

Sensoril® - A Multifunctional Performance Activator

Bruce Abedon, PhD, *Director of Scientific Affairs*
NutraGenesis LLC, Brattleboro, Vermont

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STRUCTURE/FUNCTION CLAIMS:

- Helps boost energy levels*
- Enhances energy levels while helping to alleviate fatigue*
- Helps reduce stress-induced appetite cravings and weight gain*
- Helps inhibit cellular oxidative stress*
- Helps slow the effects of aging by inhibiting free radical damage*
- Promotes a healthy response to inflammation*

* These statements have not been evaluated by the Food and Drug Administration.

This product is not intended to diagnose, treat, cure or prevent any disease.

MUSCLE AND FITNESS ATHLETES DESIRE COMPREHENSIVE, PERFORMANCE-ENHANCING PRODUCTS

The demand for performance-enhancing, sports nutrition products in the muscle and fitness markets has exploded over the last five years, with athletes of all ages using specialized dietary supplements, drinks, and bars on a regular basis to increase energy, strength, and endurance. Gym users, endurance athletes, and weekend warriors alike are finding that energy supplementation is essential for enhanced workout productivity as well as muscle mass and stamina management. Increasingly, these groups are seeking innovative products that also speed workout recovery time and counteract negative physiological changes that exercise can produce in the body. In the pursuit of developing new, innovative sports performance ingredients, an ideal performance-enhancing product would provide multifunctional benefits including: long-lasting energy, increased anabolic metabolism to promote lean muscle mass development, curbing appetite cravings, natural stimulation of performance-enhancing hormones, and reduction of exercise-induced inflammation while having limited negative side effects to promote optimum health and wellness. Because many performance-enhancing products sold today typically fall short of satisfying these goals, new formulations containing novel ingredients are required. Today, such a novel, optimal performance-enhancing product exists and is sold by Nutragenesis under the tradename Sensoril®.

SENSORIL® - A NOVEL, COMPREHENSIVE PERFORMANCE-ENHANCING NUTRACEUTICAL

Sensoril® is a proprietary, multi-patented, standardized extract of Ashwagandha (*Withania somnifera*), a plant grown in India that is revered for its ability to balance, energize, rejuvenate, and revitalize. Sensoril's energizing and restorative characteristics result from unique bioactive compounds that are extracted from specially grown Ashwagandha roots and leaves in a patented, water-based process. These bioactives give Sensoril® adaptogenic properties. Adaptogens are a small group of plants and mushrooms that energize the body, increase its ability to resist and recover from stress, and stimulate an overall feeling of balance and normalization. Although adaptogens such as Ashwagandha, Siberian ginseng, Reishi mushroom, and Cordyceps mushroom have been used as energy and performance enhancers for thousands of years in Ayurvedic medicine and countries of the East, the concept of adaptogenic energy and performance supplementation is relatively new to the West. As an adaptogen, Sensoril® is unique in that it provides sustained energy over the long term when taken as a tonic on a daily basis without any negative side effects. It also provides many other benefits that make it ideally suited for inclusion in a muscle and fitness performance product (Table 1).

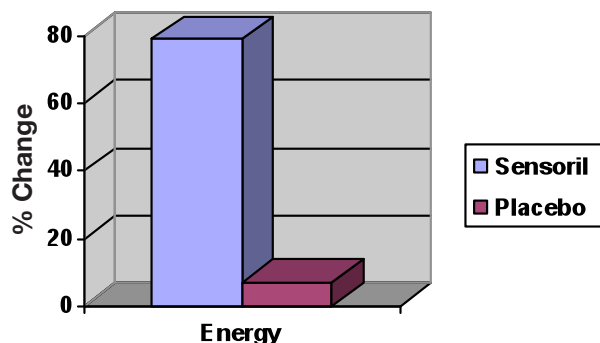
Table 1. Performance-enhancing properties of Sensoril®.

