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Medicinal Plants for the Treatment of Irritable Bowel Syndrome (IBS): A Review and Comparison with Animal and Clinical Studies

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Abstract: Irritable bowel syndrome (IBS) is one of the most prevalent gastrointestinal disorders, significantly impairing patients' quality of life. The use of medicinal plants in traditional Iranian medicine has a long-standing history in managing the symptoms of this condition. This study aimed to review and identify native medicinal plants employed in traditional Iranian medicine for the treatment of IBS and to compare traditional evidence with findings from preclinical, clinical, and animal model studies. This study was conducted as a systematic review of traditional Iranian medical texts. Sources included reference books on traditional medicine and herbal therapy, as well as relevant online databases and resources. The traditionally reported effects of medicinal plants were subsequently compared with data from preclinical studies and contemporary research findings. A wide range of medicinal plants has been used in the treatment of IBS, including *Matricaria chamomilla* L., *Cuminum cyminum* L., *Mentha piperita* L., *Valeriana officinalis* L., *Silybum marianum* (L.) Gaertn., *Melissa officinalis* L., *Foeniculum vulgare* Mill., *Glycyrrhiza glabra* L., *Aloe barbadensis* Mill., *Brassica oleracea* L., *Cynara scolymus* L., *Curcuma longa* L., *Daucus carota* L., *Zingiber officinale* Roscoe, *Hordeum vulgare* L., *Lens culinaris* Medik., *Avena sativa* L., *Linum usitatissimum* L., *Spinacia oleracea* L., *Ferula assa-foetida* L., *Quercus robur* L., *Taraxacum officinale* F.H. Wigg., *Urtica dioica* L., *Lavandula angustifolia* Mill., *Pimpinella anisum* L., *Cinnamomum verum* J. Presl, *Achillea millefolium* L., *Nigella sativa* L., and *Camellia sinensis* (L.) Kuntze. Native Iranian medicinal plants demonstrate considerable potential in alleviating the symptoms of IBS and may serve as complementary therapeutic options.

Keywords: Gastrointestinal disorders, irritable bowel syndrome, medicinal plants, traditional medicine, herbal therapy

Plantas Medicinais para o Tratamento da Síndrome do Intestino Irritável (SII): Uma Revisão e Comparação com Estudos Animais e Clínicos

Resumo: A síndrome do intestino irritável (SII) é um dos distúrbios gastrointestinais mais prevalentes, afetando significativamente a qualidade de vida dos pacientes. O uso de plantas

medicinais na medicina tradicional iraniana possui uma longa história no manejo dos sintomas desta condição. Este estudo teve como objetivo revisar e identificar plantas medicinais nativas empregadas na medicina tradicional iraniana para o tratamento da SII e comparar as evidências tradicionais com achados de estudos pré-clínicos, clínicos e modelos animais. O estudo foi conduzido como uma revisão sistemática de textos de medicina tradicional iraniana. As fontes incluíram livros de referência sobre medicina tradicional e fitoterapia, bem como bases de dados e recursos online relevantes. Os efeitos tradicionalmente relatados das plantas medicinais foram posteriormente comparados com dados de estudos pré-clínicos e pesquisas contemporâneas. Uma ampla gama de plantas medicinais tem sido utilizada no tratamento da SII, incluindo *Matricaria chamomilla* L., *Cuminum cyminum* L., *Mentha piperita* L., *Valeriana officinalis* L., *Silybum marianum* (L.) Gaertn., *Melissa officinalis* L., *Foeniculum vulgare* Mill., *Glycyrrhiza glabra* L., *Aloe barbadensis* Mill., *Brassica oleracea* L., *Cynara scolymus* L., *Curcuma longa* L., *Daucus carota* L., *Zingiber officinale* Roscoe, *Hordeum vulgare* L., *Lens culinaris* Medik., *Avena sativa* L., *Linum usitatissimum* L., *Spinacia oleracea* L., *Ferula assa-foetida* L., *Quercus robur* L., *Taraxacum officinale* F.H. Wigg., *Urtica dioica* L., *Lavandula angustifolia* Mill., *Pimpinella anisum* L., *Cinnamomum verum* J. Presl, *Achillea millefolium* L., *Nigella sativa* L. e *Camellia sinensis* (L.) Kuntze. As plantas medicinais nativas do Irã demonstram considerável potencial na redução dos sintomas da SII e podem servir como opções terapêuticas complementares.

