

## Research Article

# Elucidating the Impact of Iranian Herbs on Athletic Performance: A Narrative Review of Scientific Evidence

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### Abstract

This article explores the growing trend among athletes to seek out substances that can enhance their performance to achieve optimal athletic performance. The increasing concerns regarding banned supplements have led to a growing interest in exploring the effectiveness of herbal alternatives. Herbs native to Iran have gained significant attention due to the substantial body of research that supports their potential to enhance athletic performance and protect overall health. Research has demonstrated that herbs such as jujube and saffron can augment cognitive function, regulate tension, reduce the likelihood of injuries, improve sleep quality, and restore vitality and endurance. Simultaneously, Iranian sage and chamomile effectively reduce inflammation and accelerate recovery after physical activity. An additional treasure from Iran's herbal treasury, Ginkgo biloba is notable for its profound advantages on focusing and cognitive ability. The combined use of these herbs enhances athletic performance and promotes overall well-being. This presentation broadly examines Iran's medical herbs and explains how they can help athletes in many ways. These natural remedies provide a sustainable route to optimal performance, particularly during the critical pre-competition phase, by facilitating fatigue reduction and obesity management. All things considered, this highlights the revolutionary potential of Iranian herbal mixtures for molding top-notch athletic performance and fostering overall wellness. Athletes can attain peak performance levels while avoiding the drawbacks of illegal supplements when they advocate for taking these natural substances in their workouts.

### Keywords:

Iranian Herbs, Exercise, Herbal supplements, Botanical intake.

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## 1. Introduction

The perpetual pursuit of peak athletic performance has sparked a collective enthusiasm among scientists, athletes, and coaches, propelling an unyielding effort to surpass the boundaries of human physical capability (1, 2). In the annals of history, a wide range of methodologies, including both conventional knowledge and contemporary advancements, have been thoroughly investigated to enhance athletic prowess (3). This narrative review undertakes a dual investigation, examining the diverse array of Iranian herbs and the complex issues presented by sports supplements, which converge to shape the realm of athletic improvement.

Iranian herbs, comprising a wide array of medicinal plants, have been extensively utilized for their therapeutic properties (4, 5). As per the currently existing knowledge of Avicenna, certain herbal species are believed to possess distinctive properties that enhance performance, including Jujube (*Ziziphus jujuba*), Sage (*Salvia officinalis*), Saffron (*Crocus sativus*), and others (6, 7). The efficacy of sports supplements is supported by scientific research, yet their use poses a complex challenge concerning anti-doping principles (8). Contrary to the stringent regulation observed in the pharmaceutical sector, this industry is characterized by relatively lenient supervision. This presents concerns regarding the possibility of adulteration, mislabeling, and contamination (9). Ensuring compliance with legal regulations regarding ergogenic aids poses a significant challenge, owing to the broad classification of these substances intended to enhance athletic performance. Consequently, it is imperative to adhere strictly to anti-doping regulations (10).

The motivations behind supplement use among athletes are diverse, including the need to make up for nutritional deficiencies and the pursuit of an ergogenic edge during training or competition (1, 11, 12).

The significance of employing activities and the potential risk of inadvertent doping (13, 14). Conversely, the extensive adoption of dietary supplements engenders concerns concerning the possible risks associated with particular constituents. Nevertheless, this emphasizes the importance of exercising caution, reducing potential hazards, and undertaking an extensive investigation into herbal supplements, given their intricate composition and limited scientific support (1, 15).

### **Overview of the variety of Iranian herbs commonly used in sports performance.**

Iranian herbs encompass a vast array of medicinal plants that have been meticulously studied and utilized for centuries. These botanical wonders have demonstrated remarkable ability to enhance human well-being, including athletic performance (table 1). Among the most notable Iranian herbs commonly used in sports performance are:

- Jujube (*Ziziphus jujuba*): A sweet and nutritious fruit, jujube is renowned for its ability to enhance energy levels and endurance. Its abundance of vitamins, minerals, and antioxidants supports muscle function and energy production.
- Sage (*Salvia officinalis*): A culinary staple, sage is also renowned for its antioxidant and anti-inflammatory properties. These properties aid in muscle recovery and reduce post-exercise soreness, which can help athletes maintain peak performance. Sage's ability to promote blood circulation and oxygen delivery to muscles further enhances athletic performance.
- Saffron (*Crocus sativus*): The world's most expensive spice, saffron possesses potent antioxidant and adaptogenic properties. Adaptogens help the body adapt to stress and enhance overall well-being. Saffron's antioxidant activity protects cells from damage, while its adaptogenic properties help athletes cope with the physical and mental demands of training and competition.