- PROVIDES SUSTAINED ENERGY
- SPEEDS WORKOUT RECOVERY TIME
- RETURNS THE BODY TO BALANCE AFTER EXERCISE-INDUCED STRESS
- LOWERS SERUM CORTISOL LEVELS
- PROMOTES THE NATURAL SYNTHESIS OF PERFORMANCE-ENHANCING HORMONES
- STIMULATES ANABOLIC MUSCLE DEVELOPMENT
- INCREASES METABOLISM
- SUPPRESSES FOOD CRAVINGS
- REDUCES EXERCISE-INDUCED INFLAMMATION
- DISPLAYS NO HARMFUL SIDE EFFECTS

SENSORIL® - CLINICALLY PROVEN TO BOOST ENERGY

Recently, a double-blind, placebo-controlled, human clinical trial was conducted that confirmed Sensoril's ability to boost energy levels. Subjects taking Sensoril® at the recommended dosage of 250 mg per day experienced a 79% increase in energy. This significant energy boost contrasts with a non-significant rise in energy of only 7% in the placebo group (Figure 1).

Figure 1. Change in Energy in Subjects Receiving Sensoril® Compared to a Placebo.



SENSORIL® BOOSTS ENERGY AT THE CELLULAR LEVEL

At the cellular level, Sensoril® enhances energy-related metabolism in several significant ways. Scientific research has demonstrated that Sensoril® increases levels of ATP and other energy-related cellular metabolites and intermediates that are produced in mitochondria, the cell's energy factory. These metabolites are the underlying energy "currency" that drive all cellular processes and are vital for maintaining

healthy levels of energy in the body. One possible explanation for this finding is that Sensoril® generates higher activity of enzymes like ATP synthase, which are responsible for their production from the breakdown of glucose, lipids, and other energy sources in the body. These enzymes can be rate-limiting factors in the production of useable energy. Nutritional supplementation from Sensoril® that boosts their activity can actually result in greater energy levels felt by an individual.

An alternate explanation is that these energy metabolites are by-products of increased rates of cellular respiration resulting from improved oxygenation of tissues. Except for short-lived bursts of activity that rely on energy generated anaerobically, without the need for oxygen, most activity in the body is aerobic and requires a continual flow of oxygen to tissues. Ashwagandha, from which Sensoril® is extracted, has been shown to increase oxygenation of tissues through the synthesis and activity of nitric oxide synthase, the enzyme that produces nitric oxide in the body. Cells that line the interior wall of blood vessels use nitric oxide to signal surrounding smooth muscle to relax. The resulting vasodilation (expansion) of blood vessels improves blood flow and oxygenation of tissues, leading to increased energy in the body. There is every indication that Sensoril®, like other powerful antioxidants, may also potentiate the nitric oxide-stimulating properties of other well-known nitric oxide enhancers like L-arginine.

EXERCISE LEADS TO STRESS-INDUCED HORMONE CHANGES IN THE BODY

Although there are many positive benefits to exercise, such as it being psychologically calming, exercise also causes significant stress which brings the body out of its normal range of balance. Part of the body's response to this stress is to secrete hormones like cortisol from the adrenal glands. Cortisol levels can remain high in the blood for several hours after a workout is completed. This buildup of cortisol in the blood has several negative consequences for athletes. Cortisol is a catabolic steroid hormone that studies have shown leads to the breakdown of muscle protein. In healthy athletes, this loss of lean muscle mass can occur within a few hours of even mild elevations in serum cortisol levels. Cortisol is also an antagonist of DHEA, another adrenal hormone, which is a precursor for testosterone. Numerous scientific studies have demonstrated that both DHEA and testosterone are vital for the maintenance of athletic energy. Testosterone is also an important androgen necessary for increasing muscle mass, bone density, strength, and stamina that athletes of both sexes require to attain peak performance.

So as cortisol levels rise in response to exercise-induced stress, energy becomes depleted and lean muscle mass is lost as DHEA and testosterone levels fall, resulting in decreased athletic performance.