Palavras-chave: Distúrbios gastrointestinais, síndrome do intestino irritável, plantas medicinais, medicina tradicional, fitoterapia

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Introduction

Chronic diseases are becoming increasingly prevalent and constitute a major global health challenge, imposing substantial economic and social burdens. The effective prevention and management of these diseases are essential for improving quality of life and reducing healthcare costs (GHASEMI et al., 2020; SHOJASAADAT et al., 2019; AZARY et al., 2011; MEHRYAR et al., 2024; ALIZADEH et al., 2024; FARAJI et al., 2022). Irritable bowel syndrome (IBS) is one of the most common chronic gastrointestinal disorders. Gastrointestinal disorders represent some of the most significant public health challenges worldwide, imposing substantial burdens on quality of life, healthcare costs, and overall disease burden

(THAKUR et al., 2025). These conditions encompass both functional and structural disorders of the digestive tract, ranging from acute, life-threatening illnesses to chronic disorders that markedly impair daily functioning and well-being (Black et al., 2025). From both clinical and public health perspectives, timely diagnosis, optimal management, and the development of low-cost, low-risk therapeutic strategies remain key priorities for research and healthcare policy (BLACK et al., 2025).

Irritable bowel syndrome (IBS) is a common functional gastrointestinal disorder characterized by recurrent abdominal pain or discomfort accompanied by chronic alterations in bowel habits, including constipation, diarrhea, or a combination of both (Marano et al., 2025). Despite the absence of detectable structural abnormalities in many patients, IBS imposes a considerable symptom burden, often leading to reduced quality of life, impaired social and occupational functioning, and increased healthcare utilization (MARANO et al., 2025). Typical clinical manifestations include recurrent abdominal pain or discomfort, bloating, a sense of incomplete evacuation, straining or urgency, and changes in stool frequency and consistency. IBS frequently co-occurs with psychosomatic conditions such as anxiety and depression (Ng et al., 2018). Its pathogenesis is multifactorial, involving visceral hypersensitivity, motility disturbances, dysregulation of the brain–gut axis, alterations in gut microbiota, and psychosocial factors (CHEY et al., 2015).

The etiology of IBS is complex and involves multiple interacting mechanisms. These include visceral hypersensitivity, dysregulated gastrointestinal motility and neuromuscular signaling, alterations in serotonergic pathways within the gut, low-grade or post-infectious inflammation, dysbiosis, and the influence of psychological stressors or mood disorders (Chey et al., 2015). Genetic predisposition, dietary components particularly fermentable oligo-, di-, monosaccharides, and polyols (FODMAPs) and certain medications may also contribute to the onset or exacerbation of symptoms (AMOURETTI et al., 2006). Epidemiologically, IBS is among the most prevalent gastrointestinal disorders worldwide, with prevalence estimates varying across studies due to differences in diagnostic criteria, methodologies, and population demographics (AMOURETTI et al., 2006). Nevertheless, significant prevalence is observed across virtually all societies, underscoring the pressing need for

effective and sustainable therapeutic strategies (CANAVAN et al., 2014).

Clinical management of IBS typically involves a combination of behavioral interventions, dietary modifications, and pharmacotherapy (CAMILLERI, 2021). Medications are tailored to the predominant symptom profile and may include antispasmodics (for abdominal pain), laxatives or agents that slow bowel transit (for constipation- or diarrhea-predominant IBS), antidiarrheals, serotonergic receptor agonists or antagonists, gut-targeted antibiotics (for small intestinal bacterial overgrowth or microbiota modulation in selected cases), and low-dose psychotropic agents such as tricyclic antidepressants or selective serotonin reuptake inhibitors (SSRIs) (CHEN et al., 2017). While these therapies may be effective for some patients, they are often limited by side effects including dizziness, dry mouth, urinary retention, constipation or diarrhea, cardiovascular complications (for certain serotonergic agents), and other systemic adverse events which can complicate long-term use or use in vulnerable populations such as children, older adults, or patients with comorbidities (BONETTO et al., 2021; DEKEL et al., 2013).

Moreover, patient responses are highly variable, and symptoms may remain refractory to conventional treatments, highlighting the need to explore alternative or complementary therapies with improved efficacy and safety profiles (DEKEL et al., 2013).

In this context, traditional medicine and herbal therapies have emerged as a compelling focus for both research and clinical practice (TACK et al., 2006). In Iran, the rich heritage of traditional medicine and indigenous knowledge of medicinal plants provides a repository of empirically based remedies that have been applied for centuries to gastrointestinal disorders, including abdominal pain, bloating, bowel irregularities, and dyspepsia (HOOSHMAND GAREHBAGH, 2025; SEYDI et al., 2025; ZOLFIGOL, 2025; HAMZEH & RAZMJOUE, 2025).

