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Endurance Effect of *Rasayana* Drug "*Ashwagandha-Withania Somnifera*" in Athletes-A Review Article

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ABSTRACT:

Doping drugs or performance-enhancing substances are illicit substances used to improve performance. These substances could be toxic and have a negative effect on athlete's health. *Rasayana* therapy can be given to healthy people to boost health and increase strength as well as to sick people to improve their immunological resistance. Researchers have discovered that *Ashwagandha* and other *Rasayana* drugs have nootropic (improving cognition and brain function) advantages in addition to immunomodulatory, adaptogenic, antioxidant, anti-aging, nutritional, anabolic, haemopoetic, and anti-ageing characteristics. Numerous herbal blends and other *Rasayana* treatments are available based on the demands of the individual. Various Research study have been carried out which shows adaptogenic effect of ashwagandha. This paper aims to study endurance effect of ashwagandha through various studies.

Keywords: *Ashwagandha*, *Rasayana*, Adaptogenic

INTRODUCTION

An *Ayurvedic* herb and medicinal plant with a 4,000-year history, *Ashwagandha* promotes muscle strength, energy, sexual vigour, and mental health in addition to addressing stress, strain, and weariness. *Ashwagandha* has traditionally been used mostly for reducing stress and for its "mind" advantages. With regard to sports and active lifestyle, it has recently begun to be acknowledged for the "body" benefits. Clinical studies have shown that this traditional herb, in particular, improves cardio-respiratory response. As a result, you'll feel less tired and have more energy. *Ashwagandha's* demonstrated capacity to enhance athletes' performance in terms of muscle strength, lean body mass, and body fat percentage is another advantage. Another recent study found that *Ashwagandha* significantly raised serum testosterone levels.

AIMS & OBJECTIVES

To review the role of *Ayurvedic Rasayna* Drug *Ashwagandha* as Immuno- modulator and Strength enhancer in athletes.

MATERIALS & METHODS

Review of *Ayurvedic* Literature and their corresponding commentaries have undergone in-depth. Peer-reviewed medical publications and textbooks of contemporary medical sciences have also been cited as sources for this topic.

RESULTS

Botanical Description–

A member of the Solanaceae family, ***Withania***

somnifera is a little, two-foot-tall woody shrub. It grows throughout Africa, the Mediterranean region, and India. A 30-150 cm tall, upright, evergreen, tomentose shrub that can be found on bunds and in waste areas all over the drier sections of India.[1] Inconspicuous greenish or lubrid-yellow flowers in axillary, umbellate cymes; small, globose, mature orange-red berries wrapped in the persistent calyx; yellow, reniform seeds; robust fleshy roots; glabrous leaves; smaller, opposing leaves in the floral region. The primary plant parts used for therapeutic purposes are the roots. The fruit, which is a vivid red colour, is picked in the late fall, and the seeds are dried for spring sowing. the entire plant, the roots, leaves, stem, green berries, fruits, seeds, bark are used.

Parts used:

Whole plant, roots, leaves, stem, green berries, fruits, seeds, bark are used.

Chemical Constituents –

The biologically active chemical constituents of ***Withania somnifera*** (WS) include alkaloids (isopelletierine, anaferine, cuseohygrine, anahygrine, etc.), steroidal lactones (withanolides, withaferins) and saponins [1]. Sitoindosides and acylsterylglucosides in *Ashwagandha* are anti-stress agents. Active principles of *Ashwagandha*, for instance the sitoindosides VII-X and Withaferin-A, have been shown to have significant anti-stress activity against acute models of experimental stress [2]. Many of its constituents support immunomodulatory actions [3]. The aerial parts of *Withania somnifera* yielded 5-dehydroxy withanolide-R and withasomniferin-A.[4]

Various References of *Ashwagandha* as *Rasayana* From Different *Ayurvedic Samhitas* – Table 1

Endurance of Athlete Body

Being Athlete is a endurance sport, and success in this discipline frequently requires outstanding endurance physiology. Years of endurance training combined with a genetic predisposition lead to a series of physiological adaptations that are intended to increase the quantity of oxygen that can be transported to and used by working muscles in order to maximize endurance performance.[5]

These adaptations can be broadly divided into central and peripheral. The peripheral adaptations include increased vascularization, mitochondrial density and enzyme activity, which help in increasing the rate of oxygen extraction and usage. Those adaptations that occur centrally, that is involving the cardiovascular system, affect the rate at which oxygen can be delivered to the entire body.[6]These central factors include maximal cardiac output, pulmonary diffusion, blood volume, and blood flow.[7] Therefore the ability of the cardiorespiratory system to transport oxygen to the exercising muscles is considered the central component of the maximal aerobic capacity (VO_2 max).[8] Endurance training enhances the VO_2 max through adaptations of heart contractility and function, blood volume, and oxygen-carrying capacity. When the peripheral and central systems are highly adapted, as in the case of an elite endurance cyclist, high rates of work can be achieved for extended durations. The maximal amount of oxygen that is consumed during exercise, defined as VO_2 max, is dependent on both the delivery and utilization of oxygen, and is limited by the system that is least adapted. In the elite endurance cyclist, it is generally believed that VO_2 max is centrally limited, that is, by the rate of oxygen delivery.[9] Therefore, alterations to the oxygen transport system have the potential to enhance VO_2max further.[10] The usage of dietary aids or supplements, which is supported by evidence-based research in sports sciences, is another factor that may have a significant impact on improving an athlete's VO2 max. Ergogenic aids and nutritional supplements have become increasingly prevalent in the sports world in recent years.[11] An ergogenic aid is a method or practice that improves training efficiency, exercise recovery, performance capacity, and training quality, leading to more favorable training adaptations.[12]

