

# Dhoopana Review (Ayurvedic fumigation): Traditional practices and modern evidences

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# DHOOPANA REVIEW (AYURVEDIC FUMIGATION): TRADITIONAL PRACTICE AND MODERN EVIDENCE

## Abstract

**Aim:** To summarize traditional Ayurvedic dhoopana practices and recent scientific insights into its antimicrobial, immunomodulatory, and environmental benefits.

**Background:** Dhoopana (medicated fumigation) is an ancient method to purify environments. Herbal and animal-derived smokes are used therapeutically. Recent interest has surged for infection control and respiratory aid.

**Methods:** A narrative review of classical texts and modern studies was conducted. Data were organized into tables: ingredients and properties (Table 1), dhoopana types (Table 2), and key studies (Table 3).

**Results:** Several herbs (turmeric, garlic, neem, frankincense, ajwain) effectively reduce microbial loads. Immunostimulant properties are demonstrated in *Trachyspermum ammi* and *Azadirachta indica*.

**Conclusion:** Classical wisdom, backed by modern evidence, supports dhoopana as a safe, natural adjunct for disinfection and immune support.

**Keywords:** Dhoopana; Ayurvedic fumigation; Rakshoghna; antimicrobial smoke; nosocomial infection control; environmental hygiene

## Introduction

Dhoopana (also called dhupana or dhumapana) is an Ayurvedic therapy in which herbal or herbo-mineral preparations are burned to generate smoke (fume) that is inhaled or exposed to a space. Classical sources (e.g. *Charaka Samhita*, *Sushruta Samhita*, *Kashyapa Samhita*) emphasize fumigation for both therapeutic and hygienic purposes. It is traditionally used to disinfect sick rooms, operation theaters, incubators and garments, and even for gynecologic and pediatric care[8][9]. For example, *Charaka* (Sharira Sthana) recommends fumigating postpartum rooms and garments with mixes containing barley, mustard, and neem to protect mother and child. *Kashyapa Samhita* devotes an entire chapter (Dhoopakalpa Adhyaya) to formulations for various conditions[10]. The classical term “Rakshoghna” literally means “germ-killing,” and dhoopana is noted in ancient texts as rakshoghna (anti-microbial) practice[2][10]. In summary, Ayurveda regards dhoopana as a preventive and curative measure that cleanses the environment and supports healing.

Despite millennia of traditional use, scientific evaluation of Ayurvedic fumigation is recent. The resurgence of interest is driven by infection control needs (e.g. hospital pathogens, viral outbreaks) and a desire to replace toxic chemicals (like formalin) with natural alternatives[8][7]. This review surveys key classical references and recent peer-reviewed studies (mostly past ten years) on dhoopana. We focus on evidence of antimicrobial efficacy, immune effects, and practical applications of dhoopan formulations. To aid clarity, we include tables of common ingredients (Table 1), dhoopana types and uses (Table 2), and summaries of representative studies (Table 3).

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43 **Methods**

44 We performed a narrative review of Ayurvedic texts and modern research. Classical  
 45 sources (*Charaka*, *Sushruta*, *Kashyapa*, etc.) were consulted via translations and  
 46 secondary literature on dhoopana[2][7]. For contemporary evidence, PubMed, Google  
 47 Scholar, and Ayurvedic journals were searched for terms like “dhoopana”, “dhupana”,  
 48 “Ayurvedic fumigation”, and specific herbal smoke formulations. We prioritized  
 49 studies from the last decade reporting antimicrobial, immunological or air-quality  
 50 outcomes. Selected studies were categorized and are summarized in Table 3 (with  
 51 source, year, methods, outcomes). Tables 1 and 2 were compiled from Ayurvedic  
 52 manuals and pharmacopeias describing common fumigation materials and techniques,  
 53 with reference to known herbal properties.

54 **Discussion**55 **Ayurvedic Dhoopana Preparations**

56 Classical texts list many **dhoopana dravya** (fumigation drugs) – herbs, resins, woods,  
 57 spices – that are antimicrobial and aromatic[7][10]. Table 1 shows common  
 58 ingredients and their principal properties.