Many medicinal plants contain bioactive compounds with anti-inflammatory, antispasmodic, microbiota-modulating, mucosal-protective, carminative, and neurocalming properties that, from a pharmacological perspective, can target key pathophysiological pathways implicated in IBS (AVICENNA, 1999).
Furthermore, patient preference for natural

therapies, the relatively lower costs, and the potential for fewer adverse effects albeit requiring careful evaluation and standardization have spurred research into the efficacy, safety, mechanisms of action, and quality control of herbal formulations for IBS management. The aim of this review is to examine the role and therapeutic potential of native medicinal plants used in traditional Iranian medicine for alleviating IBS symptoms.

Methods

This study was conducted as a comprehensive review of traditional Iranian medical texts and relevant online resources related to medicinal plants. Initially, classical and contemporary reference books on traditional medicine and herbal therapy were examined (JURJANI, 2012; RHAZES, 1961; AQILI KHORASANI, 2008; IBN AL-BAYTAR, 1980; MO'MEN TONEKABONI, 2007; ASSADI et al., 1988–2020; SUBRAMANIYAM et al., 2020). Subsequently, online databases, including PubMed, Scopus, Web of Science, SID, and Google Scholar, were searched to identify preclinical studies and recent research investigating the effects of these plants.

Inclusion Criteria:

- Sources describing native Iranian medicinal plants mentioned in traditional texts for the treatment of gastrointestinal disorders, including irritable bowel syndrome (IBS).
- Preclinical studies and recent research reporting the effects of these plants on IBS symptoms.
- Articles and resources published in Persian or English.

Exclusion Criteria:

- Sources focusing on non-native plants or applications unrelated to gastrointestinal health.
- Articles lacking full-text access or extractable data.
- Sources with low scientific quality or insufficient evidence.

After collecting eligible sources, the traditionally reported effects of the medicinal plants were systematically compared with findings from preclinical studies and contemporary research to identify plants with the highest potential for managing IBS symptoms.

Results

A wide range of medicinal plants has been employed in the management of irritable bowel syndrome (IBS), including *Matricaria chamomilla* L., *Cuminum cyminum* L., *Mentha piperita* L., *Valeriana officinalis* L., *Silybum marianum* (L.) Gaertn., *Melissa officinalis* L., *Foeniculum*

vulgare Mill., *Glycyrrhiza glabra* L., *Aloe barbadensis* Mill., *Brassica oleracea* L., *Cynara scolymus* L., *Curcuma longa* L., *Daucus carota* L., *Zingiber officinale* Roscoe, *Hordeum vulgare* L., *Lens culinaris* Medik., *Avena sativa* L., *Linum usitatissimum* L., *Spinacia oleracea* L., *Ferula assa-foetida* L., *Quercus robur* L., *Taraxacum officinale* F.H. Wigg., *Urtica dioica* L., *Lavandula angustifolia* Mill., *Pimpinella anisum* L., *Cinnamomum verum* J. Presl, *Achillea millefolium* L., *Nigella sativa* L., and *Camellia sinensis* (L.) Kuntze. Table 1 provides a comprehensive list of native Iranian medicinal plants that have been traditionally used for the therapeutic management of IBS, along with their reported effects and supporting evidence from preclinical and contemporary studies.

Table 1: List of medicinal plants effective for irritable bowel syndrome (IBS) in Iranian traditional medicine

Common Name	Scientific Name	Plant Family	Mechanism of Action
Thyme	*Thymus vulgaris* L.	Lamiaceae	Antispasmodic, anti-inflammatory, antimicrobial
Chamomile	*Matricaria chamomilla* L.	Asteraceae	Anti-inflammatory, smooth muscle relaxant, antispasmodic
Cumin	*Cuminum cyminum* L.	Apiaceae	Carminative, antispasmodic, digestive stimulant
Peppermint	*Mentha piperita* L.	Lamiaceae	Antispasmodic, smooth muscle relaxant, carminative
Valerian	*Valeriana officinalis* L.	Caprifoliaceae	Sedative, antispasmodic, stress reduction
Milk Thistle	*Silybum marianum* (L.) Gaertn.	Asteraceae	Hepatoprotective, anti-inflammatory, supports fat digestion
Lemon Balm	*Melissa officinalis* L.	Lamiaceae	Anxiolytic, intestinal relaxant, carminative

