

# The Role of Anise in Traditional Medicine and Naturopathy: A Literature Review

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**Abstract - Anise (*Pimpinella anisum* L.) remains one of the most important aromatic medicinal plants used in traditional medicine, household therapy, and contemporary naturopathy. Interest in anise has increased in recent years because modern research increasingly supports its long-recognized digestive, antispasmodic, antimicrobial, antioxidant, and symptom-oriented therapeutic roles. The current review reassesses the medicinal significance of anise by emphasizing recent literature published from 2020 onward and by integrating updated evidence on phytochemistry, ethnomedical relevance, gastrointestinal applications, women's health, antimicrobial activity, and safety considerations. Current evidence indicates that anise is best supported as a digestive and carminative herb with plausible roles in functional gastrointestinal complaints, while women's health, respiratory use, neuro-metabolic activity, and anti-inflammatory effects remain promising but less clinically mature fields. The literature also highlights the importance of extract type, chemical standardization, and preparation-dependent safety interpretation, especially for essential oil-rich products. Overall, anise should be regarded as a scientifically relevant traditional medicinal plant whose most defensible modern applications lie in integrative symptom management rather than broad disease-specific claims.**

**Keywords:** anise, *Pimpinella anisum*, traditional medicine, naturopathy, phytotherapy, trans-anethole, medicinal plants, essential oil

## 1. INTRODUCTION

Medicinal plants still hold the key position in world health care as they are a blend of culture, access, and pharmacological possibilities. Anise (*Pimpinella anisum* L.) is one of the aromatic seeds that has retained a remarkable level of medicine applicability both in the traditional and complementary medicine practices. Despite being commonly known as a cooking spice, anise is also known as a digestive aid, warming household remedy, aromatic expectorant and a part of women's traditional herbal preparations. Modern literature still refers to anise as a plant, the usefulness of which is based on the convergence of the ethnomedical tradition of use and the bioactivity profile of trans-anethole that is well characterized chemically (Singletary, 2022; Mahboubi and Mahboubi, 2021; Soussi et al., 2023).

Over the recent years, there is an increased scientific interest in anise due to a number of reasons. To start with, the revision of the phytochemical and pharmacological explanation of anise and anethole-rich preparations has been reinforced (Wu et al., 2023; Semwal et al., 2026). Second, recent articles published since 2020 have reported antioxidant, antimicrobial, anti-inflammatory and tissue-protective effects in extracts and essential oils (Ghliissi et al., 2020; Albalawi et al., 2023; Dumitrescu et al., 2023; Rossi et al., 2024). Third, there is a recent revival of interest in anise as a symptom-based botanical in integrative health especially in digestive medicine and in particular women-specific health indications (Farahmand et al., 2020; Mosaffa-Jahromi et al., 2024; Azimi et al., 2024). Thus, anise ceases to be considered as a simple traditional aromatic spice, but rather as a plant, which has real scientific significance in the contemporary phytotherapy.

This review is aimed at establishing a more robust and up to date scientific debate on the use of anise in traditional medicine and naturopathy. In specific, special focus is given to the literature published since 2020 and related to phytochemistry, therapeutic interpretation, representative evidence, and safety-quality considerations.

## 2. ETHNOMEDICAL RELEVANCE OF ANISE

The recent literature affirms that anise is still a highly appreciated plant in the traditional medicine as it is a low-intensity and low-cost remedy to receive common complaints in a form that is practical and acceptable by the culture.

Anise is rather widely used in domestic and ethnomedical practice as a warming infusion following meals, carminative in the abdomen, and an aromatic in the cough, throat pains, and general digestive upsets. According to the reviews related to herbal medicine and female disorders, anise is notably prominent in the traditions where aromatic seeds are preferred to manage digestion, relieve spasmodic pain, and make women feel comfortable during menstruation and menopause (Singletary, 2022; Mahboubi and Mahboubi, 2021).

