bias Assessment of the included studies

Discussion:

Nothing replaces Nature; similarly, although various artificial or synthetic drugs are available for the management of diseases, the good results or outcome that will be obtained on the use of natural products always stands high and is well appreciated. One such gift from nature is Sesame. It is not simply called the Queen of oilseed crops, but it actually deserves it. Sesame has various properties like antioxidant, anti-inflammatory, and antimicrobial, which are due to its various secondary metabolites like sesaminol, sesamol, sesamin, sesamolin, naphthoquinone, hydroxysesamone, and anthrasesamones A-F.

In dentistry, sesame is tried and used in various conditions like gingivitis, aphthous ulcer, OSMF, halitosis, oral mucositis, etc, and promising results have been obtained in various studies. In the 13 included studies, sesame has been used

either in the form of oil pulling or as a topical application at a specific site.

In a study done by Asokan et al in 2009, sesame was found to be equally effective in reducing plaque and modified gingival index in comparison with the chlorhexidine group; however, the reduction in the colony count was not statistically significant between the two groups.[12] Similarly, in 2014, Singla et al noted no statistically significant results between the groups in S. Mutans count, Lactobacillus count, Plaque index, and Gingival index.[14] Asokan et al in 2011 and Sood et al in 2014 respectively, in their studies proved that sesame was equally as effective as chlorhexidine in reducing halitosis; however, rice bran oil was found to be significant in reducing the grades of halitosis compared to sesame oil and chlorhexidine in a study done by Sheik et al.[13,15,18]

Considering the studies conducted in the management of recurrent aphthous ulcer, Dharmavaram et al in 2015 proved ozonated oil as superior compared to sesame oil and placebo; and Sharquie et al in 2020 proved that the mean OCMI score was highly significant statistically after day 8 in sesame oil ($p<0.001$) compared to pumpkin oil group ($p<0.05$) whereas the difference in size of ulcer between two groups on day 4 and 8 was statistically not significant. [16,23]

In 2015, Okada et al conducted a pilot study on chemotherapy-induced mucositis, and no significant result was obtained between sesame oil and the control group regarding the outcome measures pertaining to subjective and objective symptoms graded with the CTCAE V3.0 scale.[17]

In 2020, Khaira et al conducted a study to prove the efficacy of sesame oil in the management of OSMF, and the outcomes, like mouth opening, burning sensation, tongue protrusion, cheek flexibility, and gingival index, were taken into consideration, and a statistically significant result was obtained in the pre- and post-treatment assessment of all these parameters except for cheek flexibility. [21] Qahtani et al in 2020 proved sesame to be superior (36.2% reduction in sensitivity) in the management of dentin hypersensitivity in comparison with desensitizing toothpaste (30.5% reduction). [22]

Sesame has been tried worldwide in the management of various oral conditions and has proved to be equal to or superior to the gold standards or the common drugs available in terms of efficacy. In the present scenario, the use of natural remedies for the management of different diseases has gained attention, particularly in the past decade. Hence, finding out about a medicine that is naturally and easily available is more important in the present scenario, as people also need treatment with the least side effects. As mentioned earlier, nature cannot be replaced by anything.

Conclusion:

Sesame can confidently be called the Queen of oil seeds, as it has such wonderful properties, and moreover, it is easily available worldwide. Although various parts of the plant, like leaves, stem, root, etc, have been proven to have properties like antioxidant, anti-inflammatory, and anti-microbial, most of the published articles concentrated on oil obtained from its seed. Further studies to prove the efficacy of other plant parts are encouraged in the future.

Conflict of Interest: Nil

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