Fennel	*Foeniculum vulgare* Mill.	Apiaceae	Antispasmodic, carminative, digestive stimulant
Licorice	*Glycyrrhiza glabra* L.	Fabaceae	Anti-inflammatory (intestinal mucosa), antispasmodic
Aloe Vera	*Aloe barbadensis* Mill.	Asphodelaceae	Anti-inflammatory, intestinal mucosa soother
Cabbage	*Brassica Oleracea* L.	Brassicaceae	Antioxidant, anti-inflammatory, digestive aid
Artichoke	*Cynara scolymus* L.	Asteraceae	Stimulates bile secretion, carminative, digestive aid
Turmeric	*Curcuma longa* L.	Zingiberaceae	Anti-inflammatory, antispasmodic, antioxidant
Carrot	*Daucus carota* L.	Apiaceae	Anti-inflammatory, soluble fiber, promotes bowel movements
Ginger	*Zingiber officinale* Roscoe	Zingiberaceae	Anti-nausea, antispasmodic, anti-inflammatory
Barley	*Hordeum vulgare* L.	Poaceae	Soluble fiber, promotes bowel motility, prebiotic
Lentil	*Lens culinaris* Medik.	Fabaceae	Soluble fiber, prebiotic, digestive aid
Oat	*Avena sativa* L.	Poaceae	Soluble fiber, anti-inflammatory, promotes bowel movements
Flax	*Linum usitatissimum* L.	Linaceae	Natural laxative, soluble fiber, anti-inflammatory
Spinach	*Spinacia Oleracea* L.	Amaranthaceae	Antioxidant, anti-inflammatory, dietary fiber
Fennel	*Foeniculum vulgare* Mill.	Apiaceae	Antispasmodic, carminative, intestinal relaxant
Asafoetida	*Ferula assa-foetida* L.	Apiaceae	Carminative, antispasmodic, digestive stimulant

Oak	*Quercus robur* L.	Fagaceae	Anti-inflammatory, astringent, reduces diarrhea
Dandelion	*Taraxacum officinale* F.H. Wigg.	Asteraceae	Stimulates bile secretion, diuretic, digestive aid
Nettle	*Urtica dioica* L.	Urticaceae	Anti-inflammatory, antispasmodic, digestive aid
Lavender	*Lavandula angustifolia* Mill.	Lamiaceae	Sedative, antispasmodic, anti-inflammatory
Anise	*Pimpinella anisum* L.	Apiaceae	Carminative, antispasmodic, intestinal relaxant
Cinnamon	*Cinnamomum verum* J. Presl	Lauraceae	Anti-inflammatory, antimicrobial, digestive stimulant
Yarrow	*Achillea millefolium* L.	Asteraceae	Antispasmodic, anti-inflammatory, carminative
Black Seed	*Nigella sativa* L.	Ranunculaceae	Anti-inflammatory, antispasmodic, immune booster
Green Tea	*Camellia sinensis* (L.) Kuntze	Theaceae	Antioxidant, anti-inflammatory, carminative

Medicinal plants traditionally used for the management of irritable bowel syndrome (IBS) have been investigated in clinical, preclinical, and animal studies. The relevant findings, including study models, interventions, and observed effects, are summarized in Table 2.

Table 2: Animal models, preclinical, and clinical studies on medicinal plants used for the treatment of irritable bowel syndrome (IBS) and their reported effects

Plant / Compound	Study Model	Study Type	Summary of Results	Reference
Thymol	Rat	Animal	Reduced intestinal hypermotility and visceral discomfort	Rahimi et al., 2023
Licorice + Chamomile + Yarrow	Patients	Clinical	Reduced abdominal pain, bloating, constipation, and diarrhea	Amin et al., 2024
Cuminum cyminum (Cumin)	Post-surgery patients	Clinical	Enhanced bowel movements, reduced pain and bloating	Hirata et al., 2025
Mentha piperita and Peppermint Oil	Patients	Clinical	Reduced abdominal pain and dyspepsia	Azimi et al., 2024
MPR Herbal Formula	IBS-C patients	Clinical	Reduced anxiety and depression	Portincasa et al., 2016
Curcumin + Fennel Essential Oil (CU-FEO)	Patients	Clinical	Reduced symptom severity, improved quality of life	Størsrud et al., 2015
Licorice + Chamomile + Yarrow	Patients	Clinical	Reduced abdominal pain, bloating, constipation, and diarrhea	Giacosa et al., 2022; Zhang et al., 2020