- Chamomile (*Matricaria chamomilla*): This calming herb is a natural sleep aid that promotes relaxation and deep rest. Adequate sleep is crucial for athletes to optimize recovery and performance. Chamomile's anti-inflammatory properties can also aid in muscle recovery.
- Ginkgo Biloba: This ancient tree extract is rich in antioxidants and can improve cognitive function and blood flow. Increased blood flow to the brain can enhance alertness, focus, and decision-making, which are essential for athletes during competitions.

**Table 1.** Overview of the Iranian herbs used in sports performance.

Herb	Traditional Knowledge and Historical Use	Potential Benefits for Athletes
Jujube ( <i>Ziziphus jujuba</i> )	Renowned for its ability to enhance energy levels and endurance	Enhances energy levels and endurance, supports muscle function and energy production, boosts bone health, and reduces inflammation.
Sage ( <i>Salvia officinalis</i> )	Renowned for its antioxidant and anti-inflammatory properties	Promotes muscle recovery, reduces post-exercise soreness, enhances blood circulation and oxygen delivery to muscles, and aids in wound healing.
Saffron ( <i>Crocus sativus</i> )	Possesses potent antioxidant and adaptogenic properties	Protects cells from damage, helps athletes cope with stress, improves cognitive function and focus, and enhances alertness, focus, and decision-making during competitions.
Chamomile ( <i>Matricaria chamomilla</i> )	Natural sleep aid that promotes relaxation and deep rest	Promotes relaxation and deep rest, aids in muscle recovery, and reduces inflammation, enhancing overall recovery and performance.
Ginkgo Biloba	Rich in antioxidants and can improve cognitive function and blood flow	Enhances cognitive function and focus, boosts blood flow to the brain, and reduces inflammation, improving overall performance.

**Description of the traditional knowledge and historical use of Iranian herbs**

The consumption of Iranian herbs to enhance sports performance is well established in the country's extensive medicinal heritage (table 2). The Canon of Medicine, a thorough medical book, carefully researched the therapeutic characteristics of several Iranian herbs, including some that have potential ergogenic advantages.

Iranian physicians have long acknowledged the unique benefits and capacity to improve the physical performance of these herbs.

**Table 2.** The traditional knowledge of Iranian herbs.

Herb	History of Use
Jujube (Ziziphus jujuba)	The use of jujube for athletic performance is deeply rooted in Iran's rich medical tradition, dating back to the time of Avicenna, the renowned Persian physician. Avicenna's comprehensive medical treatise, the Canon of Medicine, extensively documented the therapeutic properties of numerous Iranian herbs, including those with potential ergogenic benefits.
Sage (Salvia officinalis)	Iranian physicians have long recognized the unique properties of sage and its ability to enhance physical performance. They have used this herb to treat a variety of ailments and promote overall health and well-being. The historical use of sage for athletic performance demonstrates its enduring value and effectiveness.
Saffron (Crocus sativus)	The world's most expensive spice, saffron possesses potent antioxidant and adaptogenic properties, making it an excellent choice for enhancing physical performance and stress management.
Chamomile (Matricaria chamomilla)	Iranian physicians have long used chamomile to promote relaxation and deep rest, which are crucial for athletes to optimize recovery and performance. Chamomile's anti-inflammatory properties can also aid in muscle recovery.
Ginkgo Biloba	This ancient tree extract is rich in antioxidants and can improve cognitive function and blood flow. Increased blood flow to the brain can enhance alertness, focus, and decision-making, which are essential for athletes during competitions.
Barberry (Berberis vulgaris)	Barberry has been used in traditional medicine for centuries for a variety of purposes, including improving cardiovascular health, reducing inflammation, and increasing exercise tolerance. There is some scientific evidence to support these claims, but more research is needed.
Ashwagandha (Withania somnifera)	Ashwagandha is an adaptogenic herb, which means that it helps the body adapt to stress and improve overall health. It has been traditionally used in Ayurvedic medicine to improve sleep quality, reduce anxiety and stress, and boost energy levels. Some studies have shown that ashwagandha may also improve athletic performance, but more research is needed.
Pomegranate (Punica granatum)	Pomegranate is a fruit that is rich in antioxidants and polyphenols. These compounds have anti-inflammatory and antioxidant properties that may help protect against muscle damage and reduce inflammation. There is some scientific evidence to suggest that pomegranate juice may improve exercise performance, but more research is needed.
Turmeric (Curcuma longa)	Turmeric is a spice that is traditionally used in Indian cuisine. It contains curcumin, a compound that has anti-inflammatory and antioxidant properties. Turmeric has been shown to reduce muscle soreness and improve recovery after exercise.
Ginseng (Panax spp.)	Ginseng is another adaptogenic herb that has been traditionally used in Asian medicine to improve overall health and well-being. It has been shown to improve cognitive function, reduce fatigue, and increase exercise performance.
Green tea (Catechins)	Green tea is a popular beverage that is rich in catechins, which are antioxidants that have been shown to improve exercise performance. Green tea has been shown to increase fat burning, improve endurance, and reduce post-exercise muscle soreness.

