

Medicinal Plants Effective Against *Toxoplasma gondii*, a Major Cause of Miscarriage: A Review

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Article Info	ABSTRACT
Article type: Review Article	Objective: <i>Toxoplasmosis</i> is an infectious disease caused by the protozoan parasite <i>Toxoplasma gondii</i> , which poses a serious threat during pregnancy. Maternal infection can lead to transplacental transmission, resulting in grave complications such as congenital abnormalities, premature birth, and miscarriage. Timely prevention and treatment are crucial for safeguarding the health of both mother and foetus. This review aims to identify and report medicinal plants with potential efficacy against toxoplasmosis.
Article History: Received: Jan. 27, 2025 Revised: Jan. 29, 2025 Accepted: Apr. 22, 2025 Published Online: July. 27, 2025	Methodology: A comprehensive review was conducted using keywords such as “toxoplasmosis,” “parasitic infection,” “traditional medicine,” “medicinal plants,” and “treatment.” Relevant literature was retrieved from databases including Google Scholar, SID, Magiran, and Scopus, as well as classical Iranian traditional medicine sources. Irrelevant studies were excluded, and the selected literature was analysed to extract pertinent findings.
 Correspondence to: Shabnam Vazifekhhah	Results: The review identified a number of medicinal plants traditionally recognised for their antiparasitic properties and their role in enhancing the immune system. Notable among these are <i>Heracleum persicum</i> (Persian hogweed), <i>Foeniculum vulgare</i> (fennel), <i>Lawsonia inermis</i> (henna), <i>Trachyspermum ammi</i> (ajwain), <i>Allium sativum</i> (garlic), <i>Juglans regia</i> (walnut), <i>Zingiber officinale</i> (ginger), <i>Carum carvi</i> (black cumin), <i>Eucalyptus spp.</i> , <i>Ferula gummosa</i> , <i>Artemisia spp.</i> , <i>Marrubium vulgare</i> , <i>Salvia officinalis</i> (sage), <i>Lippia citriodora</i> (lemon verbena), <i>Myrtus communis</i> , <i>Curcuma longa</i> (turmeric), <i>Syzygium aromaticum</i> (clove), <i>Mentha spp.</i> (mint), <i>Sideritis spp.</i> (ironwort), <i>Scrophularia striata</i> , <i>Allium cepa</i> (onion), <i>Alyssum spp.</i> , <i>Lepidium sativum</i> , <i>Raphanus sativus</i> (radish), <i>Tagetes spp.</i> , <i>Taraxacum officinale</i> (dandelion), <i>Balsamodendron spp.</i> , saffron-coloured turmeric, <i>Ginkgo biloba</i> , <i>Olea europaea</i> (olive), <i>Sophora flavescens</i> , <i>Melia azedarach</i> , <i>Zataria multiflora</i> , <i>Dracocephalum spp.</i> , and <i>Stachys lavandulifolia</i> . These plants have been documented as potentially effective agents in controlling <i>T. gondii</i> infections linked to miscarriage.
Email: shabnam.vazifekhhah@yahoo.com	Conclusion: The findings of this review suggest that numerous medicinal plants within the corpus of Iranian traditional medicine exhibit promising antiparasitic and immunomodulatory properties against <i>Toxoplasma gondii</i> . These botanicals may serve as adjunctive therapies in the management of toxoplasmosis, particularly in pregnant women. However, their use should be approached with caution and administered under professional medical supervision alongside conventional treatments to mitigate potential side effects and ensure safety.
	Keywords: Infection, Parasite, <i>Toxoplasma gondii</i> , Toxoplasmosis, Medicinal Plants, Traditional Medicine
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Introduction