Curcumin + Boswellia (CBP) with low-FODMAP diet	IBS patients with dysbiosis	Clinical	Reduced bloating and pain, improved dysbiosis	Qayyum et al., 2023
Ginger and its Extract	Animal Model	Animal	Reduced intestinal inflammation and hypersensitivity	Amjad & Jafary, 2000
Psyllium-based mixture (Flaxseed, Psyllium, Honey)	Patients	Clinical	Improved symptoms and quality of life	Nematgorgani et al., 2020
Urtica dioica (Nettle)	IBD patients	Clinical	Reduced inflammation, TNF-α, and calprotectin	Sharma et al., 2024
Mao Jian Green Tea Ethanol Extract (MJGT_EE)	IBS-C animal model	Animal	Enhanced bowel movements, reduced sensitivity, improved gut microbiota	Wu et al., 2023

Discussion

Recent studies indicate that irritable bowel syndrome (IBS) is not merely a functional gastrointestinal disorder but also has widespread impacts on patients' quality of life and mental health. Clinical manifestations including abdominal pain, bloating, and altered bowel habits often lead to social and psychological limitations. Conventional pharmacological treatments, particularly antagonists and antispasmodic drugs, are limited by variable efficacy and potential adverse effects, emphasizing the need to explore complementary and natural approaches, particularly medicinal plants (SHARMA et al., 2024; WU et al., 2023; RAHIMI et al., 2023; SHARMA et al., 2024; WU et al., 2023).

Preclinical and clinical evidence demonstrates that various plant compounds can alleviate IBS symptoms through multiple mechanisms. For example, thymol has been shown to modulate 5-HT3AR receptors and reduce stress-induced intestinal hypermotility and visceral discomfort, producing effects comparable to

conventional antagonists and representing a promising therapeutic option (RAHIMI et al., 2023). These findings underscore the central role of neurotransmitter systems and gut–brain pathways in IBS management.

Multicomponent herbal formulations have also produced significant clinical outcomes. Combinations containing licorice, chamomile, and yarrow administered over two to four weeks significantly reduced abdominal pain, bloating, diarrhea, constipation, and the sensation of incomplete evacuation (AMIN et al., 2024; GIACOSA et al., 2022; ZHANG et al., 2020). These effects are likely attributable to the anti-inflammatory and antispasmodic properties of the constituent plants, as well as their beneficial modulation of gut microbiota. Similarly, formulations such as curcumin combined with fennel essential oil (CU-FEO) and the MPR formula not only alleviated gastrointestinal symptoms but also improved psychological indices, including anxiety and depression (Portincasa et al., 2016; Størsrud et al., 2015), highlighting the importance of the gut–brain axis in IBS therapy.

Individual medicinal plants including green cumin, ginger, peppermint, nettle, and Mao Jian green tea target diverse pathophysiological mechanisms. These include anti-inflammatory effects via NF-κB pathway modulation, enhancement of gastrointestinal motility, reduction of visceral hypersensitivity, modulation of gut microbiota, and decreased expression of inflammatory cytokines (HIRATA et al., 2025; AZIMI et al., 2024; AMJAD & JAFARY, 2000; NEMATGORGANI et al., 2020; SHARMA et al., 2024; WU et al., 2023; RAHIMI et al., 2023; SHARMA et al., 2024; WU et al., 2023).

For instance, administration of the ethanol extract of Mao Jian green tea (MJGT_EE) in an IBS-C animal model enhanced bowel movements, improved stool output, and increased populations of beneficial bacteria (40), demonstrating its potential to concurrently improve both clinical and microbiological features of IBS.

Evidence also supports the integration of herbal approaches with dietary interventions. For example, low-FODMAP diets combined with curcumin and boswellia supplementation have produced synergistic effects, significantly alleviating bloating and abdominal pain (QAYYUM et al., 2023). These findings highlight the interplay between nutrition, gut microbiota, and herbal therapy in IBS management.

Overall, preclinical and clinical evidence indicates that medicinal plants can reduce gastrointestinal symptoms while

exerting positive psychological effects, offering a safe, cost-effective, and multifaceted management approach. Nevertheless, many studies require validation through larger clinical trials, standardization of dosages and herbal formulations, and determination of optimal treatment durations. This is particularly critical for multicomponent formulas and concentrated extracts with complex mechanisms. Taken together, the use of medicinal plants for IBS is supported by scientific evidence and mechanistic rationale and given the limitations of conventional pharmacotherapy and patient preference for natural treatments, they hold substantial clinical potential as complementary or alternative therapeutic options (Sharma et al., 2024; Wu et al., 2023; Rahimi et al., 2023; Sharma et al., 2024; Wu et al., 2023).