59 [3] Table 1. **Common Ayurvedic Dhoopana Ingredients and Properties**

Ingredient (English, Latin)	Sanskrit/Usage	Key Actions and Ayurvedic Properties
<b>Neem</b> ( <i>Azadirachta indica</i> A)	Nimba (leaves, oil)	Broad-spectrum antibacterial, antifungal; immunostimulant; antipyretic; pungent–bitter; Ushna (warming).
<b>Guggulu</b> ( <i>Commiphora mukul</i> )	–	Antibacterial, anti-inflammatory; resin with phenolics; tridosha balancing.
<b>Loban/Frankincense</b> ( <i>Boswellia Serrata</i> )	Shallaki, Loban, Salai (resin)	Antimicrobial, antiseptic, aromatic; used in incense; Kapha-Pitta balancing.
<b>Vacha</b> ( <i>Acorus calamus</i> )	–	Aromatic nervine, carminative; has antibacterial phenols; clears Kapha.
<b>Daruharidra</b> ( <i>Berberis aristata</i> )	–	Antimicrobial (berberine content); bitter, Pitta-reducing, digestive aid.
<b>Turmeric</b> ( <i>Curcuma longa</i> )	Haridra, Pitthanika (rhizome)	Anti-inflammatory, wound-healing; contains curcumin (antibacterial).
<b>Mustard</b> ( <i>Brassica nigra</i> L)	Sarshapa (seeds)	Warming rubefacient; antimicrobial (allyl isothiocyanate); Kapha-Vata reducing.

<b>Ajwain</b> ( <i>Trachyspermum ammi</i> L)	Yavani	Carminative, expectorant; immunostimulant; antibacterial volatile oils.
<b>Sandalwood</b> ( <i>Santalum album</i> L)	Chandanam	Cooling, fragrant; mild antiseptic; used for calming and skin health.
<b>Camphor</b> ( <i>Cinnamomum Camphora</i> )	Kapur	Volatile stimulant; antimicrobial and decongestant; heats sinuses; Pitta increasing.
<b>Surasadi group</b> (kushtha, vacha, etc.)	–	Many classical herbs for fumes; generally aromatic and “krimighna” (bug-killing).
<b>Honey/Ghee</b>	Madhu	Vehicles for decoctions; ghee (clarified butter) helps burn and release herbs’ actives.

## 60 Dhoopana Modalities and Applications

61 Ayurveda categorizes dhoopana by purpose and form. Broadly, three classical types  
62 are described: **Dhoopana**(primary fumigation), **Anu-dhoopana** (re-fumigation to  
63 reinforce effect), and **Prati-dhoopana** (maintenance fumigation to prevent  
64 recurrence)[12]. (In modern terms, these are like initial, repeat, and follow-up  
65 fumigation sessions.) Kashyapa Samhita lists dozens of specific dhoopan formulas for  
66 various diseases (fever, diarrhea, wounds, etc.) and for general prophylaxis[10][7].

67 Among these, the most common purpose is environmental disinfection: burning  
68 fumigants in wards, therapy rooms or homes to reduce airborne microbes and  
69 malodors. This has parallels to modern “air sterilizers.” In fact, recent hospital studies  
70 explicitly evaluate dhoopana for this: a 1-hour fumigation in an Ayurvedic hospital’s  
71 pediatric and therapy rooms cut airborne bacterial counts (colony-forming units,  
72 CFUs) by over 60% and reduced fungal counts significantly[4]. Table 2 outlines  
73 typical types and uses.

74 Table 2. **Types of Ayurvedic Dhoopana and Applications**

75

Dhoopana Type/Name	Application & Uses
<b>General Dhoopana (ward fumigation)</b>	Burned in a chamber or vessel to sterilize rooms, instruments, linens; used in surgery, dental, maternity wards. E.g. “Parikarma” or “Kshetra” Dhoopan for whole-room disinfection.
<b>Anudhoopana/Pratidhoopana</b>	Repeated or follow-up fumigation sessions to reinforce

	disinfection or prevent recontamination.
<b>Karna Dhoopana (Ear fumigation)</b>	Smoke from herbs (often mixed with Vacha, mustard, goat's hair, etc.) puffed into ear canal. Used for otitis media, ear pain, hearing issues.
<b>Yoni Dhoopana (Vaginal fumigation)</b>	Directed fumes to vaginal/perineal area. Indicated in puerperal (postpartum) care, abnormal discharge, itching; cleanses the birth canal. Ayurvedic guides list specific "yoni dhoopan" herbs.
<b>Mukha/Shiro Dhoopana (Nasal/head)</b>	Inhale herbal smoke through nose/mouth (similar to dhumapana). Helps relieve sinus congestion, headaches, and respiratory conditions by delivering antimicrobial fumes.
<b>Specific Formulations</b>	E.g. <b>Grahaghna Dhoop</b> (removes household evil, general sterilization); <b>Kumar Dhoop</b> (purifies newborn's bed); <b>Sri Dhoop</b> , <b>Maheshwar Dhoop</b> etc. – named formulas noted in Kashyapa and later texts (used for spiritual and antimicrobial effects).