HIGH CORTISOL LEVELS CAN PROMOTE WEIGHT GAIN

Athletes are concerned with maintaining a healthy weight not only because they want to look good after working out, but also because weight management is a vital component of achieving optimal performance and stamina levels. In fact, many athletic trainers recommend that their clients lean up and trim down for peak physical fitness. Many athletes often find it difficult to lose weight, however. The catabolic loss of muscle mass associated with exercise-induced spikes in serum cortisol levels can make weight loss difficult because muscles are a major driver of metabolic rate. As muscle mass diminishes, a person's reduced metabolism makes it harder to burn off excess calories.

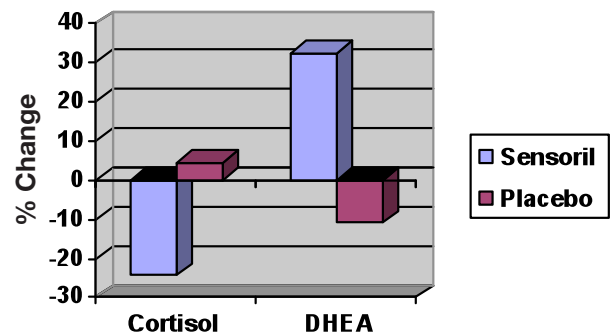
High cortisol levels that result from working out also stimulate the appetite substantially. The body has evolved this response to stressful events as a mechanism for replenishing lost energy. Unfortunately, cortisol-induced food cravings, especially for foods like fats and carbohydrates, can result in overeating and excessive consumption of calories. To make matters worse, most of these excess calories are deposited as visceral fat in the abdominal region surrounding the internal organs because fat cells in this region have up to four times the number of cortisol receptors on their cell membranes as fat cells in other parts of the body. Visceral fat is derided by athletes and medical practitioners alike not only because it is unattractive and limits a person's athletic potential, but also because its accumulation is now considered a contributing factor for insulin resistance, glucose intolerance, dyslipidemia, hypertension, and coronary artery disease.

SENSORIL® ENHANCES PERFORMANCE BY PROMOTING A HEALTHY HORMONE BALANCE

Sensoril's superior performance-enhancing properties result from its unique ability to increase energy and help the body recover from exercise-induced stress through improvement in stress-related hormone activity in the body. This was confirmed in a double-blind, placebo-controlled human clinical trial in which subjects taking Sensoril® at the recommended dosage of 250 mg per day had a 24.2% reduction in serum cortisol levels and a 32.2% increase in serum DHEA levels (Figure 2). These types of hormone changes are normally associated with greater anabolic activity in the body, which leads to increased lean muscle mass. Reductions in cortisol levels can lead to improved

weight management as extra muscle mass promotes a faster metabolic rate and food craving suppression restricts deposition of visceral fat. Increased levels of DHEA also lead to faster attainment of pre-workout energy levels. Because recovery time in between workouts is directly related to how quickly the body can return to normal homeostasis and become energized again, Sensoril's energy-boosting and cortisol-reducing properties can reduce recovery time in athletes.

Figure 2. Percent Changes in Serum Cortisol and DHEA in Subjects Receiving Sensoril® Compared to a Placebo.



SENSORIL® RELIEVES SYMPTOMS OF OVERTRAINING

Often, when athletes train at a very high level, they do not give their bodies enough time to recover in between workouts. This can lead to Overtraining Syndrome, a debilitating condition characterized by rampant fatigue, irritability, anxiety, insomnia, and loss of appetite and enthusiasm for training. These symptoms, which are similar to what a person experiences when they are subjected to chronic stress, result from a high cortisol:DHEA ratio in the blood. In a double-blind, placebo-controlled human clinical trial, subjects taking Sensoril® at the recommended dosage of 250 mg per day experienced an improvement in similar symptoms including decreased fatigue, irritability, anxiety, insomnia, and loss of appetite. In contrast, the placebo group saw no significant change in any of these symptoms for the duration of the study. These changes in stress-related symptoms were probably due to the decrease in cortisol levels described previously and demonstrate that Sensoril® can help relieve symptoms of Overtraining Syndrome.

