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The Role of Avicenna in Herbal Medicine for Infertility Treatment in The Modern Studies: A Systematic Review

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Abstract

Infertility is a significant global health issue, affecting approximately 10–15% of couples worldwide. While modern reproductive medicine has advanced significantly, traditional medical systems continue to offer complementary approaches, particularly through herbal medicine. Avicenna (Ibn Sina, 980–1037 AD), one of the most influential physicians in history, extensively documented herbal treatments for infertility in his seminal work, The Canon of Medicine. However, a systematic evaluation of his contributions within the context of contemporary scientific research is lacking. This systematic review aims to identify, analyze, and evaluate research published till January of 2025 that explores Avicenna's contributions to herbal medicine for infertility. The study assesses the relevance of these herbal remedies based on modern biomedical literature and their potential applications in current infertility treatments. A comprehensive search was conducted across Scopus scientific databases. The search strategy included a combination of keywords related to Avicenna (Ibn Sina), herbal medicine, and infertility. Studies were screened based on predefined eligibility criteria, including relevance to Avicenna's documented herbal treatments for infertility. Data extraction focused on the types of herbal remedies, pharmacological mechanisms, and clinical outcomes reported in the literature. The review identifies key herbal treatments described by Avicenna and evaluates their alignment with modern pharmacological research on infertility. Preliminary findings suggest that several of Avicenna's recommended herbs possess anti-inflammatory, antioxidant, and hormone-regulating properties, supporting their potential therapeutic role in reproductive health. However, scientific validation remains limited, and further experimental and clinical studies are needed. Avicenna's contributions to herbal medicine for infertility remain highly relevant, offering a historical foundation for modern research. This systematic review highlights the need for integrative approaches that bridge traditional and modern medicine to improve infertility treatments. Future studies should focus on experimental validation and clinical trials to establish the efficacy and safety of these herbal remedies.

Keywords: Avicenna, Ibn Sina, Herbal medicine, Infertility, Traditional medicine, Reproductive Health

Introduction

Infertility is a global health concern affecting millions of couples, with an estimated prevalence of 10–15% worldwide (1). Despite advances in modern reproductive medicine, many individuals continue to seek alternative and complementary therapies, including herbal medicine, for managing infertility (2). Traditional medical systems, particularly those rooted in Persian, Greek, and Islamic medicine, have long emphasized the use of natural remedies to enhance fertility (3). One of the most influential figures in the history of medicine, Avicenna (Ibn Sina, 980–1037 AD), played a pivotal role in documenting and systematizing herbal treatments for various health conditions, including reproductive disorders (4).

Avicenna's seminal work, The Canon of Medicine, remains one of the most comprehensive medical encyclopedias ever written and has significantly influenced both Eastern and Western medical traditions (5). Within this text, Avicenna extensively described herbal formulations and their applications for improving reproductive health (6).

His insights into the physiological and pathological aspects of infertility, along with suggested herbal interventions, continue to be referenced in traditional medicine and modern pharmacological research (7). However, the extent and relevance of his contributions to contemporary infertility treatment have not been systematically reviewed (8).

Recent years have seen a surge in bibliometric and systematic analyses evaluating the historical foundations of herbal medicine (9). Given the increasing interest in evidence-based traditional medicine, there is a growing need to assess Avicenna's documented herbal treatments for infertility in the context of modern scientific advancements (10). This systematic review aims to bridge this gap by: A) Identifying and analyzing research studies published between 2020 and 2025 that investigate Avicenna's contributions to herbal medicine for infertility. B) Evaluating the pharmacological relevance of these herbal remedies based on contemporary biomedical literature. C) Comparing Avicenna's insights with modern infertility treatment approaches to determine potential

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areas for integration into clinical practice.

By synthesizing historical and modern perspectives, this review seeks to provide a comprehensive evaluation of Avicenna's legacy in herbal medicine for infertility and explore its potential therapeutic applications in current reproductive health research.

Methods

This systematic review was conducted to evaluate Avicenna's contributions to herbal medicine research in infertility. The review was designed and performed following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines.

Search strategy

A comprehensive literature search was performed using Scopus to identify relevant studies published till 30th January 2025. The search strategy was developed using a combination of Medical Subject Headings (MeSH) terms and keywords related to Avicenna (Ibn Sina), herbal medicine, and infertility (Table 1).

Inclusion and exclusion criteria

Studies were included if they: A) Examined Avicenna's contributions to herbal medicine for treating infertility. B) Were original research articles, reviews, or historical analyses published till January 2025. C) Were published in English. And studies were excluded if they: A) Focused on non-herbal treatments for infertility. B) Were unrelated to Avicenna or did not explicitly mention his contributions. C) Were editorials, commentaries, or opinion pieces without primary data?

Study selection and data extraction

Full-text articles were assessed for eligibility based on the inclusion criteria. Disagreements were resolved through discussion with a third reviewer. The following data were extracted: A) Study title, author(s), and publication year; B) Study type (e.g., review, experimental, historical); C) Herbal remedies discussed; D) Infertility outcomes reported; and E) References to Avicenna's texts or concepts.