## **Highlighting the potential benefits of Iranian herbs for athletes**

The potential benefits of Iranian herbs for athletes are numerous and multifaceted:

- **Enhanced Energy and Endurance:** Many Iranian herbs, such as jujube and saffron, can increase energy levels and stamina, aiding athletes in maintaining peak performance throughout training and competitions.
- **Improved Muscle Recovery:** Iranian herbs like sage and chamomile can promote muscle recovery and reduce inflammation, allowing athletes to bounce back quickly from workouts and competitions.
- **Enhanced Cognitive Function:** Ginkgo biloba, a traditional Iranian herb, can improve cognitive function and focus. This can be particularly beneficial for athletes who require mental clarity and alertness during competitions.
- **Stress Management:** Relaxing herbs like chamomile and lavender can help athletes manage stress and anxiety, which can have a significant impact on athletic performance.
- **Reduced Risk of Injury:** Certain Iranian herbs, such as jujube and chamomile, can enhance bone health and reduce inflammation, which can help to protect athletes from injury.
- **Improved Sleep:** Many Iranian herbs, such as chamomile and lavender, promote sleep quality, which is essential for athletes to recover and perform at their best.

## **Review of Current Evidence on Iranian Herbs Athletic Performance**

Recently, the therapeutic use of Iranian medicinal plants has brought about important changes in the field of sports medicine. These traditional, age-old herbal remedies, full of powerful components, may have significant impacts on athletic performance. The methodologies and outcomes of research in this field, along with the advantages and disadvantages of the current state of knowledge, are reviewed in this investigation into the scientific basis for Iranian herbal products and their impact on athletic performance.

### ***Jujube***

The jujube fruit originates from Asia and is notable for its unique ability to improve endurance (16, 17). It can increase  $VO_2\max$ , decrease body fat, and protect cells from oxidative damage (18-20). Consistently, scientific investigations using meticulous double-blind procedures exhibit its potential to enhance endurance and accelerate recuperation, rendering it an optimal companion for athletes spanning diverse athletic disciplines (18, 19).

### ***Sage***

Sage improves discomfort that occurs after exercise, thereby serving as a protector of the muscles of athletes (21, 22). It functions as a beneficial adjunct to relieve discomfort and facilitate recuperation. This powerful herb is a safeguard for the muscles, reducing the risk of damage and inflammation (23, 24). Evidence has shown that it can remarkably reduce signs of muscle injury and improve strength, power, and sprint performance (22, 25, 26). *Salvia officinalis* proves to be an advantageous companion for athletes competing in any discipline, including weightlifting and track and field, by assisting them in surpassing their physical limitations (27).

### ***Pomegranate***

It was previously believed that the pomegranate originated in Iran prior to its introduction and subsequent exportation to other nations (55). The Garden of Paradise is where pomegranates are described in the Quran, where they are repeatedly referred to as one of God's excellent creations (56). According to ancient Iranian Christianity, the pomegranate was also purportedly present in the Garden of Eden. It was considered the authentic forbidden fruit, in contrast to the apple (57). Pomegranate juice possesses the most potent antioxidant effect among juices derived from other vegetables and fruits (58-60). In addition, it serves as a plentiful reservoir of bioactive chemicals, including polyphenols. This substance has the potential to prevent muscle damage, reduce inflammation, enhance antioxidant status (61), and suppress oxidative stress biomarkers such as low-density lipoprotein oxidation and lipid peroxidation (62). According to the existing body of evidence, supplementation with pomegranate may provide potential antioxidant and anti-inflammatory advantages during and following physical activity (63). Furthermore, research has demonstrated that it improves strength performance (60), endurance (64), and recovery after exercise (64, 65).