Conclusion

Native medicinal plants used in traditional Iranian medicine demonstrate considerable potential for alleviating IBS symptoms. Preclinical and clinical studies indicate that herbal compounds, acting through diverse mechanisms including antispasmodic, anti-inflammatory, microbiota-modulating, and neurocalming effects can reduce abdominal pain, bloating, and bowel habit irregularities. Multicomponent formulations and herbal regimens combined with appropriate dietary interventions exhibit synergistic effects and improvements in psychological indices such as anxiety and depression. The use of these plants provides a safe, cost-effective, and multifaceted approach to IBS management. However, further large-scale clinical trials, dose standardization, and determination of optimal treatment durations are required. Current evidence supports the integration of medicinal plants as complementary or alternative therapies alongside conventional pharmacological treatments, potentially offering novel therapeutic options for patients with treatment-resistant symptoms.

References

ALIZADEH M, HOSSEINIAZAR MM, ALAMI F, BARARNIA ADABI S. The effects of meal patterns on liver steatosis, fibrosis, and biochemical factors in patients with nonalcoholic fatty liver disease: a randomized controlled clinical trial. **J Diabetes Metab Disord.** 2024 May 31;23(1):987–97.

AMIN EA, ISMAIL E, MAHBOOBEH R, TABANDEH S. The effect of Cuminum cyminum on the return of bowel motility after abdominal surgery: a triple-blind randomized clinical trial. **BMC Complement Med Ther.** 2024 Jul 4;24(1):254.

AMJAD H, JAFARY HA. Foeniculum vulgare therapy in irritable bowel syndrome: 273. **Off J Am Coll Gastroenterol.** 2000 Sep 1;95(9):2491.

AMOURETTI M, LE PEN C, GAUDIN AF, BOMMELAER G, FREXINOS J, RUSZNIEWSKI P, et al. Impact of irritable bowel syndrome (IBS) on health-related quality of life (HRQOL). **Gastroenterol Clin Biol.** 2006 Feb 1;30(2):241-6.

AQILI KHORASANI MH. MAKHZAN AL-ADWIYAH. Tehran: Tehran University of Medical Sciences Press; 2008.

ASSADI M, MAASSOUMI AA, KHATAMSAZ M, MOZAFFARIAN V, editors. Flora of Iran. Tehran: **Research Institute of Forests and Rangelands;** 1988–2020.

Avicenna. The Canon of Medicine (Al-Qanun fi al-Tibb). Beirut: **Alaalami Library;** 1999.

AZARY SY, KALBASI H, SETAYESH A, ZALI MR, ALIZADEH AHM. Predictive value and main determinants of abnormal features of intraoperative cholangiography during cholecystectomy. **Hepatobiliary Pancreat Dis Int.** 2011 May 31;10(3):308–12.

AZIMI M, SHAHRBABAKI HK, RAEISZADEH M, ESLAMI O. Effects of a traditional herbal formula containing Melissa officinalis, Pimpinella anisum, and Rosa damascena on anxiety and depression in patients with constipation-predominant irritable bowel syndrome (IBS-C): A double-blind randomized clinical trial. **Explore.** 2024 Nov 1;20(6):103013.

BLACK CJ, OLANO C, QUIGLEY EM, FORD AC. Common misconceptions and controversies in the management of irritable bowel syndrome. **Nat Rev Gastroenterol Hepatol.** 2025 Apr 25:1-0.

BONETTO S, FAGOONEE S, BATTAGLIA E, GRASSINI M, SARACCO GM, PELLICANO R. Recent advances in the treatment of irritable bowel syndrome. **Pol Arch Intern Med.** 2021 Aug 30;131(7-8):709-15.

CAMILLERI M. Diagnosis and treatment of irritable bowel syndrome: a review. **JAMA.** 2021 Mar 2;325(9):865-77.

CANAVAN C, WEST J, CARD T. The epidemiology of irritable bowel syndrome. **Clin Epidemiol**. 2014 Feb 4; 6:71-80.

CHEN L, ILHAM SJ, FENG B. Pharmacological approach for managing pain in irritable bowel syndrome: a review article. **Anesth Pain Med.** 2017 Jan 25;7(2): e42747.