Quality assessment

Historical and review articles were evaluated based on relevance, citation credibility, and methodological rigor.

Data Synthesis

Extracted data were synthesized qualitatively, grouping findings based on: A) Herbal treatments identified, B) Mechanisms of action described, C) Comparison with modern infertility treatments, D) References to Avicenna's original texts

Table 1. Search strategy for systematic review of Avicenna's contributions to herbal medicine research in infertility

Code	Queries	Searchable fields
#1	"Ibn Sina" OR "Ibn-e-Sina" OR "Ibnu Sina" OR "Avicenna" OR "Abu Ali Sina" OR "Abu Ali al-Husayn ibn Sina" OR "Abu Ali al-Husayn ibn Abd Allah ibn Sina" OR "Al-Sheikh al-Rais Ibn Sina" OR "Husayn Ibn Abd Allah Ibn Sina" OR "Ibn Seena" OR "Ibn Sīnā (with diacritics)" OR "Avicenne (French)" OR "Abo Ali Sina" OR "Ibn Sena" OR "Abu Ali al-Hussain Ibn Abdallah Ibn Sina"	All fields
#2	"Herbal" OR "Herbals" OR "Herbal Medicine" OR "Medicine, Herbal" OR "Herbalism" OR "Hawaiian Herbal Medicine" OR "Herbal Medicine, Hawaiian" OR "Medicine, Hawaiian Herbal" OR "Laau Lapaau" OR "La au Lapa au" OR "La'au Lapa'au" "Infertility" OR "Sterility, Reproductive" OR "Reproductive Sterility" OR "Sterility" OR "Subfertility" OR "Sub-Fertility"	Title, OR Abstract, OR Author keywords
#3	#1 AND #2 AND #3	

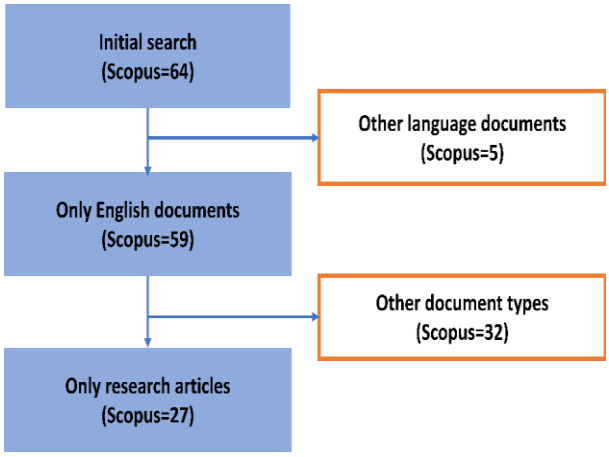

Figure 1. Document selection process for systematic analysis, filtering and refinement of research articles on Avicenna and herbal medicine for infertility in Scopus

Results

The studies reviewed in Table 2. explore various herbal and complementary medicine treatments for reproductive health conditions, particularly polycystic ovary syndrome (PCOS), male infertility, and testicular damage.

The findings highlight the potential therapeutic benefits of plant-based treatments in managing these conditions, supporting both traditional and emerging therapeutic approaches.

Table 2. Research articles on Avicenna and herbal medicine for infertility in Scopus. This table summarizes each study's focus, design, and key findings.