The fact that anise has remained in the popular herbal practice is not a historical incident. Evidence in the community indicates that herbal remedies remain very common during the period of pregnancy and lactation and are usually founded on the family customs instead of solid clinical data. This applies specifically to anise as being familiar with it might promote their use in the populations that are sensitive without sufficient knowledge of dose, extract type, and toxicological threshold (Eid and Jaradat, 2020; Foong et al., 2020; National Library of Medicine, 2026). Anise has continued to be appealing in naturopathic practice as it is palatable with a plausible therapeutic effect, and would be suitable in teas, powders, and blended formulations designed to enhance digestive and respiratory comfort (Silveira et al., 2020; Singletary, 2022).

### 3. PHYTOCHEMISTRY AND BIOACTIVE BASIS

The medicinal property of anise is highly associated with its volatile component, especially trans-anethole, which is mostly considered the major constituent of anise essential oil. Recent reviews in chemistry have confirmed that trans-anethole is typically present with estragole, anisaldehyde, limonene, alpha-terpineol, and other aromatic compounds in different proportions, depending on genotype, seed maturity, extraction mode, and storage conditions (Wu et al., 2023; Nasir and Yabalak, 2021; Onder et al., 2024). This chemical profile gives the best mechanistic foundation to the interpretation of the carminative, antispasmodic, secretolytic, antimicrobial and organoleptic qualities that have been traditionally associated with anise.

Nevertheless, it is also highlighted in modern studies that anise ought not to be lowered to one molecule. The comparative analyses indicate that extraction method can significantly affect total phenolic, antioxidant, and relative abundance of volatile components. Based on this, the presumption of the medicinal performance of an infusion, a powder, a hydroalcoholic extract, and a concentrated essential oil cannot be made equal (Nasir et al., 2023; AlBalawi et al., 2023; Boumahdi et al., 2021). Agronomic studies have also indicated that the level of CO<sub>2</sub>, maturity stage of seeds, and environmental developmental conditions have an effect on oil metabolism and biological activity, which strengthens the importance of standardization in interpreting therapeutic evidence (Balkhyour et al., 2021; Soussi et al., 2023).

Such variability is most significant in terms of therapeutic perspective. It describes the reason that in modern literature, there is a distinction between crude seed material and essential oil and polysaccharide-rich fractions as well as extracted phytochemical preparations. It also gives the reason why recent reviews have been growing to focus on quality control, extract characterization, and dose-specific interpretation in scientific and clinical discussions of anise (Singletary, 2022; Wu et al., 2023; Semwal et al., 2026).

**Table 1. Major phytochemical fractions of anise and their therapeutic relevance**

Fraction / group	Representative constituents	Main pharmacological relevance	Recent supporting sources
Volatile phenylpropanoids	trans-Anethole, estragole, anisaldehyde	Core aromatic signature; linked to carminative, spasm-modulating, secretolytic, and antimicrobial effects	Wu et al., 2023; Semwal et al., 2026
Monoterpene-related components	Limonene, alpha-terpineol, minor terpenes	Contribute to aroma, antioxidant action, and membrane-related bioactivity	Onder et al., 2024; Dumitrescu et al., 2023
Phenolic fraction	Phenolic acids and antioxidant-associated compounds	Associated with redox balance and antioxidant potential	Nasir et al., 2023; Rossi et al., 2024

Fraction / group	Representative constituents	Main pharmacological relevance	Recent supporting sources
Polysaccharide-rich fraction	Seed polysaccharides	Relevant to anti-inflammatory and wound-healing effects in experimental models	Ghliissi et al., 2020
Preparation-dependent matrix	Powder, infusion, extract, essential oil	Determines exposure level, reproducibility, efficacy interpretation, and safety profile	AlBalawi et al., 2023; Singletary, 2022

#### 4. THERAPEUTIC EVIDENCE AND BIOLOGICAL ACTIVITIES

##### 4.1 Gastrointestinal Applications

The most persuasive area of therapy of anise is digestive medicine. Recent evaluations still single out anise as a classical carminative and digestive herb of which the core contemporary worth can be found in manageability of bloating, postprandial pain, and functional bowel issues (Singletary, 2022; Wu et al., 2023). Even though some preclinical human trials on dyspepsia and irritable bowel syndrome were published prior to 2020, they remain regarded in the recent reviews and evidence syntheses as having therapeutic relevance (Mahboubi and Mahboubi, 2021; Baez et al., 2023; Hawrelak et al., 2020).

