

Bridging traditional medicine and endocrinology: Assessing herbal and ayurvedic therapies for hypothyroidism

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Received: 02-12-2025, Accepted: 24-02-2026, Published online: 28-02-2026



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HOW TO CITE THIS

Rana et al. Bridging traditional medicine and endocrinology: Assessing herbal and ayurvedic therapies for hypothyroidism. *Mediterr J Pharm Pharm Sci.* 2026; 6(1): 57-61. [Article number: 241]. <https://doi.org/10.5281/zenodo.18800493>

Keywords: Ayurvedic medications, Hashimoto's thyroiditis, goitre/iodine deficiency, thyroxine

Abstract: Thyroid problems are among the most prevalent and difficult endocrine illnesses that we face globally. Goitre/iodine deficiency, Hashimoto's thyroiditis, hypothyroidism, hyperthyroidism, and thyroid cancer are among the major thyroid conditions because of their varied clinical appearance. Hypothyroidism is possibly the most difficult of them to diagnose. A lack of the thyroid hormones triiodothyronine and thyroxine in the body is the cause of hypothyroidism. The condition known as mild or subclinical hypothyroidism occurs when blood thyroid-stimulating hormone levels are slightly high, but peripheral thyroid hormone levels are within the normal range. There is currently little information on the direct experimental, pharmacological, or preclinical forms of proof that using herbal and ayurvedic medications to treat hypothyroidism is effective. This article's scope includes the effectiveness of herbal medications or traditional Ayurvedic treatments in reducing the pathophysiological symptoms of hypothyroidism.

Introduction

Hypothyroidism, which is caused by low thyroid hormone levels. Thyroid hormone production is insufficient in primary hypothyroidism [1]. Hypothyroidism is caused by faulty pituitary or hypothalamic activity, however, less frequent secondary or central hypothyroidism occurs when the thyroid gland functions correctly. Morbidity and mortality are increased when hypothyroidism is left untreated. Hypothyroidism can manifest in a variety of ways, ranging from an asymptomatic patient whose illness is detected by regular blood work to the severe manifestation of myxoedema coma [2].

In the anterior neck, directly under the laryngeal prominence (Adam's apple), lies the thyroid gland, a ductless alveolar gland. With two lobes around the trachea and joined in the centre by an isthmus, it resembles a butterfly [3]. Its lymphatic system is abundant, and its superior and inferior thyroid arteries supply it with blood. Its superior, middle, and inferior thyroid veins drain it [4]. However, the most prevalent aetiology in iodine-sufficient nations, such as the USA and Australia, is autoimmune thyroid illnesses (the most common of these being Hashimoto thyroiditis) [5]. There is a chance that autoimmune thyroid illness is inherited. Similar to many other autoimmune diseases, it is more prone to coexist with diseases of other organ systems. The degree to which environmental variables contribute to the development of autoimmune thyroid illnesses is unknown, they may include infections, excessive iodine consumption, or adverse drug reactions [6]. The symptoms of hypothyroidism are many and might differ from person to person. Typical signs of

hypothyroidism include fatigue, increased susceptibility to cold, constipation, skin that is dry, gaining weight, puffy face, a raspy voice, rough skin and hair, weakening of the muscles, stiffness, soreness, and muscle pains, irregular or heavier-than-normal menstrual periods, hair thinning, bradycardia, another name for slowed heart rate, depression, and issues with memory [7]. There is little information on the experimental, pharmacological, or preclinical forms of proof that using herbal and Ayurvedic medications to use in the treatment of some diseases [8-10], one of these are hypothyroidism, is effective. This review aims to assess the current effectiveness of herbal medications or traditional Ayurvedic treatments in reducing the pathophysiological symptoms of hypothyroidism.

Study design and search strategy

An evidence-based study was created by compiling research articles from a variety of offline and online peer-reviewed journals and databases, including PubMed, MedlinePlus, Sodhganga, Google Scholar, and others, that contained data on the pharmacological activities and preclinical efficacy of chemically induced hypothyroidism in mammals. The Charaka Samhita and Sushruta Samhita, two traditional Ayurvedic classics, were also examined to get insightful inferences from the classical data.

Traditional Ayurvedic treatment of hypothyroidism: According to Ayurveda, the thyroid gland is a lymphatic channel (rasabaha srotas). A comprehensive approach to the mind, behaviour, body, and environment is used in the treatment. To balance tridoshas and transition to rasayana (rejuvenative) therapy, its primary goal is to unclog the body's obstructed channels before beginning any oral therapy [11]. One of the fundamental principles, known as "Saamana Vishesh Siddhanta," states that similar conditions exacerbate the disease condition, while dissimilar conditions alleviate it. This treatment methodology aids in the reduction of kapha through the use of kapha-inhibiting drugs, the elevation of dhatugata (tissue level), or pitta, through the use of pitta-enhancing drugs, and the reduction of meda (fat) through the use of meda neutralising drugs. All of these techniques aid in the restoration of the body's equilibrium and metabolic activity, which were changed when kapha blocked the channels [12].

