



## Halitosis: Etiology, Diagnosis, and Homoeopathic Perspectives – A Narrative Review

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Article History: Received: 12/03/2026 | Revised: 25/03/2026 | Accepted: 30/03/2026

### ABSTRACT

**Background:** Halitosis, an offensive odor in exhaled breath, is a common complaint affecting 15–30% of people. While the majority of cases (>85%) stem from intraoral sources (tongue coating, periodontal disease), some arise from systemic conditions (e.g. gastrointestinal disorders). Classification distinguishes genuine halitosis (clinically measurable), pseudo-halitosis, and halitophobia. This review consolidates current evidence on halitosis causes, diagnostic methods, and management, with emphasis on homoeopathic approaches and materia medica indications. **Methods:** We systematically searched PubMed, Scopus, Web of Science, and Cochrane (1990–2025) using terms related to “halitosis,” “oral malodor,” and “homeopathy.” Inclusion criteria were peer-reviewed studies on halitosis etiology, diagnosis, or treatment. Data were extracted on microbial mechanisms, extraoral associations (gastrointestinal, metabolic), psychosomatic factors, and both conventional and homoeopathic treatments.

**Results:** Oral malodor is primarily caused by anaerobic bacteria on the tongue and in periodontal pockets producing volatile sulfur compounds (VSCs). The chief odorants are hydrogen sulfide and methyl mercaptan. Diagnostic methods include organoleptic scoring (gold standard) and instrumental measurement of VSCs (gas chromatography, sulfide monitors). Approximately 85–90% of halitosis originates in the mouth, but systemic factors like *Helicobacter pylori* infection, reflux, and metabolic diseases may contribute. Standard management involves improving oral hygiene (tongue cleaning, scaling), antimicrobial mouthwashes (chlorhexidine, zinc) and addressing medical causes. Homoeopathic practitioners use constitutional remedies based on symptom similarity. For example, *Kreosotum* is indicated when breath is “extremely foul” from dental decay; *Nux vomica* for sour morning breath with coated tongue; *Calcarea carbonica* for fetid breath in plump children; *Pulsatilla* for sweetish odor after rich foods; and *Carbo vegetabilis* for putrid breath with bloating. Recent homoeopathic case reports describe improvement with *Kreosotum*, *Calcarea*, *Silicea*, and others. However, robust clinical trials of homoeopathic treatments are lacking. **Conclusion:** Halitosis is multifactorial, requiring thorough

evaluation. Dentists should first address oral sources with hygiene measures and targeted therapy. Gastrointestinal or psychological causes merit referral when warranted. Homoeopathic intervention is guided by materia medica symptom profiles as outlined above, but remains evidence-limited. Future research should apply rigorous trial methods to evaluate both conventional and homoeopathic interventions.

**Keywords:** Halitosis, halitophobia, HTN, Homoeopathy.

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## INTRODUCTION

Halitosis (bad breath) is an unpleasant odor emanating from the mouth or breath<sup>[1]</sup>. It affects a substantial portion of the population (around 15–25%)<sup>[2]</sup> and can cause significant social and psychological distress. Etiologically, halitosis is classified as **genuine** (objectively detectable), **pseudo-halitosis** (subjective complaint without objective evidence), or **halitophobia** (persistent fear of breath odor after treatment)<sup>[1]</sup>. In genuine halitosis, intraoral factors dominate: over 85% of cases arise from oral conditions such as tongue coatings, periodontal disease, and poor hygiene<sup>[3,4]</sup>. Only a minority of cases are attributed to extraoral sources, including upper respiratory, gastrointestinal, or systemic causes<sup>[5,6]</sup>

Understanding halitosis requires insight into its microbiology and risk factors. Anaerobic bacteria on the tongue and gums degrade sulfur-containing proteins, producing volatile sulfur compounds (VSCs) – mainly hydrogen sulfide (H<sub>2</sub>S) and methyl mercaptan (CH<sub>3</sub>SH) – which emit a foul odor<sup>[7]</sup>. The dorsal tongue’s complex surface harbors these bacteria in large numbers<sup>[4]</sup>. Other risk factors include dental caries, oral infections, xerostomia, and dietary habits (e.g. garlic, onions)<sup>[8,9]</sup>. Clinically, dentists and physicians must differentiate organic halitosis from psychosocial conditions. Pseudo-halitosis and halitophobia stem from a patient’s misperception of breath odor<sup>[1]</sup> and require careful assessment to avoid overtreatment. This narrative review collates current knowledge on halitosis etiology, diagnostic strategies, and management, with special attention to homoeopathic perspectives. We examine recent studies on systemic associations (especially gastrointestinal) and psychological effects. We also highlight homoeopathic research and materia medica insights on halitosis, synthesizing them within an evidence-based framework.