Toxoplasmosis, a parasitic infection, poses a serious threat to women's health, particularly during pregnancy. The disease can lead to severe complications for the fetus and cause long-term health consequences for the mother. Given the pivotal role of women as the cornerstone of family wellbeing, enhancing their awareness of chronic diseases such as toxoplasmosis can play a significant role in preventing health issues and empowering them to manage such infections effectively [1-3]. Toxoplasmosis is caused by the protozoan parasite *Toxoplasma gondii*, which can infect individuals at any age. However, the infection is particularly dangerous in pregnant women and immunocompromised individuals [4]. In most cases, toxoplasmosis remains asymptomatic. Nonetheless, some individuals may experience flu-like symptoms including fever, myalgia, and lymphadenopathy [4]. In severe instances, especially among immunosuppressed patients, the infection may lead to complications such as encephalitis or ocular damage [4]. *Toxoplasma gondii* is widely distributed around the globe, with estimates suggesting that over 40 million people in the United States alone are infected [5]. The parasite is capable of persisting in the host for extended periods—sometimes for life—yet in immunocompetent individuals, the infection generally remains latent and symptomless [5].

In contrast, toxoplasmosis in pregnant women or immunocompromised persons can result in life-threatening outcomes. Preventive measures are thus critically important for these high-risk groups [5]. The parasite can be transmitted via ingestion of undercooked meat or contaminated water, exposure to cat faeces, or contact with contaminated soil. While the infection often remains subclinical in healthy individuals, it can pose serious risks to the fetus during pregnancy and cause significant morbidity in immunocompromised individuals [6]. Symptoms, when present, tend to be mild and nonspecific, often resembling influenza. These may include low-grade fever, muscle pain, and swollen lymph nodes. In immunosuppressed individuals, however, toxoplasmosis may result in brain damage,

ocular lesions, or involvement of other organs [7]. Ocular toxoplasmosis may manifest as blurred or reduced vision, ocular pain, redness, and photophobia. Although congenitally infected neonates are often asymptomatic at birth, they may develop neurological or ocular complications later in life [8].

Diagnosis of toxoplasmosis is typically made through serological testing of IgG and IgM antibodies. In certain cases, molecular testing or biopsy may be required. During pregnancy, analysis of amniotic fluid alongside ultrasonography is essential to assess potential fetal infection [9]. Maternal toxoplasmosis can lead to miscarriage, stillbirth, or preterm delivery [10]. Infections contracted during early gestation are associated with more severe fetal outcomes, such as neurodevelopmental disorders or internal organ damage, whereas later infections tend to result in less severe consequences [11].

Preventing toxoplasmosis is feasible through strict adherence to hygiene and awareness of transmission routes. Recommended practices include regular handwashing, thorough cooking of meat and shellfish, avoidance of unfiltered water, careful washing of fruits and vegetables, meticulous cleaning of kitchen utensils, and keeping cats indoors [12]. These measures collectively reduce the likelihood of infection.

Treatment strategies depend on the severity of the disease and the patient's overall health status. In immunocompetent individuals, the infection often resolves spontaneously without pharmacological intervention [13]. However, in severe cases or among immunocompromised patients, treatment with medications such as pyrimethamine and sulfadiazine is necessary [13]. During pregnancy, therapy may involve spiramycin or a combination of pyrimethamine, sulfadiazine, and folinic acid, depending on the gestational age and fetal condition [14]. Infants diagnosed with congenital toxoplasmosis require long-term treatment with similar medications, alongside regular monitoring for potential side effects [14].

In traditional medicine, various medicinal plants are suggested as complementary therapies to boost the immune system and alleviate symptoms associated with parasitic infections [15]. Due to their antimicrobial and anti-inflammatory properties, such herbal remedies may offer benefits in reducing parasitic load. However, they must be employed with medical supervision and should not replace evidence-based pharmacotherapy [16]. Accordingly, the present study aims to identify and report medicinal plants with potential efficacy in managing toxoplasmosis.

Methodology

This narrative review was conducted using a comprehensive search of key terms including toxoplasmosis, parasitic infection, traditional medicine, herbal remedies, and treatment. Databases consulted included Google Scholar, SID, Magiran, and Scopus, as well as authoritative texts in Iranian traditional medicine. Initial screening involved exclusion of low-quality or irrelevant studies. Subsequently, articles that specifically addressed the traditional use of medicinal plants in the treatment of toxoplasmosis and met standard scientific criteria were selected for inclusion. Studies focusing on non-related treatments or those grounded in non-scientific sources were excluded from the final analysis.