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## 77 Antimicrobial and Environmental Effects

78 Modern studies strongly support dhoopana's **antimicrobial efficacy**.

Study	Year	Methodology	Findings	Reference
<b>Pandey et al.</b>	2017	Immunological assay in rats with ajwain extract; measured delayed-type hypersensitivity (DTH) and white blood cell response.	<b>Enhanced immune response</b> and increased macrophage activity.	Pandey et al., 2017
<b>Kaur et al.</b>	2018	Neem oil administration in mice; observed cytokine levels and T-cell proliferation.	Stimulated <b>innate immunity</b> and enhanced IFN- $\gamma$ levels.	Kaur et al., 2018
<b>Balkrishna et al.</b>	2022	Tested Vishaghna Dhoop in vitro on agar plates and in liquid culture; environmental fumigation in	Bacterial growth reduced by <b>50–85%</b> , Candida growth by <b>80%</b> ; no toxicity to	Balkrishna et al., 2022

		unsanitized rooms.	human cells.	
<b>Das et al.</b>	2024	Used “Shodashanga Dhoopa” (16-herb mix) in OPD and therapy room; bacterial and fungal colony count recorded before and after fumigation.	Significant drop in <b>bacterial and fungal counts</b> ( $P<0.001$ and $P<0.05$ respectively).	Das et al., 2024
<b>Greeshma et al.</b>	2025	Used Sarshapanimbadi Dhoopan Churna in a controlled lab fumigation setting; microbial load tracked over time.	<b>Complete elimination</b> of bacterial CFUs in 20 min and fungal CFUs in 15 min.	Greeshma et al., 2025

79

80 In summary, multiple recent trials (Table 3) report that Ayurvedic fumigation **significantly**  
81 **lowers microbial counts** in air and on surfaces. These studies typically use settle-plate air  
82 sampling or direct colony counts, and consistently find that herb-derived smoke is  
83 microbicidal. The active volatiles (e.g. sulfur compounds from garlic, eugenol in clove,  
84 thymol in ajwain) likely oxidize or penetrate microbial cells. Importantly, unlike  
85 formaldehyde-based foggers, herbal smoke is generally safe for humans at moderate  
86 exposures[4][11].

## 87 Immunomodulatory and Systemic Benefits

88 Beyond direct killing of pathogens, many dhoopan ingredients modulate the immune  
89 system. As noted, *Trachyspermum ammi* (ajwain) seed extract enhanced delayed-type  
90 hypersensitivity (a cell-mediated immunity measure) in rats[5]. Similarly, neem oil  
91 markedly stimulated white blood cells and macrophage activity in mice, and induced  
92 interferon- $\gamma$  production, indicating boosted innate immunity[6]. Many essential oils in  
93 dhoopan herbs (such as eucalyptol, camphor, and citric aldehydes) have anti-  
94 inflammatory effects and can ease respiratory symptoms, helping mucosal immunity.  
95 Thus, dhoopana may also serve as a passive **drug delivery** system: volatile anti-  
96 pyretic or bronchodilatory compounds in the smoke (like camphor from Kapur, or  
97 alcohols from sandalwood) could reach the airways without ingestion. In practice, this  
98 is akin to inhalation therapy (like steam treatments), but with added disinfection.

99 Finally, the environmental benefit extends beyond sterility. By drying moisture and  
100 repelling insects, smoke creates a healthier microclimate. Ayurveda explicitly praises  
101 dhoopan for **purifying space** (“*kapshat prajwalanam dhoopena*”... burning smoke to  
102 cleanse mosquitoes and bugs)[1]. This aligns with aromatherapy insights: many  
103 constituents are **aromatic volatile oils** that lift mood and reduce pathogen load. The  
104 classical view is that dhoopana cleanses the “vitiated air” (dhoomaja visha) and  
105 prevents disease spread[1].



## 106 Conclusion

107 Dhoopana is a time-honored Ayurvedic fumigation technique for disinfection and  
108 disease prevention. Classical literature regards it as an effective way to create a sterile  
109 environment and to deliver herbal medicinals via smoke. Recent scientific studies  
110 validate many of these claims: natural plant fumigants reduce airborne bacteria and  
111 fungi in clinical rooms, and their active compounds possess antimicrobial and  
112 immunomodulatory properties. Given the push to replace toxic formaldehyde  
113 fumigants, Ayurvedic dhoopana offers a low-cost, eco-friendly alternative. Practical  
114 applications include hospital ward fumigation, postpartum and newborn care (yoni  
115 dhoopana), dental and surgical suites, and even household sanitation.

116 For practitioners, tabled references (Tables 1–3) provide guidelines on choosing  
117 dhoopan materials and protocols. Future work should standardize doses, safety, and  
118 quantify long-term outcomes. Nonetheless, current evidence supports including  
119 dhoopana as an adjunct disinfection measure. By combining classical wisdom with  
120 modern data, healthcare providers can utilize dhoopana to improve air hygiene and  
121 possibly bolster immunity in patient care settings.

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