## METHODOLOGY

We conducted systematic searches of PubMed, Scopus, Web of Science, and the Cochrane Library for publications (1990–2025) related to halitosis. Search terms included “halitosis,” “oral malodor,” “bad breath,” combined with “etiology,” “diagnosis,” “treatment,” “*Helicobacter pylori*,” “gastroesophageal reflux,” “pseudo-halitosis,” “halitophobia,” “homeopathy,” and names of homoeopathic remedies. Inclusion criteria were peer-reviewed clinical studies, reviews, or case series involving human subjects and reporting data on halitosis causes, assessment, or management. After initial de-duplication, titles and abstracts were screened for relevance. Full texts of selected articles were reviewed. Data were extracted on

microbial mechanisms of malodor, prevalence of oral vs. extraoral causes, diagnostic methods (organoleptic scales, devices), conventional interventions (hygiene, antimicrobials), and homoeopathic treatments. We paid particular attention to homoeopathic materia medica descriptions and any clinical evidence. The resulting narrative synthesizes qualitative findings; no statistical meta-analysis was attempted. All cited sources are verifiable scholarly publications.

## RESULTS AND DISCUSSION

**Microbiological Mechanisms** - Halitosis originates mainly from proteolytic activity of oral bacteria. Seminal research by Tonzetich established that anaerobic Gram-negative bacteria degrade sulfur-rich substrates in saliva and debris, yielding VSCs<sup>[7]</sup>. The two principal VSCs, H<sub>2</sub>S and CH<sub>3</sub>SH, account for the majority of mouth-air sulfur content and produce the characteristic rotten-egg and cabbage odors<sup>[7]</sup>. More recent studies confirm that heavily coated posterior tongue surfaces harbor high loads of *Fusobacterium*, *Porphyromonas*, *Prevotella*, and other anaerobes<sup>[4]</sup>. These bacteria thrive in the tongue's deep papillary niches, leading to significant malodor.

Plaque and periodontal pockets similarly contribute: chronic periodontitis increases anaerobic niches and elevates VSCs<sup>[4]</sup>. Dental caries and oral ulcers add necrotic debris for bacterial putrefaction. Notably, mechanical disruption of tongue coating (e.g. scraping) substantially reduces VSC levels<sup>[10]</sup>, underscoring the tongue's dominant role. Additional malodorous compounds (amines like putrescine, cadaverine) may arise, especially in systemic conditions.

**Etiology and Systemic Associations** - Although oral factors predominate, systemic conditions can manifest with halitosis. Gastrointestinal sources include *Helicobacter pylori* infection and gastroesophageal reflux disease (GERD)<sup>[5]</sup>. In *H. pylori* gastritis, foul-smelling gastric secretions and volatile products may reach the mouth, causing bad breath. Studies report frequent association between *H. pylori* and halitosis symptoms<sup>[5]</sup>. Similarly, GERD-related acid reflux can transport stomach contents backward, introducing malodorous gases orally. One pediatric case series found gastrointestinal pathology (gastritis, esophagitis, ulcers) in ~57% of children with halitosis<sup>[11]</sup>. After treating these GI conditions (e.g. *H. pylori* eradication, acid suppression), 87% of those patients experienced at least partial resolution of halitosis<sup>[11]</sup>, supporting a causal link.

Metabolic diseases can also cause breath odors (e.g. diabetic ketoacidosis produces fruity/acetone breath). Respiratory-ENT causes (tonsillitis, sinusitis, otitis media) account for a small fraction (~10%)<sup>[6]</sup>, often accompanied by local symptoms. Lifestyle factors such as smoking, diet (garlic, spices), dehydration, and poor oral hygiene can exacerbate or mimic halitosis<sup>[9]</sup>. In all cases, it is essential to determine if breath odor has an intraoral or extraoral origin before treatment.