Relevant Condition or Subject	Study Focus	Research Type	Key Findings	References
Cervicitis	Effects of Henna vaginal suppository with antibiotics	Randomized controlled trial	Henna suppositories with antibiotics are effective for cervicitis treatment	(11)
Diabetes-induced male infertility	Efficacy of Curcuma amada on male infertility	Preclinical study	Curcuma amada shows antiapoptotic and antioxidative effects on male infertility	(1)
Diabetes-induced sexual dysfunction	Effects of Lycium barbarum on male sexual dysfunction	Preclinical study	Lycium barbarum improves male sexual function and fertility in diabetic mice	(12)
Diabetes-induced testicular changes	Effects of glibenclamide and troxerutin on sperm and testicular changes	Preclinical study	Glibenclamide and troxerutin improve sperm and testicular health in diabetic rats	(13)
Diabetes-induced testicular changes	Effects of silymarin and metformin on sperm and testicular health	Experimental study	Silymarin and metformin improve sperm parameters and testicular health	(14)
Diabetes-induced testicular toxicity	Effects of silymarin on diabetic male rats	Preclinical study	Silymarin improves testicular toxicity and reproductive performance	(15)
Gynecological diseases	Traditional medicinal plants used by indigenous communities	Ethnobotanical survey	Indigenous communities use various plants for gynecological issues	(16)
Fertility treatments	Review of herbal fertility treatments in North America	Historical review	Historical herbal fertility treatments may offer insights into modern fertility treatments	(17)
Idiopathic male infertility	Comparison of Withania somnifera and pentoxifylline on sperm parameters	Clinical trial	Withania somnifera may improve sperm parameters compared to pentoxifylline	(18)
Infertility	Use of complementary medicine among infertile Iranian women	Cross-sectional study	High use of complementary and alternative medicine among infertile Iranian women	(19)
Male infertility	Comparison of Carob syrup and Vitamin E on male infertility	Randomized controlled trial	Carob syrup shows beneficial effects on sperm parameters and oxidative stress	(20)
Male infertility	Effects of Nettle and Alyssum vs Q10 Plus and L-Carnitine on sperm parameters	Comparative study	Nettle and Alyssum improve sperm parameters more effectively than Q10 Plus and L-Carnitine	(21)
Male reproduction	Meta-analysis of herbal medicines on male reproduction	Meta-analysis	Herbal medicines show positive effects on male reproductive health	(22)
PCOS	Effect of green tea supplementation on PCOS	Systematic review & meta-analysis	Green tea supplementation shows benefits for women with PCOS	(23)
PCOS	Use of complementary medicine for PCOS	Cross-sectional study	High prevalence of complementary and alternative medicine use among Jordanian women with PCOS	(24)
PCOS	Comparison of Asafoetida and oral contraceptive on PCOS	Double-blind randomized trial	Asafoetida shows promise in treating PCOS symptoms	(25)
PCOS, Oligo/amenorrhoea, Hyperandrogenism	Review of herbal treatments for PCOS	Laboratory evidence & Clinical review	Evidence for the effects of herbal treatments for managing PCOS symptoms	(26)
PCOS, Oligomenorrhea	Comparison of celery + anise vs metformin for PCOS	Randomized clinical trial	Celery and anise are as effective as metformin for treating oligomenorrhea in PCOS	(21)
Spermatogenesis	Effects of Carob extract on spermatogenesis	Preclinical study	Carob extract promotes spermatogenesis through gene regulation	(27)
Spermatotoxicity	Effects of Sesamum indicum on sperm parameters	Preclinical study	Sesamum indicum improves sperm and hormonal parameters	(28)
Testicular damage	Effects of Withania somnifera on testicular damage	Preclinical study	Withania somnifera protects against testicular damage induced by cyclophosphamide	(29)
Testicular morphology	Effects of Phaleria macrocarpa on testicular morphology	Preclinical study	Phaleria macrocarpa affects testicular morphology	(30)

Herbal Interventions for PCOS

Several studies investigated the role of herbal medicine in managing PCOS symptoms, including oligomenorrhea, hyperandrogenism, and insulin resistance. A systematic review and meta-analysis on green tea supplementation demonstrated beneficial effects in PCOS patients, likely due to its antioxidant and anti-inflammatory properties (23). Similarly, a randomized clinical trial comparing celery and anise with metformin found that the herbal combination was equally effective in treating oligomenorrhea, suggesting a natural alternative for menstrual regulation (21). Another trial on Asafoetida showed promising results in alleviating PCOS symptoms, reinforcing the potential of herbal therapies as adjunct treatments (25).

Herbal treatments for male infertility and testicular health

Numerous studies explored the efficacy of herbal treatments in improving male reproductive health. Withania somnifera was examined in both preclinical and clinical settings, demonstrating protective effects against testicular damage and significant improvements in sperm parameters (18, 29). A comparative clinical trial suggested that Withania somnifera may be more effective than pentoxifylline in treating idiopathic male infertility (18). Additionally, studies on Curcuma amada and Sesamum indicum showed antiapoptotic and antioxidative properties, contributing to improved sperm quality and hormonal balance in animal models (1, 28).

Protective and therapeutic effects of herbal compounds

Silymarin, a well-documented antioxidant, was investigated in multiple studies for its role in ameliorating diabetes-induced testicular toxicity (14, 15). Experimental findings revealed that silymarin improved sperm parameters and reduced histopathological damage in diabetic rats, particularly when combined with metformin (15). Similarly, Lycium barbarum polysaccharide activated the hypothalamic-pituitary-gonadal axis in diabetic mice, enhancing fertility and sexual function (12). Another study highlighted the spermatogenic potential of carob extract, demonstrating upregulation of key reproductive genes in an infertile mouse model (27).

Complementary and alternative medicine in infertility

Two cross-sectional studies assessed the prevalence of complementary and alternative medicine (CAM) use among women with PCOS and infertile women (19, 24). Both studies reported high usage rates, indicating widespread reliance on non-conventional treatments in reproductive health management. These findings underscore the need for further clinical validation of herbal remedies to integrate them into mainstream medical practice safely and effectively.

Ethnobotanical and historical perspectives

A study focused on the traditional use of medicinal plants for gynecological and reproductive health (16). An ethnobotanical survey in North Waziristan documented indigenous knowledge of herbal remedies for gynecological conditions, highlighting the importance of cultural preservation and scientific validation. Similarly, a historical review of herbal fertility treatments in North America provided insights into past practices, potentially informing modern approaches to assisted reproductive technology (17).

Conclusion

The collective findings indicate strong potential for herbal medicine in managing reproductive health disorders. Preclinical and clinical studies provide promising evidence for the efficacy of various herbal compounds, particularly in PCOS, male infertility, and testicular damage. However, further randomized controlled trials and mechanistic studies are necessary to confirm these benefits and establish standardized dosing regimens. Integrating herbal medicine with conventional treatments may enhance therapeutic outcomes and offer patients more holistic treatment options.

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