This digestive applicability is extended more recently. Mosaffa-Jahromi et al. (2024) have noted that powdered aniseed has a positive effect on gastrointestinal symptoms, including abdominal pain, anorexia, and diarrhea in adults with COVID-19, which contributes to the notion that anise could be used as a symptom-oriented digestive adjuvant depending on inflammatory stressful situations. Similarly, Azimi et al. (2024) showed positive outcomes of a conventional herbal combination of *Pimpinella anisum* in individuals with constipation-based IBS, but the multi-herb nature of the study does not allow determining the entire effect of anise as an individual herb. Taken together, these results justify the future use of anise in integrative digestive supplements, particularly when the therapeutic objective is comfort, tolerance, and functional enhancement and not pharmacological targeting of disease.

##### 4.2 Women's Health and Endocrine-Related Use

One of the most actively discussed but scientifically unequal fields of anise therapy is the health of women. The literature review of recent confirms that the use of anise has long been applied to treat menstrual discomfort, menopausal symptoms, and lactation support, and also states that the grade of clinical evidence is uneven across indications (Mahboubi and Mahboubi, 2021). Of special interest is the randomized clinical trial of Farahmand et al. (2020), which found anise to have a lower intensity of symptoms of premenstrual syndrome than placebo. This provides modern-day clinical application of one of the oldest traditional applications of the plant.

However, the contemporary understanding is dangerous. The anise lactation reputation is still more of a traditional than a clinical fact. The Cochrane-level analysis of oral galactagogues revealed that the evidence base on herbal lactation aids is very heterogeneous and methodologically poor (Foong et al., 2020). Regularly, the database LactMed, has defined anise as an alleged instead of completely proven galactagogue, whereas noting the restricted confidence about advantage and the requirement of dose consciousness and newborn security (National Library of Medicine, 2026). Thus, even in the women health, despite the ethnomedical significance still present in anise, its scientific application should be indicative and safety-focused.

**Table 2. Traditional domains of use and the current level of scientific support**

Domain of use	Traditional / naturopathic rationale	Current evidence status	Key recent sources
Digestive support	Carminative, warming, relief of bloating and cramping	Strongest and most credible domain	Singletary, 2022; Mosaffa-Jahromi et al., 2024
Women's health	Menstrual comfort, menopausal relief, galactagogue reputation	Promising but uneven and indication-specific	Farahmand et al., 2020; Mahboubi & Mahboubi, 2021; National Library of Medicine, 2026

Domain of use	Traditional / naturopathic rationale	Current evidence status	Key recent sources
Respiratory comfort	Aromatic expectorant and soothing herbal infusion	Traditionally strong but clinically underdeveloped	Silveira et al., 2020; Singletary, 2022
Antimicrobial / oral support	Household antiseptic and aromatic cleansing role	Strong in vitro evidence; limited direct clinical confirmation	Dumitrescu et al., 2023; Lavaee et al., 2022; Al-wendawi et al., 2021
Neuro-metabolic prospects	Calming and tonic interpretation in some traditions	Mostly experimental and review-based	Torghabeh et al., 2024; Khodadadian & Balali-Dehkordi, 2025

### 4.3 Respiratory and Antimicrobial Relevance

Anise has been traditionally used in medicine to treat mild cough, throat pain and chest congestion. Current sources provide such an application primarily due to pharmacological plausibility, not in cases of clinical validation. The reviews of herbal adjuvant therapy indicate that volatile herbs, including anise, can help to alleviate mucosal discomfort and symptom-free respiratory symptoms due to volatile, calming, and secretolytic effects (Silveira et al., 2020; Singletary, 2022).