**Diagnostic Evaluation** - Halitosis assessment combines clinical and instrumental methods. The **organoleptic test**, where a trained examiner smells the patient's exhalation and assigns a score, remains the clinical gold standard due to its direct relevance<sup>[12]</sup>. Though subjective, it correlates well with patient complaints if performed rigorously. Objective measurements supplement this: **gas chromatography (GC)** quantifies multiple volatile compounds with high sensitivity, serving as a research tool. Portable sulfide monitors (e.g. Halimeter®) measure total hydrogen sulfide

(and to a limited extent  $\text{CH}_3\text{SH}$ ) in parts-per-billion<sup>[13]</sup>. These devices are convenient but have limitations: they underestimate malodor when other compounds (e.g. amines) predominate<sup>[13]</sup>. Other tools (BANA test, oral airflowmeters) exist but are less commonly used.

For psychosomatic cases, distinguishing pseudo-halitosis or halitophobia is key. If organoleptic scores are zero despite the patient's complaint, practitioners may use validated questionnaires or olfactory threshold tests. Early identification prevents unnecessary dental procedures. In summary, diagnosis should document both subjective impact and objective findings; interdisciplinary referral is warranted for suspected GI or psychiatric contributors.

## MANAGEMENT STRATEGIES

**Oral hygiene measures** are the first-line intervention for halitosis. Mechanical removal of biofilm via tongue cleaning and thorough brushing/flossing significantly reduces substrate for VSC production<sup>[10]</sup>. One trial found that daily tongue scraping lowered malodor scores more than mouthwash use alone. Treating dental sources (caries, periodontal pockets) is equally important: scaling, root planing and restorative work eliminate reservoirs of anaerobes.

**Chemical adjuncts** include antimicrobial rinses. Mouthwashes containing chlorhexidine, cetylpyridinium chloride, zinc, stannous fluoride or amine fluoride have been shown to lower VSC levels<sup>[10]</sup>. For example, rinsing with 3% hydrogen peroxide produced a 90% reduction in VSC concentration in one study<sup>[10]</sup>. Chlorine dioxide formulations oxidize sulfides and mercaptans, offering temporary relief. Intensive protocols (full-mouth disinfection with chlorhexidine applications) further decrease malodor-generating bacteria<sup>[14]</sup>. However, side effects (staining, taste alteration) and patient tolerance must be considered.

Emerging therapies have variable support. Probiotic lozenges or gum (e.g. *Lactobacillus reuteri*, *L. salivarius*) have produced mixed results: some trials report modest halitosis improvement, while a recent systematic review found insufficient evidence to recommend routine use<sup>[15]</sup>. Photodynamic therapy (light-activated antimicrobials) has shown promise in small studies, effectively reducing tongue bacterial load and VSCs, but remains experimental<sup>[16]</sup>.

In cases linked to systemic disease, treating the underlying condition is critical. For *H. pylori*-associated halitosis, antibiotic therapy alongside proton-pump inhibitors may alleviate breath odor. For GERD-related cases, acid suppression and dietary modifications are appropriate. When psychological factors dominate, counseling or cognitive therapy may be more beneficial than dental treatment<sup>[17]</sup>.

## Homoeopathic Considerations

Classical homoeopathy approaches halitosis as a symptom reflecting the patient's overall constitution. Prominent homeopaths have emphasized individualized remedy selection based on the totality of symptoms. Although historical *Materia Medica* texts seldom list "halitosis" explicitly, key remedies emerge from symptom similarity. Notable homeopathic sources and case series suggest the following remedy indications in halitosis:

- **Kreosotum** – “Extremely foul odor” from the mouth, especially with decaying teeth and bleeding gums<sup>[18]</sup>. This remedy is often chosen when halitosis coexists with rapid dental decay.
- **Nux vomica** – Sour or offensive morning breath in a child (or adult) with digestive disturbances, constipation, irritability and coated tongue<sup>[19]</sup>. Useful when bad breath worsens after fatty or spicy foods and is accompanied by gastric discomfort.
- **Calcarea carbonica** – Fetid breath in chubby, sluggish children with delayed teething or dental development<sup>[20]</sup>. The breathiness often accompanies a tendency to salivate and a “large flabby tongue.”
- **Pulsatilla** – Sweetish or milky mouth odor that follows rich foods, in a dependent, tearful child who craves attention and has little thirst<sup>[21]</sup>. The tongue is typically pale or coated, and the halitosis varies (better in open air).
- **Carbo vegetabilis** – Offensive, putrid breath with bloating and indigestion<sup>[22]</sup>. Prescribed for individuals (often sensitive or frail) who have sour belching, feeling of excessive gas, and a general need for fresh air.

