

Sensoril[®] Energy White Paper

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



STRUCTURE/FUNCTION CLAIMS FOR ENERGY:

- Enhances energy levels while helping to alleviate fatigue*
- Boosts energy and reduces fatigue*
- Helps restore and sustain energy levels*
- Boosts Energy Levels*

* 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.

The market for energy enhancing products has exploded over the last five years, with people of all ages using energy drinks, bars, and dietary supplements in increasing quantity. Many men and women use these products as a physical “pick-me-up” to maintain or boost their normally healthy energy levels as needed during the day. For gym users and athletes, energy supplementation is essential for enhanced workout productivity as well as muscle mass and stamina management. Others needing energy products are part of the “lost-energy” demographic who experience prolonged periods of energy depletion and poor mental focus. They seek a prophylactic, sustained energy source to help them get through the day. A fourth consumer group is composed of women who define their energy needs in terms of reducing stress-induced fatigue, providing a balanced physical energy boost, as well as promoting an emotional uplift and improved mood so they can handle whatever life throws at them in a calm, healthy, and effective manner.

TODAY'S STIMULANT-BASED ENERGY PRODUCT ENVIRONMENT

To date, most energy products for all these consumer groups have contained plant-based, active ingredients that mimic central nervous system (CNS) stimulants like adrenaline to boost short-term energy levels. The most notable of these ingredients are caffeine or herbal ingredients that contain caffeine (such as coffee, green tea, guarana, and yerba mate), taurine, and (now banned) ephedra. CNS stimulants are normally secreted in response to stressors to prepare the body for “fight” or “flight”, which can result in increased heart and breathing rates, flow of blood to muscles and lungs and away from digestive organs, and the breakdown of muscle protein to increase blood glucose levels. This physiological response is the cause of both the energy boosting properties of stimulants and also the many contraindications and negative physical and emotional side effects people taking them sometimes experience.

STIMULANTS ALONE ARE NOT IDEAL ENERGY SOURCES

Few people realize that stimulants, when used alone, are not ideal energy sources. Stimulants provide short-term energy but can actually deplete the body of energy as it slows down to recover from the heightened energy state. People often feel more tired after coming off the “high” than they felt before consuming the stimulant. If, as is often the case, additional stimulant-based energy products are consumed to offset this low, a vicious cycle of energy highs and lows ensues. Regular use of stimulants in this manner strains the adrenal glands, which produce hormones to bring the body back into balance, resulting in hormone depletion over time. Ultimately this leads to adrenal exhaustion, the root cause of chronic fatigue. Furthermore, as the

body becomes accustomed to regular intake of stimulants, greater levels are needed to achieve the same effect. In other words, while sporadic consumption of stimulants may have positive, short-term energy benefits, regular long-term use can result in complications in users’ physical and emotional health and well-being, and promote dependency and recurring fatigue, the opposite of their intended use.

HEALTH CONSCIOUS CONSUMERS DEMAND NEW ENERGY PRODUCTS

Today’s health conscious consumers desire energy products that provide long-lasting, continuous energy throughout the day, without any highs and lows or negative side effects that might adversely affect their health and well-being. This new form of energy nutrition would ideally be beneficial to all classes of consumers: people with normal energy levels who want to maintain or augment those levels in a healthy way, athletes wanting to boost strength and endurance, chronically low-energy individuals who want to feel normal again, and women trying to cope with stress in their daily lives. Because energy products containing only stimulants can be problematic, new energy formulations are required which utilize novel energy sources that can either be used in place of stimulants or in conjunction with them to extend their short term energy benefit while minimizing their side-effects. Ideally, these new formulations would provide universal, sustained, vibrant energy that enhances physical and emotional energy, as well as mental vitality. Today, such a novel, optimal energy source exists and is sold by Nutrigenesis under the tradename Sensoril®.

SENSORIL® - A NEW DIMENSION IN HEALTHY ENERGY

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, 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 increase the body’s ability to resist and recover from fatigue and stress while stimulating an overall feeling of balance and normalization. Although adaptogens such as Ashwagandha, Siberian ginseng, and Reishi mushroom have been used as energy

enhancers for thousands of years in Ayurvedic medicine and countries of the East, the concept of adaptogenic energy supplementation is relatively new to the West.

ADAPTOGENS AND SUSTAINED ENERGY RELEASE

A true adaptogen acts as a metabolic regulator that increases the body’s ability to adjust to environmental stressors. Adaptogens are unique in that they provide sustained energy over the long term when taken as a tonic on a daily basis without any negative side effects. Adaptogens also provide many other benefits while counteracting the negative side effects of CNS stimulants (Table 1). Because the body does not become habituated to adaptogen use, increased dosage is not necessary over the long term to produce a sustained effect, unlike a stimulant. With its adaptogenic properties, Sensoril® is ideally suited for inclusion in an energy product either as a stand-alone energy enhancer or together with a stimulant because it provides long-lasting, sustained energy that complements a stimulant’s short-term energy boost and evens out the highs and lows normally experienced by stimulant users. Sensoril® also promotes improved performance, mental acuity, calmness, and stress tolerance while minimizing a stimulant’s negative side effects.