Table 1: Herbal remedies and their pharmacological action for hypothyroidism

Botanical name/family	Common Name	Used part	Action	Pharmacological activity
<i>Nigella sativa L.</i> Ranunculaceae	Kalonji	Seeds	Thyroid stimulating hormone (TSH) and antithyroid peroxidase (anti-TPO) antibody levels in the blood dropped as serum T3 levels rose [13].	Antioxidant activity, antimicrobial/antibacterial activity, antiviral activity, antiparasitic, anticancer activity, anti-inflammatory and immunomodulatory activity, cardioprotective, antihypertensive activity, antidiabetic activity [14, 15].
<i>Morus alba</i> Moraceae	Shahtoot	Leaf	It cured goitre	Analgesic, anthelmintic, antibacterial, anti-rheumatic, diuretic, hypotensive, hypoglycaemia, purgative, restorative, sedative tonic, blood stimulant [16].
<i>Bauhinia purpurea</i> Fabaceae	Kaniar	Bark	It reduced cholesterol levels and increased thyroid hormone levels	liver protective, renal protective, anti-inflammatory, antipyretic, analgesic, antimalarial, gastrointestinal protective, prophylactic, wound rehabilitation, antidiabetic, antifungal, antiulcer, antioxidant, antidepressant, cardiac action [17].
<i>Bacopa monnieri</i> Scrophulariaceae	Brahmi	Whole plant	It increased T3 and T4, decreased oxidative stress, and enhanced focus and memory	Antibacterial, anti-cancer, anti-oxidant, antihyperglycemic, detoxifying, stimulating memory, anti-psychotic, anti-epileptic, anti-hypertensive [18, 19].
<i>Commiphora mukul</i> Burseraceae	Guggulu	Oleo-rasin	It increased the T3 and T4 ratios and enhanced thyroid histology.	Arthritis, Anti-diabetic and anti-high cholesterol. Anti-neoplastic insect repellent properties [20, 21].
<i>Withania somnifera</i> Solanaceae	Ashwagandha	Root	It reduced oxidative stress, increased thyroid hormone levels, and decreased cortisol.	Antimicrobial and antifungal activities, pesticidal and larvicidal activities, anti-inflammatory, cytotoxic activities, hepatoprotective activities, immunomodulatory activity, cardioprotective activity [22].

<i>Moringa oleifera</i> Moringaceae	Shigru	Roots, seeds, leaf	Thyroid hormone levels were elevated.	anti-cancer activity, anti-diabetic activities, cardioprotective activity, neuroprotective activity, immunomodulatory activity, hepatoprotective activity, antihypertensive activity, anti-asthmatic activity [18, 23].
<i>Achyranthes aspera</i> Amaranthaceae	Apamarga	Whole plant	It decreased oxidative stress and increased glucose and thyroid hormones.	Anti-inflammatory, antioxidant, antimicrobial activity, antidiabetic effects, analgesic properties, hepatoprotective activity [24, 25].
<i>Bauhinia variegata</i> Fabaceae	Kachanara	Bark	It improved thyroid histology, lowered cholesterol, raised blood thyroid hormone levels, and decreased neck oedema.	Anticancer, antioxidant, hypolipidemic, anti-inflammatory, nephroprotective, antiulcer, immunomodulating, wound healing effect [26, 27].
<i>Magnifera indicum</i> Anacardiaceae	Mango	Fruit peel	It decreased oxidative stress and increased thyroid hormone levels.	antibacterial, anti-tumor, antispasmodic, antipyretic, antidiarrheal, antiallergic, immunomodulation, hypolipidemic, anti-microbial, hepatoprotective, gastroprotective [28].
<i>Eichhornia crassipes</i> Pontederiaceae	Water hyacinth	Whole plant	Thyroid function was boosted.	antioxidant properties, cytotoxic and anticancer effects, antimicrobial activity, larvicidal activity [29, 30].
<i>Pistia startiotes</i> Araceae	Jalakumbhi	Whole plant	It decreased thyroid oedema.	Anti-inflammatory activity, diuretic activity, antifungal activity, wound healing potential, antidiabetic, bronchodilator [31, 32].
<i>Linum usitatissimum</i> Linaceae	Alsi	Seeds	It enhanced the synthesis of thyroid hormones and preserved thyroid function.	anti-cancer, antidiabetic, anti-malarial, hepatoprotective, immunosuppressive, antiarrhythmic [33-35].
<i>Zingiber officinale</i> Zingiberaceae	Adrak	Rhizome	In cases of hypothyroidism, it restored thyroid health.	Anti-cancer effects, anticoagulant effects, anti-inflammatory effects, cardiovascular effects, immunomodulatory effects, antiarthritic effect, antigenotoxic activity, mutagenicity [36-39].
<i>Saussurea lappa</i> Compositae	Kuth	Root	It enhanced the histology of the thyroid.	Antiulcerogenic activity, anti-cancer activity, anti-inflammatory activity, antibacterial activity, hepatoprotective activity, immunomodulatory activity, cardiovascular diseases, anticonvulsant, antihyperlipidemic activity [40, 41].

Conclusion: Herbal medication therapy presents a promising adjunctive strategy for the treatment of hypothyroidism, especially in mild or subclinical instances, or as a supportive measure in conjunction with traditional therapies. Herbs with the ability to modulate thyroid function and alleviate symptoms include guggul, bacopa, and ashwagandha. However, to guarantee safety and efficacy, customised therapy and medical monitoring are necessary due to the intricacy of thyroid problems. To confirm these plants' medicinal potential and provide standardised treatment procedures, more clinical research is required. Since herbal remedies are natural and have the ability to promote thyroid function, they have become more and more popular as complementary and alternative therapies for treating hypothyroidism. Numerous herbs include adaptogenic, anti-inflammatory, and thyroid-stimulating qualities that can have a beneficial effect on the endocrine system.

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Author contribution: PR conceived, designed the study, and collected data. MRR, VT & AK contributed to data analysis. All authors performed the analysis. MRR drafted the manuscript. All authors approved the manuscript, hence, are accountable for its contents.

Conflict of interest: The authors declare the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

Ethical issues: The authors completely observed ethical issues, including plagiarism, informed consent, data fabrication or falsification, and double publication or submission.

Data availability statement: The raw data that support the findings of this article are available from the corresponding author upon reasonable request.

Generative AI disclosure: No Generative AI was used in the preparation of this manuscript.