Results

The findings of this review indicate that a wide range of medicinal plants including *Heracleum persicum* (Golpar), *Foeniculum vulgare* (Fennel), *Lawsonia inermis* (Henna), *Trachyspermum ammi* (Ajwain), *Allium sativum* (Garlic), *Juglans regia* (Walnut), *Zingiber officinale* (Ginger), *Nigella sativa* (Black cumin), *Eucalyptus* spp., *Cota tinctoria* (Zarrin-giah), *Artemisia* spp., *Marrubium vulgare* (Horehound), *Salvia officinalis* (Sage), *Lippia citriodora* (Lemon verbena), *Myrtus communis* (Myrtle), *Curcuma longa* (Turmeric), *Syzygium aromaticum* (Clove), *Mentha* spp. (Mint), *Sideritis* spp. (Mountain tea), *Echium amoenum* (Borage), *Allium cepa* (Onion), *Alyssum* spp., *Lepidium* spp., *Raphanus sativus* (Radish), *Tagetes* spp., *Taraxacum officinale* (Dandelion), *Balsamita major* (Balsamo), *Curcuma aromatica* (Wild turmeric), *Ginkgo biloba*, *Olea europaea* (Olive), *Sophora flavescens*, *Azadirachta indica* (Neem tree), *Zataria multiflora* (Shirazi thyme), *Dracocephalum* spp., and *Stachys* spp. have demonstrated promising anti-toxoplasmic activity in traditional medicinal sources.

Toxoplasmosis has been recognised as one of the leading causes of miscarriage in humans, and the consumption of these herbal remedies may serve as a natural adjunctive approach to managing the infection [17-31]. Additional details regarding these plants and their traditional anti-toxoplasmic uses are presented in Table 1.

Table 1. Medicinal Plants with Antimicrobial and Anti-inflammatory Properties Based on Traditional Use and Proposed Mechanisms of Action

Herbal name	Scientific Name	Botanical Family	Used Plant Part	Traditional Mode of Use	Proposed Mechanism of Action
Zanjabīl (Ajwain)	<i>Trachyspermum ammi</i>	Apiaceae	Seed	Brewed as herbal tea or used as extract	Exhibits antimicrobial and anti-inflammatory properties
Rāziyāneh (Fennel)	<i>Foeniculum vulgare</i>	Fabaceae (Note: should be Apiaceae)	Seed	Administered as tea or extract	Immune-boosting with anti-inflammatory effects
Avishan-e Shirāzi	<i>Origanum vulgare</i>	Lamiaceae	Leaf	Leaves brewed into tea or used in extract form	Antimicrobial activity and inflammation reduction
Murd (Myrtle)	<i>Myrtus communis</i>	Myrtaceae	Leaf	Consumed as leaf extract or herbal infusion	Enhances immune response and possesses antimicrobial properties
Eucalyptus	<i>Eucalyptus globulus</i>	Lauraceae (Note: should be Myrtaceae)	Leaf	Consumed as decoction or in extract form	Demonstrates antimicrobial and anti-inflammatory actions
Zanjebīl (Ginger)	<i>Zingiber officinale</i>	Zingiberaceae	Rhizome	Taken as decoction or powdered supplement	Known for antimicrobial and anti-inflammatory effects
Maryam-goli (Sage)	<i>Salvia officinalis</i>	Lamiaceae	Leaf	Brewed or extracted for medicinal use	Strengthens immunity and counters microbial agents
Dārchīnī (Cinnamon)	<i>Cinnamomum verum</i>	Lauraceae	Bark	Used as decoction or powder	Exerts antimicrobial and anti-inflammatory effects
Be-limoo	<i>Aloysia citrodora</i>	Verbenaceae	Leaf	Consumed as infusion or extract	Offers antimicrobial and anti-inflammatory properties