Table 1. Differences Between Adaptogens And Stimulants

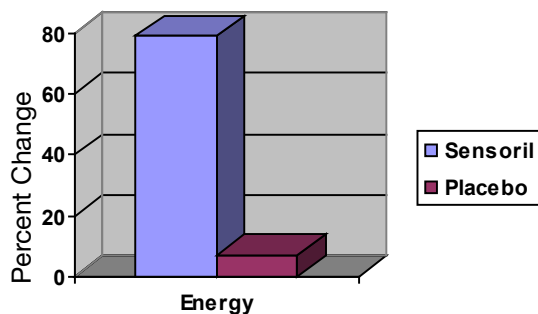
	Adaptogens	Stimulants
Contributes to long-term energy depletion	No	Yes
Performance under stress	Increased	Decreased
Recovery from stress	High	Low
Promotes insomnia	No	Yes
Calming	Yes	No
Improves mental acuity	Yes	No

CLINICALLY PROVEN TO BOOST ENERGY AND IMPROVE OVERALL HEALTH

Recently, a double-blind, placebo-controlled, human clinical trial was conducted that confirmed Sensoril’s ability to boost energy and improve overall health by counteracting many symptoms that are negative side effects of stimulants. Subjects taking Sensoril® at the recommended dosage of 250 mg per day experienced a 79% increase in energy compared to a placebo group (Figure 1). The Sensoril® group also had significant reductions in symptoms normally considered

side effects of stimulants including flushing and sweating, headache, heart palpitations, insomnia, irritability, and inability to concentrate. In contrast, the placebo group saw no significant change in these symptoms for the duration of the study.

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



SENSORIL® LOWERS CORTISOL LEVELS ELEVATED BY STRESS

Sensoril's energy-enhancing properties result, in part, from its unique ability to reduce fatigue and limit negative responses to stress brought on by today's fast-paced lifestyles. Even exercise, in spite of its many health-enhancing aspects, can increase stress on the body and increase fatigue while the body recovers. Chronic stress is both physically and emotionally draining, depleting the body of vital energy, reducing our ability to cope with life, and negatively affecting our mood. Sensoril's adaptogenic properties calm the body and bring it into greater balance, relieving many symptoms of stress.

Sensoril® achieves these outcomes by improving stress-related hormone activity in the body. This was confirmed in a double-blind, placebo-controlled 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 compared to a placebo group. Cortisol is a hormone secreted by the adrenal glands in response to stress. When secreted at low levels in response to mild stress, cortisol can be beneficial and helps the body respond appropriately to a stressor, after which relaxation and recovery bring the body back into balance. Under the conditions of chronic stress typically experienced by people today, however, cortisol levels are maintained at abnormally high levels for extended periods and produce damaging effects on the

body. These include rampant fatigue, increased feelings of anxiety, impaired cognitive performance, lowered immunity, weight gain, elevated blood sugar levels, and premature aging. Research has suggested that the drop in energy associated with stress may be traced to suppressed thyroid function, adrenal exhaustion brought on by excessive use of stimulants, blood sugar imbalances, and/or alterations in the activity of energy boosting hormones such as DHEA and testosterone. By lowering cortisol levels, Sensoril® reverses these stress-induced, energy-depleting factors to enhance overall energy, vitality, and well-being.

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 the production of these metabolites 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.

Sensoril® also lifts energy at the cellular level through its effect on hormonal activity. Cortisol is an antagonist of DHEA, a hormone that is a precursor of testosterone. Numerous scientific studies have demonstrated that both DHEA and testosterone are positively correlated with overall energy in the body and are vital for the maintenance of cellular energy in both men and women. Testosterone is also an important androgen necessary for increasing muscle mass, bone density, strength, stamina, and performance in athletes of both sexes. As cortisol levels rise in the body due to stress, DHEA levels fall and energy and performance are depleted. Conversely, as cortisol levels fall when Sensoril® is consumed on a daily basis, the level of DHEA rises. This was confirmed in the same double-blind, placebo-controlled clinical trial discussed previously. The significant reduction in cortisol levels observed in subjects who took Sensoril® was associated with a 32.2% increase in serum DHEA levels compared to a placebo group. The increased energy felt by subjects taking Sensoril® may have been due, in part, to increased testosterone levels resulting from this rise in DHEA levels.

SENSORIL® - LONG-LASTING, EFFECTIVE ENERGY

It is clear that the current energy needs of a diverse array of consumer groups is not being completely satisfied by products that rely solely on stimulants to boost energy levels. These products are limited by having short-lived activity that can result in energy highs and lows, side effects, and increased dosage requirements after continual use. By contrast, Sensoril® provides safe, effective, natural energy that can be relied on day after day to meet the physical, emotional, and mental energy needs of men and women. Sensoril® can be used either by itself to provide long-lasting, balanced energy or can be used to complement and extend a stimulant's short term energy boost while evening out the highs and lows normally experienced by stimulant users. Sensoril® also reduces a stimulant's side effects, which improves the health profile of an energy product containing both Sensoril® and a stimulant. Because of these outstanding energy-enhancing properties, Sensoril® is the superior choice for dietary supplement, food and beverage manufacturers looking to develop a new generation of energy products that meet the needs of today's health conscious consumers. ■

— 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.