



KSM-66: Applications and Benefits in Sports Nutrition and Active Health



Endurance

Recovery

Weight Management

Focus

Strength

Testosterone

KSM-66 
ashwagandha
WORLD'S BEST ASHWAGANDHA

KSM-66:

A Holistic Approach to Fitness

Whether they're amateur athletes or marathoners, power walkers or Crossfit devotees, consumers across the athletic spectrum are turning to supplements to help them achieve optimum fitness. Indeed, a space once occupied solely by bodybuilders and extreme athletes is now the territory of an ever-widening range of consumers of all abilities and ages. Look no further than the immense market size of the sports nutrition arena for proof of it: according to Euromonitor International, the sports nutrition market in the United States alone reached nearly US\$6 billion by the end of 2014, accounting for over half of the global \$10 billion market.

But with a diverse consumer base comes a diverse set of challenges plaguing their myriad fitness goals—low energy, day-to-day stressors and inefficient recovery all take their toll. Current solutions on the market include stimulants like caffeine to boost energy and, on the other end of the spectrum, calmatives such as valerian or kava to promote rest. The problem? Many performance enhancers aiming to increase energy levels often result in a sharp, undesirable crash in energy later on; further, many calmatives aiming to support recovery also tend to sedate mood and diminish alertness, an undesirable property for an active population.

Add to these challenges the growing skepticism driven by scandals plaguing the sports enhancer market, and it becomes clear consumers want a very specific sports nutrition supplement: one that will enhance their fitness goals directly and indirectly, by promoting overall health and wellness alongside palpable endurance and recovery benefits, and one that is also safe, natural and in support of their holistic view of health. Enter ashwagandha.

Ashwagandha is an Ayurvedic herb and medicinal plant, with a 4,000-year history addressing stress, strain and fatigue, while also promoting muscle strength, energy, sexual vitality and cognitive health.

"Historically, most ashwagandha use in North America, Europe and Australia has been toward stress relief, largely emphasizing only the 'mind' benefits of ashwagandha," said Kartikeya Baldwa, director of Ixoreal Biomed Private Limited, referencing proven effects like enhanced sleep, memory, cognition, stress management and focus. "However, in the last two years, ashwagandha has started to be recognized by formulators for the 'body' benefits, with respect to sports and active life."

Ixoreal's KSM-66 is the most highly concentrated natural ashwagandha root extract on the market and is also the most well-researched, with 11 human studies completed and eight ongoing, supporting the mind and body benefits desired by today's sophisticated sports nutrition consumer.

BODY BENEFITS

In the sports nutrition market, consumers undeniably want two things: increased performance to maximize their workout and enhanced recovery to ensure they stay on track—all without undesirable synthetics.

Ashwagandha, a powerful adaptogen, meets these demands from all angles. Adaptogens are natural metabolic regulators that increase an individual's ability to adapt to environmental factors and, at the same time, reduce the damage to the body from these factors. When that factor is exercise, adaptogens have the ability to maintain a homeostasis—or balance—that results in improved athletic performance under physical stress and, also, an improved rate of recovery, without the spike and crash found in stimulants marketed for athletes.

Specifically, KSM-66 has been clinically proven to increase cardio-respiratory response, leading to a reduction in fatigue and exhaustion and, as a result, improved stamina. In a randomized, double blind, placebo-controlled study, 49 healthy, athletic adults were supplemented with either 300 mg KSM-66 or placebo twice daily for 12 weeks.¹ Those taking KSM-66 demonstrated up to a 13.6 percent increase in maximum oxygen consumption (a marker of enhanced fitness) as compared to the placebo group. Study participants supplemented with KSM-66 also reported, via questionnaire, marked increases in their physical and psychological health and social relationships.

Why? Researchers suggest ashwagandha increases energy production in muscles through its beneficial effects on mitochondrial functioning, thereby reducing the activity of the enzyme responsible for the breakdown of adenosine triphosphate (ATP)—the molecular unit of cellular energy. Ashwagandha is also noted to increase creatine levels, which leads to even more ATP activity, generating rapid energy—without the crash. Further, the ashwagandha root extract helped support the nervous system and adrenals,



helping to maintain energy levels during times of stress and prevent the body from “burning out.”

“The energy profile from ashwagandha consumption is more sustained and stable because, instead of giving an immediate boost, it induces high stamina more systematically for the long run,” Baldwa said. “The result of this is that aswagandha gives the energy and stamina of performance enhancers like caffeine, but without the stimulating effects and the ‘rise and fall’ profile undesirable to many.”