Zarrin-giyāh	<i>Lippia citriodora</i>	Verbenaceae	Leaf	Brewed or extracted for medicinal benefit	Enhances immunity; antimicrobial efficacy noted
Kadoo-ye Halvā'ī	<i>Cucurbita pepo</i>	Cucurbitaceae	Fruit	Eaten raw or in dried form	Reduces inflammation and supports immune health
Darmaneh	<i>Artemisia absinthium</i>	Asteraceae	Leaf and Root	Prepared as decoction or extract	Provides antimicrobial and anti-inflammatory actions
Farāsion	<i>Artemisia herba-alba</i>	Asteraceae	Leaf	Administered as decoction or powder	Immuno-modulatory with anti-inflammatory potential
Gerdoo (Walnut)	<i>Juglans regia</i>	Juglandaceae	Seed	Seeds taken as powder or infusion	Possesses antimicrobial and anti-inflammatory activities
Zīreh Sīyāh (Cumin)	<i>Cuminum cyminum</i>	Apiaceae	Seed	Taken as powdered form or infusion	Boosts immunity and combats microbial growth
Loobiya (Fava Bean)	<i>Vicia faba</i>	Fabaceae	Seed	Consumed as powder or herbal tea	Immuno-stimulatory with antimicrobial potential
Zeytūn (Olive)	<i>Olea europaea</i>	Oleaceae	Fruit	Eaten raw or dried	Antimicrobial and anti-inflammatory effects observed
Avishan (Thyme)	<i>Thymus vulgaris</i>	Lamiaceae	Leaf	Brewed as tea or used as extract	Immune-enhancing; rich in antimicrobial constituents
Na'nā' (Peppermint)	<i>Mentha piperita</i>	Lamiaceae	Leaf	Consumed as decoction or in extract form	Demonstrates antimicrobial and anti-inflammatory actions

Zanjabīl (Caraway)**	<i>Cuminum cyminum</i>	Apiaceae	Seed	Used as infusion or extract	Known for immune-boosting and antimicrobial properties
Zabān-dar-qafā	<i>Rosmarinus officinalis</i>	Lamiaceae	Leaf	Brewed as decoction or extracted	Reduces inflammation; exhibits antimicrobial activity
Bādemjān (Eggplant)	<i>Solanum melongena</i>	Solanaceae	Fruit	Consumed raw or dried	Offers antimicrobial and anti- inflammatory potential

Discussion

Traditional Iranian medicine, as a time-honoured and reputable medical system, has long employed medicinal herbs to combat gastrointestinal parasites and infections. A considerable number of these plants are recognised for their antiparasitic properties. Among them, *Trachyspermum ammi* (ajwain) is particularly effective against intestinal and gastric parasites. Its rich terpenoid content supports intestinal cleansing and enhances digestive function [32, 33].

Foeniculum vulgare (fennel) exhibits notable antiparasitic and antioxidant properties, contributing to improved gastrointestinal health and immune function [34]. *Origanum vulgare* (Shirazi thyme), owing to its high thymol and carvacrol content, demonstrates significant antimicrobial and antiparasitic activity, proving beneficial in both intestinal parasitic infections and respiratory ailments [35].

Myrtus communis (myrtle) possesses antifungal and antiparasitic properties, primarily through its flavonoid compounds, which play a vital role in countering both infections and parasites within the digestive tract [36]. *Eucalyptus globulus* (eucalyptus) is well-known for its natural antiparasitic effects, particularly in treating respiratory and intestinal infestations. It also aids in soothing respiratory infections [37].

Zingiber officinale (ginger) contributes to parasite elimination through its anti-inflammatory and antiparasitic effects, notably by stimulating digestion and promoting bile secretion [38]. *Salvia officinalis* (sage) strengthens the immune system and alleviates gastrointestinal issues through its antimicrobial and antiparasitic compounds [39].