CHEY WD, KURLANDER J, ESWARAN S. Irritable bowel syndrome: a clinical review. **JAMA**. 2015 Mar 3;313(9):949-58.

DEKEL R, DROSSMAN DA, SPERBER AD. The use of psychotropic drugs in irritable bowel syndrome. **Expert Opin Investig Drugs.** 2013 Mar;22(3):329-39.

FARAJI S, HOSSEINI AZAR MRM, ALIZADEH M. Brewed chicory leaf consumption has unexpected side effects along beneficial effects on liver enzymes in non-alcoholic fatty liver disease patients. **J Herb Med.** 2022 Jun 30; 34:100.

GHASEMI A, VALIZADEH N, HASHEMI A. Evaluation of Helicobacter pylori IgG levels in type 2 diabetes mellitus patients. **Clinical Diabetology.** 2020;9(3):179-83.

GIACOSA A, RIVA A, PETRANGOLINI G, ALLEGRINI P, FAZIA T, BERNARDINELLI L, et al. Beneficial effects on abdominal bloating with an

innovative food-grade formulation of Curcuma longa and Boswellia serrata extracts in subjects with irritable bowel syndrome and small bowel dysbiosis. **Nutrients.** 2022 Jan 18;14(3):416.

HAMZEH F, RAZMJOUE D. Herbal therapy for sleep improvement: A review of herbal insomnia mechanisms. PBP. 2025;7(2):70–75. **doi: 10.61186/pbp.7.2.11.**

HIRATA M, FORNARI LAURINDO L, DOGANI RODRIGUES V, CRISTINA CASTILHO CARACIO F, VALENTI VE, PEREIRA ED, et al. Investigating the health potential of Mentha species against gastrointestinal disorders—A systematic review of clinical evidence. **Pharmaceuticals**. 2025 May 8;18(5):693.

HOOSHMAND GAREHBAGH L. An ethnobotanical review of medicinal plants traditionally used for diabetes management in southern Iran. J Biochem Phytomed. 2025;4(1):23-30. **doi: 10.34172/jbp.2025.4**

Ibn al-Baytar. Al-Jami li-Mufradat al-Adwiyah wa al-Aghdhiya. Cairo: Council of Arab League; 1980.

Jurjani I. Zakhireye Khwarazmshahi. Qom: Institute of Medical History, Islamic and Complementary Medicine; 2012.

MARANO G, TRAVERSI G, POLA R, GASBARRINI A, GAETANI E, MAZZA M. Irritable Bowel Syndrome: A Hallmark of Psychological Distress in Women?. **Life**. 2025 Feb 11;15(2):277.

MEHRYAR HR, AZAR MRH, EBRAHIMI A, GARKAZ O. Examining the prevalence of gastrointestinal symptoms in patients with COVID-19 admitted to Imam Khomeini Hospital in Urmia in the first half of 2021. **Tehran Univ Med J.** 2024 Jun 30;82(4):339–45.

Mo'men Tonekaboni M. Tohfat al-Mo'menin. Tehran: Nashre Shahr; 2007.

NEMATGORGANI S, AGAH S, SHIDFAR F, JANANI L, FAGHIHI A, et al. The effect of Urtica Dioica leaf extract intake on serum TNF-α, stool calprotectin and erythrocyte sedimentation rate in patients with inflammatory bowel disease: A double-blind, placebo-controlled, randomized, clinical trial. **Mediterr J Nutr Metab.** 2020 Mar 6;13(1):75-87.

NG QX, SOH AY, LOKE W, LIM DY, YEO WS. The role of inflammation in irritable bowel syndrome (IBS). **J Inflamm Res.** 2018 Sep 21; 11:345-9.

PORTINCASA P, BONFRATE L, SCRIBANO ML, KOHN A, CAPORASO N, FESTI D, et al. Curcumin and fennel essential oil improve symptoms and quality of life in patients with irritable bowel syndrome. **J Gastrointest Liver Dis.** 2016 Jun 1;25(2).

QAYYUM S, SULTANA A, HEYAT MB, RAHMAN K, AKHTAR F, et al. Therapeutic efficacy of a formulation prepared with Linum usitatissimum L., Plantago ovata Forssk., and honey on uncomplicated pelvic inflammatory disease analyzed with machine learning techniques. **Pharmaceutics.** 2023 Feb 14;15(2):643.