Yet another benefit for athletes is KSM-66’s proven ability to improve the results of their efforts: muscle strength, lean body mass and body fat percentage. In one recent study, 50 healthy male subjects were supplemented with 300 mg KSM-66 or placebo twice daily for eight weeks.² Throughout the study, the subjects’ serum testosterone levels, muscle strength (as measured by a maximal single repetition load), muscle size, body fat percentage, and serum creatine kinase levels were measured. At the end of the eight weeks, KSM-66 produced a marked increase in serum testosterone levels (to the tune of 15.3 percent), which was associated with muscle growth and increased strength. Most notably, those taking the ingredient experienced a 17.1 percent increase in arm muscle size, and a 16.1 percent reduction in average body fat.

The researchers attributed participants’ increased muscle size to increased testosterone levels incited by KSM-66. At the same time, KSM-66 decreased cortisol levels in participants, researchers said, thereby enabling a resistance to decreased muscle mass.

But alongside the marked benefits of training is an important caveat: the role of recovery. Without it, muscle damage, soreness, and injury can all slow down a training plan. That’s why so many athletes understand the value of rest but, in an effort to sustain skill and progress, want to do so efficiently. To that end, KSM-66 supplementation is shown to significantly accelerate muscle recovery, which means that athletes can get back on their feet not just safely, but sooner.

Researchers evaluated the efficacy of KSM-66 in subjects as they underwent resistance training, focusing on serum creatine kinase levels as a marker of exercise-induced muscle damage.² What they found was significant: In addition to its clear benefits for muscle growth, KSM-66 also produced a 98.9 percent reduction in post-exercise buildup of serum creatine kinase levels, compared to placebo, indicating a lesser degree of muscle damage. In this way, KSM-66 represents a breakthrough for sports nutrition, providing a natural increase to



stamina and muscle mass, while also promoting the quick and efficient recovery desired by today’s athletes.

COGNITIVE VALUE

Anyone committed to a successful exercise plan knows that training is half physical, half mental. KSM-66, unlike other sports nutrition ingredients on the market, boasts myriad cognitive benefits to support this oft-forgotten area of fitness.

Ashwagandha has long been documented as a stress reliever, but one recent study confirmed KSM-66 also improves focus, concentration and the ability to act calmly under pressure.³

In this randomized, double blind, placebocontrolled study, KSM-66 supplementation led to a substantial reduction in stress and anxiety per various psychometric scales among participants with documented chronic stress. Researchers concluded that, by reducing serum cortisol levels by about 28 percent, KSM-66 can safely and effectively improve an individual’s resistance towards stress and, as a result, improve self-assessed quality of life. This has benefits for not just the general population, said Baldwa, but also athletes, who are increasingly seeking a holistic view of fitness—one that also includes mind health.

Building on these findings, another study (not yet published) examined KSM-66’s efficacy in reducing body weight among adults under chronic stress. Researchers recruited 50 healthy male volunteers, who were given 300 mg KSM-66 or placebo twice daily for eight weeks. Their serum levels of cortisol (a stress hormone), body weight and body mass index (BMI) were measured, and a multitude of questionnaires were conducted.

At the end of the eight weeks, KSM-66 supplementation resulted in a 3 percent reduction in both body weight and BMI, as well as a significant 22 percent drop in serum cortisol levels, compared to placebo. Perceived Stress Scale and Food Cravings Questionnaire scores revealed KSM-66 produced a 32.74 percent reduction in stress alongside a sharp reduction in food cravings. In the end, researchers concluded that chronic stress is frequently accompanied by an increase in serum cortisol and food cravings, in



addition to a decrease in dietary control and mental well-being—combined, the result is often weight gain. By introducing cortisol-lowering KSM-66, participants experienced reduced stress and, as a result, the increased focus and sense of self-control that helps them lose weight.

The role of mind-body coordination in sports function has long been recognized, and so it is not surprising that ashwagandha can offer this pathway for physical fitness.

Another trial specifically explored the ability of ashwagandha to improve memory and certain aspects of cognitive function.⁴ In this study, 50 healthy adults received 300 mg twice daily of KSM-66 or placebo for eight weeks. Subjects were evaluated at baseline, after four and eight weeks, using a variety of memory and cognition domain assessment tools. At the eight week mark, significant improvements were seen in immediate memory and general memory in subjects taking KSM-66. Further, the researchers saw significant improvement in executive function, attention and information processing speed, demonstrated in tests showing quick and accurate decision making and faster situation analysis.