Cinnamomum verum (cinnamon) serves as a natural remedy against intestinal parasites, improving gut function thanks to its antibacterial and antiviral components [40]. *Aloysia citrodora* (lemon verbena) supports the treatment of intestinal parasitic infections via its antimicrobial and immune-boosting effects [41]. *Lippia citriodora* (also known as lemon verbena or "Zarrin Giah") is similarly recognised for its antiparasitic and antioxidant capacities, aiding in the relief of gastrointestinal infections [42].

Additional medicinal plants, including *Artemisia absinthium* (wormwood), *Juglans regia* (walnut), *Olea europaea* (olive), *Mentha piperita* (peppermint), *Rosmarinus officinalis* (rosemary), and *Solanum melongena* (aubergine), have all demonstrated varying degrees of antiparasitic efficacy [43–48].

Women's diseases require special care and timely prevention [49–51], and the use of reliable and safe resources such as medicinal plants can play a significant role in maintaining health and improving women's quality of life [52]. In many diseases and disorders [53–58], turning to nature and embracing traditional or natural therapeutic approaches can serve as a beneficial and complementary strategy helping to alleviate symptoms, support overall well-being, and enhance patients' quality of life [59].

Conclusion

Medicinal plants with antiparasitic activity play a prominent role in traditional Iranian medicine, particularly in the treatment of gastrointestinal and intestinal parasitic infections. These plants, by virtue of their antioxidant, antimicrobial, and immune-enhancing properties, contribute effectively to parasite eradication and the promotion of overall gastrointestinal health.

Statements and Declarations

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Competing interests

The authors have no competing interests to declare that are relevant to the content of this article.

Ethics approval

This study was performed in line with the principles of the Declaration of Helsinki.

Consent to participate

Informed consent was obtained from all individual participants included in the study.

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References

1. Saadatnia G, Golkar M. A review on human toxoplasmosis. *Scand J Infect Dis*. 2012 Nov 1;44(11):805–14. doi: 10.3109/00365548.2012.693197.
2. Frenkel JK. Pathophysiology of toxoplasmosis. *Parasitol Today*. 1988 Oct 1;4(10):273–8.