Role Of *Ashwagandha* in Athlete –

Despite being one of the oldest medical and therapeutic traditions, very few clinical experiments have been carried out to show the benefits of Ayurveda, particularly in the context of sports performance.[13] For more than 3,000 years, *Ashwagandha*, commonly referred to as *Withania Somnifera* or Indian winter cherry, has been a significant component of traditional herbal treatment.[13] A Solanaceae plant with a height of up to 1 m, *Withania. Somnifera* is a highly pubescent shrub. Flavonoids and several active compounds, including alkaloids and steroidal lactones—commonly referred to as withanolides—are found in the root of the plant. Three naturally occurring, potent antioxidants, superoxide dismutase, catalase, and glutathione peroxidase, are among the chemical components of *Ashwagandha*. In addition to being used as a general tonic to increase energy, improve overall health and longevity, and prevent disease in athletes, the elderly, and pregnant women, it is a component of many

formulations that are prescribed for a variety of musculoskeletal conditions (such as arthritis and rheumatism).[14]

Pharmacodynamic Action of *Ashavgandha*-

This herb has a *tikta* (bitter), *katu* (pungent), and *madhura* (sweet) *rasa* (taste). Additionally, it has *gunas* of *laghu* (light) and *snigdha* (unctuousness), *vipaka* (result seen after digestion) of *madhura*, and *virya* (potency/active principle) of *usna* (heat). Its *karma* (activity) is to correct the *kapha* (mucoid/fluid component, etc.) and *vata* (functional element of the nervous system/circulatory system) that are not in balance within the body.[15]

Research Studies related to *Ashwagandha* showing enhancing effect in athlete performance-

As an adaptogen, *Ashwagandha* has been popular for increasing stamina and athletic performance, a use that is backed up by several clinical studies.

Ashwagandha extracts have been shown to increase athletic performance in both the general healthy adult population[16,17,18] and professional/elite athletes.[19,20] VO_2 max, a measure of cardiovascular fitness, has been shown to increase by 6−14% over study periods of 4−12 weeks.[21,22] *Ashwagandha* extracts have also been found to increase muscle mass and strength, and improve muscle recovery.[23]

Quality of life scores (including physical health, psychological health, social relationships and environmental factors) have also been reported to improve significantly more with *Ashwagandha* than with placebo in athletic adults.[24]

DISCUSSION

Ashwagandha is a *rasayana* drug whose effects include clearing all body channels by the virtue of its *tikta* and *katu rasa*, and by its *madhura rasa* and laghu guna, it supply optimal nutrition to body cells at the microscopic level, and maintaining the health of all body tissues, systems, sense organs, and physiological activities. In addition, each drug has unique effects that can't be predicted but are likely to occur because many of the qualities or active ingredients are found in combinations naturally. Given these characteristics and effects, *W. somnifera* is thought to increase vascular and cardiorespiratory endurance.

Ashwagandha's characteristics have been the subject of numerous pharmacological research in an effort to confirm its reputation as a multifunctional plant. Numerous studies have revealed that *Ashwagandha* enhances hemoglobin (Hb) and red blood cell (RBC) counts, both of which are crucial determinants of an elite athlete's cardiovascular performance. A higher VO2 max is ensured by the increased blood's cardiovascular performance. A higher VO2 max is ensured by the increased blood's ability to carry oxygen to the peripheral system at a higher rate as a result of the rise in RBC mass.[24] Research study have been carried out which shows adaptogenic effect of ashwagandha. This paper aims to study endurance effect of ashwagandha through various studies.

CONCLUSION

The ability of *Ashwagandha* to increase testosterone in men and reduce cortisol would be expected to promote muscle development, while its antioxidant and anti-inflammatory properties may support muscle recovery. *Ashwagandha* appears to support mitochondrial function and as such energy levels, while its adaptogenic effects on the nervous system may also have benefits in terms of athletic performance. Increases in hemoglobin have been seen in clinical trials, which may contribute to increased athletic performance.

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Table 1 Shows Various References of *Ashwagandha* as *Rasayana* From Different *Ayurvedic Samhitas* –

Sr. No.	Preparation	*Samhita*	Reference
1	*Sukumarka Taila*	*Astanga Hirdaya* (7th Century	A.H.Ci.13/41
2	*Ghrita*	*Astanga Hirdaya* (7th Century	A.H.U. 3/53
3	*Goksuradi Modaka*	*Bhaisajya Ratnavali* (18th century	74 /279
4	*Godhumadia Ghrita*	*BhaisajyaRatnavali* 18th century	74/279
5	*Amritaprash Ghrita*	*Bhaisajya Ratnavali* (18th century	74/299
6	*Ashwagandha Taila*	*Bhaisajya Ratnavali* (18th century	78/355