The implications of this study for sports performance are noteworthy and exciting. Increased focus, attention and mindfulness can lead to better immersion, motor coordination and muscle recruitment, thereby leading to faster adaption and learning, which in turn can speed up the feedback loop toward higher performance. The role of mind-body coordination in sports function has long been recognized, and so it is not surprising that adaptogenic herbs like ashwagandha can offer this additional pathway for physical fitness.

"We are beginning to see formulators target the mind and body benefits not separately, but jointly," added Baldwa. "This makes a lot of sense because the mind and body are mutually enhancing when properly developed. We have seen this approach specifically in sports formulations where mind-body coordination helps greatly in performance."



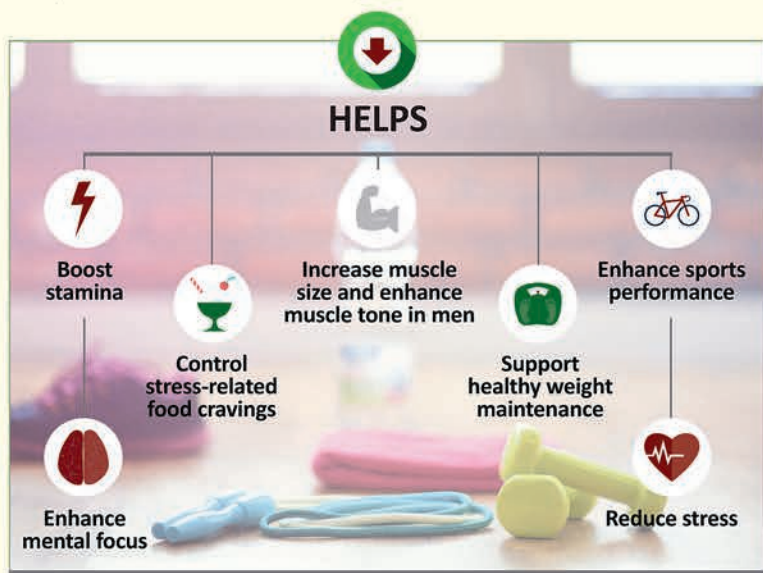
MARK OF QUALITY

Ixoreal is the only ashwagandha manufacturer to own the entire value chain utilized in producing its extract—from the farms to the production facilities, testing laboratories, research centers and distribution channels. This means Ixoreal has complete control to maintain ashwagandha's complex blend of active constituents in their natural proportions along the supply chain. The result? KSM-66 is the highest quality, highest concentration, full spectrum ashwagandha root extract available on the market, standardized to the highest percentage of withanolides in the world—greater than 5 percent HPLC. It is produced without alcohol or other chemical solvents using a first-of-its-kind extraction process, and carries a number of quality certifications: NSF, USDA Certified Organic, Non-GMO Project Verified, Certified Gluten-Free, and GRAS (generally recognized as safe), among others. And, because there are no middle men, KSM-66 is a product that is also cost effective.

Formulators using KSM-66 have the backing of top rate clinical trials, produced in tandem with leading academic and research institutions, and held to the gold standard in research: randomized, double blind, placebo-controlled designs.

In formulations, this research substantiates two distinct benefits for the mind (reducing stress, anxiety, cortisol levels and stress-related food cravings; enhancing memory and cognition), and two benefits for the body (increasing endurance, strength, muscle size and muscle recovery rate; improving sexual function). On the label, this translates to more than 30 structure/function claims in the areas of stress memory

and cognition, sexual performance, sports function, and weight management. These claims are in accordance with the requirements of the Dietary Supplement Health and Education Act of 1994 and have been submitted to the Food and Drug Administration (FDA), backed by peer reviewed studies, and deemed acceptable for KSM-66. Some examples include:



"KSM-66's two benefits for the mind and two benefits for the body as shown in numerous clinical trials are of wide appeal in the sense that they are of interest to many segments of the population: students, stay-at-home parents, working professionals, active adults, physical fitness enthusiasts, senior citizens," Baldwa said.