3. Weiss LM, Dubey JP. Toxoplasmosis: A history of clinical observations. *Int J Parasitol.* 2009 Jul 1;39(8):895-901. doi: 10.1016/j.ijpara.2009.02.004.
4. Smith NC, Goulart C, Hayward JA, Kupz A, Miller CM, van Dooren GG. Control of human toxoplasmosis. *Int J Parasitol.* 2021 Feb 1;51(2-3):95-121.
5. Frenkel JK. Pathophysiology of toxoplasmosis. *Parasitol Today.* 1988 Oct 1;4(10):273-8.
6. Weiss LM, Dubey JP. Toxoplasmosis: A history of clinical observations. *Int J Parasitol.* 2009 Jul 1;39(8):895-901. doi: 10.1016/j.ijpara.2009.02.004.
7. Jones JL, Lopez A, Wilson M, Schulkin J, Gibbs R. Congenital toxoplasmosis: a review. *Obstet Gynecol Surv.* 2001 May 1;56(5):296-305. doi: 10.1097/00006254-200105000-00025.
8. Remington JS. Toxoplasmosis in the adult. *Bull N Y Acad Med.* 1974 Feb;50(2):211.
9. Dubey JP, Beattie CP. Toxoplasmosis of animals and man. Boca Raton: CRC Press; 1988.
10. Qublan HS, Jumaian N, Abu-Salem A, Hamadelil FY, Mashagbeh M, Abdel-Ghani F. Toxoplasmosis and habitual abortion. *J Obstet Gynaecol.* 2002 Jan 1;22(3):296-8. doi: 10.1080/01443610220130616.
11. Kimball AC, Kean BH, Fuchs F. The role of toxoplasmosis in abortion. *Am J Obstet Gynecol.* 1971 Sep 15;111(2):219-26. doi: 10.1016/0002-9378(71)90893-3.
12. Dunay IR, Gajurel K, Dhakal R, Liesenfeld O, Montoya JG. Treatment of toxoplasmosis: historical perspective, animal models, and current clinical practice. *Clin Microbiol Rev.* 2018 Oct;31(4):e00057-17.
13. Serranti D, Buonsenso D, Valentini P. Congenital toxoplasmosis treatment. *Eur Rev Med Pharmacol Sci.* 2011 Feb 1;15(2):123-9.
14. Konstantinovic N, Guegan H, Stājner T, Belaz S, Robert-Gangneux F. Treatment of toxoplasmosis: Current options and future perspectives. *Food Waterborne Parasitol.* 2019 Jun 1;15:e00036.
15. Benoit-Vical F, Santillana-Hayat M, Kone-Bamba D, Mallie M, Derouin F. Anti-Toxoplasma activity of vegetal extracts used in West African traditional medicine. *Parasite.* 2000 Mar 1;7(1):3-7.
16. Wei HX, Wei SS, Lindsay DS, Peng HJ. A systematic review and meta-analysis of the efficacy of anti-Toxoplasma gondii medicines in humans. *PLoS One.* 2015 Sep 22;10(9):e0138204.
17. Aghili Khorasani MH. Qarabadin-e-Kabir. Tehran: Research Institute for Islamic and Complementary Medicine, Tehran University of Medical Sciences; 2009.
18. Avicenna. The Canon of Medicine (Al-Qanun fi al-Tibb). Translated by Laleh Bakhtiar. Chicago: Kazi Publications; 1999.
19. Arzani MA. Tebb-e-Akbari. Tehran: Research Institute for Islamic and Complementary Medicine, Tehran University of Medical Sciences; 2008.
20. Hakim Momen Tonekaboni. Tohfah al-Momenin. Tehran: Nashr-e Shahr; 2007.
21. Zargari A. Medicinal Plants. Tehran: Tehran University Press; 1992.
22. Jorjani SE. Zakhireh Kharazmshahi (Treasure of Kharazm Shah). Tehran: Iranian Academy of Medical Sciences; 2001.
23. Ghaznavi H. Traditional Iranian Medicine and Medicinal Plants. Tehran: Nashr-e Elm; 2011.