### ***Turmeric***

An herb of the Zingiberaceae family and a traditional spice, turmeric is commonly employed in traditional Iranian cuisine (66, 67). In addition to being one of the most researched medicinal herbs, it possesses a variety of physiological activities (68-70). Curcumin, a compound known for its antioxidant and anti-inflammatory properties, constitutes its composition (68). Supporting evidence suggests that turmeric may decrease concentrations of creatine kinase, prolong the time until fatigue, and prevent muscle damage, all of which contribute to its considerable therapeutic

potential in enhancing recovery time and performance (71). It may be necessary to increase the dosage and increase the frequency of consumption during the recovery period to achieve additional benefits (71-73). Enhanced endurance performance was observed as a result of turmeric supplementation, which mitigates exercise-induced inflammation (74, 75). Therefore, it has been demonstrated that the consumption of turmeric has the potential to improve overall performance and recovery time (69, 76).

### ***Green Tea***

The potential for catechins, which are present in green tea extract, to reduce body fat has been identified as one of its many health benefits (77-79). A recent study demonstrated that consuming catechins for a short time and engaging in exercise resulted in notable decreases in measurements related to body fat (80). Nevertheless, further extensive research is required to substantiate this concept. Additional investigation is required to comprehend catechins' bioavailability, metabolism, and consequences in energy metabolism. Catechins have been found to facilitate fat oxidation (81, 82), enhance endurance (78, 81), reduce muscle damage (83, 84), accelerate the metabolic rate (82, 83), and improve focus and alertness (85). Additionally, they contain antioxidant properties that assist in reducing oxidative stress and promote faster recovery and diminished inflammation. In general, catechins are a valuable addition to any dietary regimen and can aid in preventing obesity (81, 82, 86).

### ***Ginseng***

Ginseng, a traditional herb in Asia, particularly in Iran (87, 88), has demonstrated efficacy in improving exercise performance and promoting overall well-being (89). Evidence suggests that adding ginseng to one's diet can enhance

physical endurance (90), decrease fatigue (91), optimize oxygen consumption (92), exhibit anti-inflammatory characteristics (93), reduce stress (94), and elevate cognitive abilities (94, 95). The anti-inflammatory properties of ginseng assist in managing stress caused by exercise, improving recovery, and decreasing the likelihood of injury. Furthermore, it promotes cognitive function, notably enhancing focus and concentration, which is advantageous for athletes (96). Further investigation is required to comprehend comprehensively the mechanisms through which ginseng operates. Integrating ginseng into a well-rounded training routine might provide a competitive advantage (26).

Iranian herbs have displayed beneficial effects in athletic performance studies, with randomized, double-blind, placebo-controlled designs and objective outcome measures such as  $VO_2\text{max}$ , muscle injury indicators, and cognitive function tests giving specific information. However, constraints such as limited sample numbers and the need for longer-term studies remain. The current evidence is unequivocal, with robust procedures, numerous herbs tested, and positive outcomes across several performance metrics. Further research is required to determine the mechanisms of action, optimal concentrations, and efficacy of Iranian herbs for particular sports and individuals. However, investigating these aspects remains a continuous pursuit, showcasing the combined benefits of contemporary science and ancient Iranian knowledge. This surpasses mere athletic abilities and establishes a novel standard for human capabilities by applying botanical remedies.

## 2. Summary

The profound influence of Iran's herbal legacy, which is intricately woven into its traditional medicine, is evident in the realm of sports medicine. An extensive variety of natural treatments, such as ashwagandha, jujube, saffron, and ginkgo biloba, collectively offer a comprehensive strategy for enhancing athletic performance. These herbs, which are highly regarded for their cognitive-enhancing, anti-inflammatory, and antioxidant attributes, are crucial in assisting athletes to enhance their endurance, reduce fatigue, facilitate recovery, and improve cognitive abilities. Moreover, by integrating traditional Iranian herbs such as pomegranate and turmeric in conjunction with the metabolism-boosting catechins found in green tea, a comprehensive approach is achieved to improve physical performance and general health. Nevertheless, in order to completely maximize their capabilities, it is necessary to conduct exhaustive research to determine the complex mechanisms at issue and customize their use to various athletic disciplines and specific requirements. By skillfully merging its enduring herbal customs with state-of-the-art sports science, Iran has the capacity to elevate the standards of competitive ability and capacity for achievement.

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## **Compliance with ethical standards**

**Conflict of interest** None declared.

**Ethical approval** the research was conducted with regard to the ethical principles.

**Informed consent** Informed consent was obtained from all participants.

## **Author contributions**

Conceptualization: D,T.; Methodology: D,T.;  
Software: D,T.; Validation: D,T.; Formal analysis: D,T.;  
Investigation: D,T.; Resources D,T; Data curation: D,T.;  
Writing - original draft: D,T.; Writing - review &  
editing: D,T.; Visualization: D,T; Supervision: D,T;  
Project administration D,T; Funding acquisition: D,T



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