The literature of antimicrobials is much stronger at experimental level. Anise essential oil and extracts were recently reported to have antibacterial, antifungal, and antibiofilm activities, and further, against *Candida albicans*, oral bacteria, and selected multidrug-resistant isolates (Dumitrescu et al., 2023; Lavaee et al., 2022; AlBalawi et al., 2023). Other studies have also shown (An Iraqi) the antioxidant, antibacterial, and antibiofilm potential of essential oil extracted using anise seeds and the importance of preparation-dependent activity (Al-wendawi et al., 2021). Nevertheless, laboratory inhibition must not be mixed with anti-infective efficacy which undergoes clinical trials. Currently, the best scientific finding is that anise has biologically active compounds that have significant antimicrobial activity potential, although its clinical application is still under-explored.

### 4.4 Neuro-Metabolic and Anti-Inflammatory Prospects

One significant recent development in the literature is the fact that anise has expanded its mechanistic field into non-digestive areas of medical practice. The surveys of anethole and other aromatic substances suggest that they have plausible neuroactive, anti-inflammatory, antioxidant, antinociceptive, and metabolic activity, but all these are yet to be validated by large human studies and are based on experimental evidence (Semwal et al., 2026; Torghabeh et al., 2024; Khodadadian and Balali-Dehkordi, 2025).

Secondary studies such as Ghlissi et al. (2020), which reported anti-inflammatory and wound-healing effects of seed polysaccharides in mouse burn model, and Rossi et al. (2024), who supported the antioxidant interpretation of anise-related compounds with complementary analysis methods can be used to support the study. Antigiardial value, relevance in nutrition, and modulation of plant secondary-metabolites in experimental settings have been investigated in other recent studies (Alrasheid et al., 2024; Ulusoy et al., 2024; Jawed et al., 2026). These results are scientifically significant, although they are more applicable to the future development of therapeutic measures than to the everyday clinical recommendation.

**Table 3. Selected recent evidence (2020+) relevant to the therapeutic interpretation of anise**

Reference type	Study or topic	Main finding	Interpretive value
Randomized trial	Premenstrual syndrome	Anise reduced PMS symptom intensity versus placebo	Supports a contemporary women's health use
Randomized placebo-controlled trial	GI symptoms in COVID-19	Powdered aniseed improved abdominal pain, anorexia, and diarrhea	Supports digestive symptom-oriented use
Double-blind clinical trial	IBS-C herbal formula containing anise	An anise-containing formula improved outcomes in IBS-C context	Indirect support for anise-containing gut formulations

Reference type	Study or topic	Main finding	Interpretive value
Experimental study	Seed polysaccharides in burn model	Anti-inflammatory and wound-healing effects in mice	Expands biological relevance beyond the essential oil
In vitro / applied microbiology	Essential oil and extracts	Repeated antibacterial, antifungal, and antibiofilm activity	Strong laboratory support but limited clinical translation
Review literature	Anethole and systemic effects	Proposed neuroactive and metabolic relevance of anethole	Promising but still largely preclinical

## 5. SAFETY, QUALITY, AND PRACTICAL INTERPRETATION

The scientific rigorous debate about anise should be able to make a line between the regular culinary use and medicinal exposure. The observation that anise is frequently used in food and drinks does not remove the cautionary measures in the case of an anise preparation which is highly concentrated, anise preparations repeated, and anise essential oils. The recent monographic and review-level sources highlight that interpretation of medicinal relies on the type of preparation, chemical composition, dose, and time of exposure, particularly when volatile substances are highly concentrated (Semwal et al., 2026; Singletary, 2022).