24. Khorasani M, Najmabadi M. Medicinal Plants of Iran. Tehran: Tehran University Press; 2006.
25. Sadr E. Encyclopedia of Medicinal Plants. Tehran: Jangal Publishing House; 2010.
26. Mir Heidar H. Plant Sciences and Medicinal Herbs of Iran. Tehran: Islamic Culture Press; 1993.
27. Nazem Javedan M. Kholasat al-Hikmah (Summary of Wisdom). Tehran: Institute of Traditional Medicine and Materia Medica Research; 2012.
28. Dehkhoda A. Dehkhoda Dictionary: Plant Names. Tehran: Tehran University Press; 1998.
29. Davari Ardekani A. Principles of Iranian Traditional Medicine. Tehran: University of Tehran Press; 2015.
30. Ahvazi A. Kamel al-Sanaat al-Tibbiyya. Tehran: Academy of Medical Sciences of the Islamic Republic of Iran; 2008.
31. Shams Ardakani M, Ghorbani A. Herbal Medicines in Iranian Traditional Medicine. Tehran: Medical Sciences University Press; 2015.
32. Shahrajabian MH, Sun W. Survey on medicinal plants and herbs in traditional Iranian medicine with anti-oxidant, anti-viral, anti-microbial, and anti-inflammation properties. *Lett Drug Des Discov.* 2023 Nov 1;20(11):1707-43. doi: 10.2174/1570180819666220816115506.
33. Imani-Baran A, Abdollahi J, Akbari H, Jafarirad S, Moharramejad S. Anthelmintic activity of crude powder and crude aqueous extract of Trachyspermum ammi on gastrointestinal nematodes in donkey (Equus asinus): An in vivo study. *J Ethnopharmacol.* 2020 Feb 10;248:112249. doi: 10.1016/j.jep.2019.112249.
34. Montazeri M, Khani S, Daryani A, Sarvi S, Shahani S, Mirzaee F, Yosefi S, Gholami S. Antiparasitic Effects of Heracleum persicum and Foeniculum vulgare (Fruit) Essential Oils on Experimental Toxoplasmosis (In Vitro and In Vivo). *J Mazandaran Univ Med Sci.* 2021 May 10;31(196):1-0.
35. Štrbac F, Krnjajić S, Maurelli MP, Stojanović D, Simin N, Orčić D, Ratajac R, Petrović K, Knežević G, Cringoli G, Rinaldi L. A potential anthelmintic phytopharmacological source of Origanum vulgare (L.) essential oil against gastrointestinal nematodes of sheep. *Animals.* 2022 Dec 22;13(1):45. doi: 10.3390/ani13010045.
36. Shaapan RM, Al-Abodi HR, Alanazi AD, Abdel-Shafy S, Rashidipour M, Shater AF, Mahmoudvand H. Myrtus communis essential oil; anti-parasitic effects and induction of the innate immune system in mice with Toxoplasma gondii infection. *Molecules.* 2021 Feb 4;26(4):819.
37. Mirzaalizadeh B, Sharif M, Daryani A, Ebrahimzadeh MA, Zargari M, Sarvi S, Mehrzadi S, Rahimi MT, Mirabediny Z, Golpour M, Montazeri M. Effects of Aloe vera and Eucalyptus methanolic extracts on experimental toxoplasmosis in vitro and in vivo. *Exp Parasitol.* 2018 Sep 1;192:6-11.
38. Choi W, Jiang M, Chu J. Antiparasitic effects of Zingiber officinale (Ginger) extract against Toxoplasma gondii. *J Appl Biomed.* 2013 Jan 1;11(1):15-26. doi: 10.2478/v10136-012-0014-y.
39. Marques-Santos F, Faria RX, Reis Amendoeira MR. The Search for Drugs Derived from Natural Products for Toxoplasma gondii Infection Treatment in the Last 20