SENSORIL® - POTENT ANTIOXIDANT WITH ANTI-INFLAMMATORY PROPERTIES

After a hard workout, muscles and other soft tissues can become inflamed and sore, leading to delayed recovery time. This inflammatory response, involving a host of chemicals and immune cell types, is often compounded when free radicals are produced in large number because of an athlete's high energy requirements. As an athlete's energy needs rise, mitochondrial activity in muscles increases to convert glucose, lipids, and amino acids into useable energy through reaction with oxygen. A dangerous by-product of this biological activity is the formation of large quantities of free radicals, which can amplify the inflammatory response through upregulation of proinflammatory genes.

Scientific research has demonstrated that Ashwagandha, from which Sensoril® is derived, has diverse anti-inflammatory properties and relieves muscle pain. In fact, in the same double-blind, placebo-controlled study described previously, subjects taking 250 mg per day of Sensoril® had a 36.6% reduction, compared to placebo, in the level of C-reactive protein, a marker of systemic inflammation, and a 70.6% reduction in muscle pain. In addition, a recent study using an acute inflammation model in rats demonstrated that, compared to a control, Sensoril® significantly reduced soft-tissue inflammation as well as several biochemical indicators of inflammation in the blood after paws had been injected with carrageenan, an inflammatory agent. Sensoril® may reduce inflammation by virtue of its ability as an antioxidant to scavenge and eliminate free radicals, as well as the ability of its bioactive withanolides to suppress the activity of factors involved in proinflammatory gene expression (which was confirmed in a recent study).

LIMITATIONS OF TODAY'S STIMULANT-BASED PERFORMANCE PRODUCT ENVIRONMENT

The vast majority of performance products currently marketed to athletes focus on boosting short-term energy levels to increase strength and endurance by using plant-based active ingredients such as caffeine (or herbal ingredients that contain caffeine or similar chemicals). These actives mimic central nervous system stimulants and boost energy by increasing heart and breathing rates, and directing nutrient-rich blood to muscles and lungs, which leads to short-term gains in performance and the intensity of training sessions. However, stimulants have limitations that make them less than ideal for long-term use. They deplete the body of lasting energy as it slows down from the heightened energy state, often resulting in delayed recovery from exercise. If additional stimulants are used to offset

this low, a rollercoaster series of highs and lows may result. Continual use of stimulants in this manner can strain the adrenal glands and lead to adrenal exhaustion, which has many of the same symptoms as Overtraining Syndrome (described previously). Stimulants are catabolic, resulting in the breakdown of lean muscle mass, and can intensify inflammation in the body that results from exercise. They also can be subject to increased dosage requirements as the body grows accustomed to their continual use. These side effects of stimulants may be counterproductive to most athletes' performance and health goals.

SENSORIL® OFFERS A SUPERIOR ALTERNATIVE FOR MULTIFUNCTIONAL PERFORMANCE BENEFITS

Sensoril® offers a superior alternative to stimulant-based products and meets the current performance-enhancing goals of a diverse range of consumer groups. Sensoril®, when used by itself, provides long-lasting, natural energy that is safe and effective without producing negative side effects. It speeds workout recovery time by reducing inflammation, muscle pain, and the heightened cortisol levels that result from exercise-induced stress on the body. It promotes anabolic development of lean muscle mass, faster metabolism, food craving suppression, and the natural synthesis of performance-enhancing hormones, as well as relieves symptoms of overtraining. The combination of Sensoril® and a stimulant would also create an excellent sports nutrition product because Sensoril® provides balanced, sustained energy that complements a stimulant's short-term energy boost and evens out the highs and lows stimulant users sometimes experience. Because of these outstanding properties, Sensoril® is the superior choice for dietary supplement, food and beverage manufacturers looking to develop a new generation of athletic performance-enhancing products that meet the multifunctional needs of today's health-conscious athletes. ■

— Dr. Abedon received his M.S. and PhD in plant genetics from the University of Wisconsin-Madison and a B.S. in Biochemistry from the University of Massachusetts-Amherst. Dr. Abedon may be contacted through NutraGenesis at 802-257-5345, or bruce@nutragenesis.com.