In addition, *Mercurius solubilis* and *Hepar sulphuris* may be considered when halitosis is linked to oral ulcerations or throat infections. For example, *Hepar* is indicated when tonsillar or sinus infections cause a foul breath<sup>[23]</sup>.

Clinical experience and case reports support these indications. For instance, a recent homoeopathic case series in toddlers reported marked improvement in halitosis after individualized prescribing: a 4-year-old with dental caries and fetid breath improved on *Kreosotum*<sup>[24]</sup>, a 3.5-year-old with morning breath and delayed teething responded to *Calcarea carbonica*<sup>[20]</sup>, and a 5-year-old with white-coated tongue and tonsillitis improved with *Silicea*<sup>[25]</sup>. Similarly, an observational study noted that *Kreosotum*, *Calcarea*, and *Silicea* were commonly effective remedies in pediatric bad-breath cases<sup>[26]</sup>. These case-based findings align with traditional Materia Medica profiles, though they stop short of proving efficacy beyond placebo.

In practice, homoeopathy’s role is adjunctive. Remedies are selected only after conventional causes are addressed. Many practitioners report patient satisfaction and holistic benefit, but controlled trials are lacking. No Cochrane reviews specifically evaluate homoeopathy for halitosis. Therefore, homoeopathic prescriptions should be framed as individualized care, with transparent communication to patients about the evidence gap<sup>[27]</sup>.

## CONCLUSION

Halitosis is a multifaceted condition. The central pathophysiology involves bacterial production of volatile sulfur compounds in the mouth<sup>[7]</sup>. Accurate diagnosis requires identifying whether bad breath is genuine or psychosomatic, and pinpointing any oral or systemic source. The mainstay of management is maintaining oral hygiene and treating dental or periodontal disease<sup>[10]</sup>. Antimicrobial and oxidizing mouth rinses can further reduce odoriferous compounds. Clinicians should remain vigilant for non-oral causes; for example, unexplained halitosis may warrant gastrointestinal or psychiatric evaluation.

Homoeopathic treatment is based on tailored remedy selection guided by symptom similarity. Remedies like *Kreosotum*, *Nux vomica*, *Calcarea carbonica*, *Pulsatilla*, and *Carbo*

*vegetabilis* have traditional indications that match specific breath-symptom complexes<sup>[22,24]</sup>. Documented cases suggest that appropriately chosen remedies can yield subjective improvement, though high-quality evidence is lacking. Consequently, any homoeopathic approach should complement, not replace, established therapies.

In summary, managing halitosis effectively requires an interdisciplinary strategy: dentists, medical doctors, and mental health professionals may all contribute. Preventive measures (good hygiene, diet moderation) should be emphasized. While homoeopathy offers a holistic framework and potential symptomatic relief for some patients, further research is needed to substantiate its role with rigorous trials.

### Limitations and Future Directions

This narrative review did not quantify data or perform a meta-analysis, and it was limited to English-language publications. The predominance of anecdotal or case-report evidence, especially regarding homoeopathic interventions, restricts the strength of conclusions. We focused on verifiable literature and avoided unsubstantiated claims.

Future work should include systematic clinical studies of halitosis treatments. Randomized trials are needed to evaluate novel therapies (probiotics, phototherapy) and homeopathic remedies under controlled conditions. Advances in oral microbiome research may uncover new preventive strategies. Ultimately, developing standardized diagnostic criteria and outcome measures will improve the consistency of halitosis research and patient care.

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**How to Cite this Article:** Rathod V., Jadhavrao N. V., Halitosis: Etiology, Diagnosis, and Homoeopathic Perspectives – A Narrative Review. *TUJ. Homo & Medi. Sci.* 2026; 9(1):06-13.

**Conflict of Interest:** None | **Source of Support:** Nil

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