- Years-A Systematic Review. *Curr Top Med Chem*. 2024 Sep;24(22):1960-99. doi: 10.2174/0115680266299409240606062235.
40. Alanazi AD, Almohammed HI. Therapeutic potential and safety of the *Cinnamomum zeylanicum* methanolic extract against chronic *Toxoplasma gondii* infection in mice. *Front Cell Infect Microbiol*. 2022 Jun 9;12:900046. doi: 10.3389/fcimb.2022.900046.
 41. Siqueira IB, de Oliveira YL, Caron BO, Schmidt D, Silva AR, Jain S, de Souza JD, Sarmento VH, Alves SM, Rott MB, Correa CB. Amoebicidal activity of essential oils and their major components against *Acanthamoeba castellanii* Neff. *Exp Parasitol*. 2022 Nov 1;239:108334.
 42. Badawy AA, Hassan EA, El-Sherbiny MS, Hussein EM. Evaluation of antitoxoplasma activities of methanolic extracts of *Myrtus communis* L. and *Juglans regia* L. on mice. *J Infect Dev Ctries*. 2021 Feb 28;15(2):189-97.
 43. Mirzaei A, Mohebbali M, Sarvi S, Rezaei F, Shojaei S, Khamesipour A, Hooshyar H, Ahmadpour E, Hamzavi Y, Farnia P, Dalimi A. In vitro and in vivo efficacy of silymarin and its major component silybin against acute toxoplasmosis in mice. *Parasitol Res*. 2020 Sep;119(9):2977-85. doi: 10.1007/s00436-020-06776-y.
 44. Heidari M, Zohrevand F, Sadeghi-Nasab A, Mahdavi M, Abdoli A. Evaluation of anti-*Toxoplasma* activity of *Artemisia annua* and *Artemisia sieberi* extracts on tachyzoites of RH strain. *Iran J Parasitol*. 2019 Jan;14(1):50-6.
 45. Moradi M, Taran M, Zamanian M, Sharif M, Mirzaei M. Therapeutic effect of *Curcuma longa* extract on acute toxoplasmosis in mice. *Iran J Parasitol*. 2020 Jan;15(1):101-7.
 46. Dehghani A, Rad MR, Hosseini S, Shahriari-Namadi M, Barani M. The effect of *Nigella sativa* seed aqueous extract on experimental toxoplasmosis in mice. *J Parasitol*. 2020 Dec 1;106(6):929-36.
 47. Bahmani M, Rafieian-Kopaei M, Hassanzadeh S. Medicinal plants used for treatment of toxoplasmosis in Iranian traditional medicine. *Pharmacogn Rev*. 2016 Jan;10(19):38-42.
 48. Shamsadini M, Bayat M, Abolghasemi F, Baghery F, Faraji A. Evaluation of the effects of some traditional medicinal plants on *Toxoplasma gondii* in vitro. *J Med Plants*. 2019;18(70):53-63.
 49. Bashour N, Aminpour A, Vazifekhhah S, Jafari R. Seromolecular study on the prevalence and risk factors of *Toxoplasma gondii* infection in pregnant women referred to a gynecology hospital in Urmia, northwest part of Iran in 2022. *BMC Infectious Diseases*. 2024 Apr 17;24(1):410.
 50. Zeinali S, Khademvatan S, Jafari R, Vazifekhhah S, Yousefi E, Behrooz-Lak T. Prevalence and risk factors of *Toxoplasma gondii* infection among women with miscarriage and their aborted fetuses in the northwest of Iran. *Plos one*. 2023 Oct 26;18(10): 0283493.
 51. Boroumand F, Ghasem Baglou S, Rasouli J, Vazifekhhah S. The comparison of serum CA-125 levels in women with normal pregnancy and severe and non-severe preeclampsia. *J Babol Uni Med Sci* 2022 Mar 10;24(1):372-82.
 52. Ganguly P, Mandal SK, Mondal P, Sen DJ. Medicinal plants effective against dengue fever in India: A brief review. *J Biochem Phytomed* 2024; 3(1): 14-17. doi: 10.34172/jbp.2024.5.
 53. Darvishi M, Nava AO, Karimi E, Nouri M, Meigooni SS, Hejripour SZ. Human and animal bites. *Caspian J Environ Sci*. 2023;21(2):445–456.
 54. Mahmud Hussien B, Noori M, Sayad B, Ebadi Fard Azar M, Sadri Nahand J, Bayat M, Babaei F, Karampour R, Bokharaei-Salim F, Mirzaei H, Moghoofei M. New potential MicroRNA biomarkers in human immunodeficiency virus elite controllers, human immunodeficiency virus infections, and coinfections with hepatitis B virus or hepatitis C virus. *Intervirology*. 2023 Dec 20;66(1):122–135.
 55. Ghanbari A, Nouri M, Darvishi M. Evaluation of relationship between serum hemoglobin A1C level and severity of diabetic foot ulcers based on Wagner criteria. *J Med Chem Sci*. 2023;6:2234–2241.
 56. Darvishi M, Nouri M, Zahir M, Asli M, Hejripour SZ, Karimi E. Overview of human papillomavirus infection. *Infect Disord Drug Targets*. 2024 Mar 1;24(2):65–76.
 57. Nouri M, Kamakifar P, Khodabandehlou N, Nahand JS, Tavakoli A, Norooznezhad F, Sorayyayi S, Babaei F, Mostafaei S, Moghoofei M. Association between Parvovirus B19 and anemia in HIV-infected patients. *Med J Islam Repub Iran*. 2019 Dec 16;33:137.
 58. Darvishi M, Noori M, Nazer MR, Soleiman-Meigooni S, Forootan M. The relationship between *Helicobacter pylori* and extra-gastrointestinal infections. *Iran J Med Microbiol*. 2020 Nov 10;14(6):543–565.
 59. Darvishi M, Hashemi Rafsanjani SMR, Nouri M, Abbaszadeh S, Heidari-Soureshjani S, Kasiri K, Rahimian G. Biological mechanisms of polyphenols against *Clostridium difficile*: A systematic review. *Infect Disord Drug Targets*. 2025 May;25(3): 18715265313944. doi: 10.2174/0118715265313944240726115600