This difference is particularly significant with respect to the use of aromatic materials and essential oils containing estragole. The recent research has indicated that the efficacy-relevant and safety-relevant constituents can be affected depending on the extract type and environmental circumstances, which supports the idea of the need to standardize research and practice (Balkhyour et al., 2021; Nasir et al., 2023; Onder et al., 2024). Even more care must be taken with sensitive populations. The practice of using herbs during pregnancy and lactation is widespread in the community, yet the available evidence on the topic by the public-health community indicates that this practice is common without the presence of effective safety guidance (Eid and Jaradat, 2020). Similarly, syntheses of evidence and LactMed show that anise cannot be simplistically promoted in terms of reproduction or infant-feeding situations simply because it is a traditional practice (Foong et al., 2020; National Library of Medicine, 2026).

**Table 4. Safety and quality-control considerations relevant to scientific and practical use of anise**

Issue	Current interpretation	Practical implication	Key recent sources
Food use vs medicinal use	Culinary familiarity does not equal unrestricted therapeutic safety	Medicinal use should rely on preparation-specific evidence	Singletary, 2022
Essential oil concentration	Essential oil is pharmacologically stronger and toxicologically more sensitive than tea or powder	Avoid casual internal use without proper guidance	Semwal et al., 2026; Dumitrescu et al., 2023
Chemical variability	Extraction method, genotype, and environment alter composition	Standardization is essential for reproducibility and safety	Balkhyour et al., 2021; Nasir et al., 2023; Onder et al., 2024
Pregnancy and lactation	Traditional use persists, but evidence certainty remains limited	Use stronger counseling and avoid overgeneralized recommendation	Eid & Jaradat, 2020; Foong et al., 2020; National Library of Medicine, 2026
Evidence hierarchy	Many claims remain preclinical or indirect	Avoid overstating antimicrobial and neuro-metabolic promise	Torghabeh et al., 2024; Khodadadian & Balali-Dehkordi, 2025

## 6. METHODOLOGICAL LIMITATIONS AND RESEARCH PRIORITIES

Heterogeneity is the greatest drawback of the latest anise literature. Several studies vary in terms of plant part, method of extraction, standardization, dose and outcome definition. It is especially troublesome in the case of an aromatic plant, whose biological action is heavily reliant on volatile chemistry, and whose non-volatile fractions do

not necessarily play equally across models (Wu et al., 2023; Semwal et al., 2026). The second limitation is the lack of balance between the depth of the experiment and clinical maturity. The number of studies on antioxidants, antimicrobials, and anti-inflammatory is growing substantially, and the number of high-quality human trials is relatively small, small, geographically concentrated (Baez et al., 2023; Mosaffa-Jahromi et al., 2024; Azimi et al., 2024).

Further studies ought to thus emphasize better preparations, dose disclosures, multi-centered randomized controlled trials, and better isolation between individual-herb and multi-herb effects. It must also bring agronomy, chemistry and therapeutics more purposefully together, as climate sensitive cultivation, seed maturity, processing technologies and controlled ways of extracting products affect the medicinal product long before it is being used in clinics (Soussi et al., 2023; Balkhyour et al., 2021; Boumahdi et al., 2021; Ulusoy et al., 2024).

## 7. CONCLUSION

Anise is a medicinal plant which has both authentic modernity relevance since its traditional reputation is partially substantiated by current chemistry, experimental pharmacology and selective clinical literature. The most justifiable contemporary use of it is in the areas of digestive aid and the symptom-specific phytotherapy, in which traditional continuity, mechanistic plausibility, and up-to-date evidence pull most into concert. Scientifically significant, but of lower evidence quality, are women health, respiratory support, antimicrobial relevance, and more expansive neuro-metabolic effects. In that regard, anise cannot be offered as a somewhat negligible kitchen spice as well as a panacea. Instead, it can be conceptualized as a promising, preparation sensitive traditionally based medicinal plant that stands in the future provided that it is further standardized and human studies are designed more clearly and safety interpreted carefully.

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