RAHIMI E, MINOEI K, YAZDANPANAH K, ROSHANI D, FARHADI L. Evaluating the effect of Glycyrrhiza glabra, Matricaria chamomilla, and Achillea millefolium on the symptoms of irritable bowel syndrome: **Clinical trial. Chronic Dis J.** 2023 Nov 4:215-22.

RAHIMI E, MINOEI K, YAZDANPANAH K, ROSHANI D, FARHADI L. Evaluating the effect of Glycyrrhiza glabra, Matricaria chamomilla, and Achillea millefolium on the symptoms of irritable bowel syndrome: **Clinical trial. Chronic Dis J.** 2023 Nov 4:215-22.

RHAZES. AL-HAWI (Liber Continens). Hyderabad: Dairatul Ma'arif; 1961.

SEYDI F, SOLTANBEIGI A, POURRAHIM A, ASADZADEH R. Ethnobotanical study of medicinal plants utilized for the management of prostate disorders in Abdanan city, Ilam Province, Western Iran. PBP. 2025;7(2):56–68. **doi: 10.61186/pbp.7.2.7**

SHARMA M, RANA S, AGGARWAL S, AHSAN AU, BUDHWAR M, MEHRA S, et al. Efficacy of Nigella sativa seed oil against psychophysical stress induced irritable bowel syndrome and anxiety-like symptoms in Wistar rats. **Psychopharmacology.** 2024 Dec;241(12):2609-26.

SHARMA M, RANA S, AGGARWAL S, AHSAN AU, BUDHWAR M, MEHRA S, et al. Efficacy of Nigella sativa seed oil against psychophysical stress induced irritable bowel syndrome and anxiety-like symptoms in Wistar rats. **Psychopharmacology.** 2024 Dec;241(12):2609-26.

SHOJASAADAT F, AYREMLOU P, HASHEMI A, MEHDIZADEH A, ZARRIN R. A randomized controlled trial comparing effects of a low-energy diet with n-3 polyunsaturated fatty acid supplementation in patients with non-alcoholic fatty liver disease. **J Res Med Sci.** 2019 Mar 25; 24:21. **doi: 10.4103/jrms.JRMS_282_18**.

STØRSRUD S, PONTÉN I, SIMRÉN M. A pilot study of the effect of Aloe barbadensis Mill. extract (AVH200®) in patients with irritable bowel syndrome: A randomized, double-blind, placebo-controlled study. **J Gastrointest Liver Dis.** 2015 Sep 1;24(3):275-80.

SUBRAMANIYAM S, YANG S, DIALLO BN, FANSHU X, LEI L, LI C, et al. Oral phyto-thymol ameliorates the stress-induced IBS symptoms. **Sci Rep.** 2020; 10:13900.

TACK J, FRIED M, HOUGHTON LA, SPICAK J, FISHER G. Systematic review: the efficacy of treatments for irritable bowel syndrome–a European perspective. **Aliment Pharmacol Ther**. 2006 Jul;24(2):183-205.

THAKUR ER, KHASAWNEH M, MOAYYEDI P, BLACK CJ, FORD AC. Efficacy of behavioural therapies for irritable bowel syndrome: a systematic review and network meta-analysis. **Lancet Gastroenterol Hepatol.** 2025 Oct 10.

WU L, GAO L, JIN X, CHEN Z, QIAO X, CUI X, GAO J, et al. Ethanol extract of Mao Jian green tea attenuates gastrointestinal symptoms in a rat model of irritable bowel syndrome with constipation via the 5-hydroxytryptamine signaling pathway. **Foods.** 2023 Mar 4;12(5):1101.

WU L, GAO L, JIN X, CHEN Z, QIAO X, CUI X, GAO J, et al. Ethanol extract of Mao Jian green tea attenuates gastrointestinal symptoms in a rat model of irritable bowel syndrome with constipation via the 5-hydroxytryptamine signaling pathway. **Foods.** 2023 Mar 4;12(5):1101.

ZHANG C, HUANG Y, LI P, CHEN X, LIU F, HOU Q. Ginger relieves intestinal hypersensitivity of diarrhea predominant irritable bowel syndrome by inhibiting proinflammatory reaction. **BMC**

Complement Med Ther. 2020 Sep 14;20(1):279.

ZOLFIGOL A. Medicinal plants used in Iranian traditional medicine for enhancing children's heart health: A brief review. **J Biochem Phytomed.** 2025;4(1):9-14. **doi: 10.34172/jbp.2025.2**