In light of this, formulators will appreciate that KSM-66 lends itself to a variety of delivery mechanisms and product forms. It is taste neutral, heat- and shelf stable, and almost fully water soluble. It is appropriate as a stand-alone product or as a complementary ingredient in herbal, phyto-pharmaceutical and dietary supplement formulations. This means KSM-66 is appropriate for use in a wide range of applications, from capsules and tablets to functional foods and beverages, to unconventional applications such as chewing gums, teas, coffees, soups and malted powders. "One client has even formulated burgers using KSM-66," Baldwa added, noting the ingredient's flexibility. "The marketing potential of KSM-66 is very large indeed, because the ingredient supports several applications, a broad set of consumer segments, and several delivery mechanisms."

REFERENCES

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- 4 Choudhary D, Langade D. "Efficacy and Safety of an Ashwagandha (*Withania somnifera*) Root Extract in Improving Memory and Selected Cognitive Functions." Publication pending.



SUBSTANTIATED STRUCTURE/FUNCTION CLAIMS

KSM-66 Ashwagandha's substantiated structure/function claims are in accordance with the requirements of the Dietary Supplement Health and Education Act of 1994 and have been submitted to the Food and Drug Administration. Backed by peer reviewed studies, numerous claims have been deemed acceptable for KSM-66. Some examples include:

STRESS

- Helps reduce stress
- Helps promote a healthy response to everyday stress, over-work and fatigue
- Promotes relaxation without drowsiness
- Helps improve the quality of sleep
- Helps maintain normal cortisol levels to promote a healthy response to everyday stress
- Helps in calming down and relaxation of body and mind

MEMORY AND COGNITION

- Helps improve learning performance and concentration
- Helps maintain mental alertness when experiencing fatigue or drowsiness
- Helps promote mental clarity, concentration and alertness
- Helps enhance mental focus
- Helps promote mental sharpness

SEXUAL PERFORMANCE

- Helps arouse sexual desire
- Helps maintain sexual vigor and performance
- Helps the body maintain healthy levels of free testosterone in men
- Promotes sexual desire and vitality
- Promote overall well being and hormonal health
- Enhance sexual function

WOMEN HEALTH

- Helps support a healthy response to common conditions associated with menopause
- Supports a normal healthy attitude during the menstrual cycle
- Helps diminish normal symptoms of PMS

SPORTS FUNCTION

- Helps Boost stamina
- Helps increase muscle size and enhance muscle tone in men
- Helps to maintain balanced energy levels for physical performance and endurance
- Helps enhance sports performance
- Helps increase muscle strength in men
- Helps enhance the rate of muscle recovery in men

WEIGHT MANAGEMENT

- Helps to enhance overall body composition when used as part of a healthy diet and exercise program
- Helps maintain normal weight by reducing stress induced over eating
- Helps control stress-related food cravings
- Helps support healthy weight maintenance.

Cognition

Endurance

Stress Relief

Muscle Strength

Testosterone

Muscle Recovery

Sexual Wellness

Weight Management



WHAT MAKES KSM-66 THE WORLD'S BEST ASHWAGANDHA?

1. Highest Concentration:

Created via a process that took 14 years of R&D to develop and refine, KSM-66 is the highest concentration ashwagandha root extract available on the market today, produced using a first-of-its-kind extraction process, based on "Green-Chemistry" principles, without using alcohol or any other chemical solvents.

2. Tight vertical integration for price advantage and high quality:

Ixoreal is the only ashwagandha manufacturer in the world to own the entire value chain in producing the extract. Ixoreal has its own farms, production facilities, testing laboratories, research center and distribution. As a result, Ixoreal is unmatched in its ability to deliver high-quality ashwagandha with steady supply and batch-to-batch consistency.

3. The most extensive set of clinical trials:

Ixoreal is the industry leader in clinical trials and basic research investigating the effectiveness of ashwagandha.

- Largest pool of research studies: 11 human studies completed, 8 on-going human studies and 3 animal studies
- Gold Standard Studies: Double-blind, placebo controlled, randomized
- Our trials are all on healthy populations to mirror our mainstream customer base
- Our publications are of academia standard, all in PubMed-indexed, mainstream medicine journals
- The principal investigators are leading researchers with established publication records

4. Winner of several awards and honors:

- "Herbal Industry Leader 2016" Award by Society for Ethnopharmacology
- "Product Innovation in Botanicals Award" by Frost and Sullivan 2014
- "Best Botanical Ingredient" at Engredea 2013
- "Ingredient of the Year" at Panacea 2012



5. Highest number of quality certifications:





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