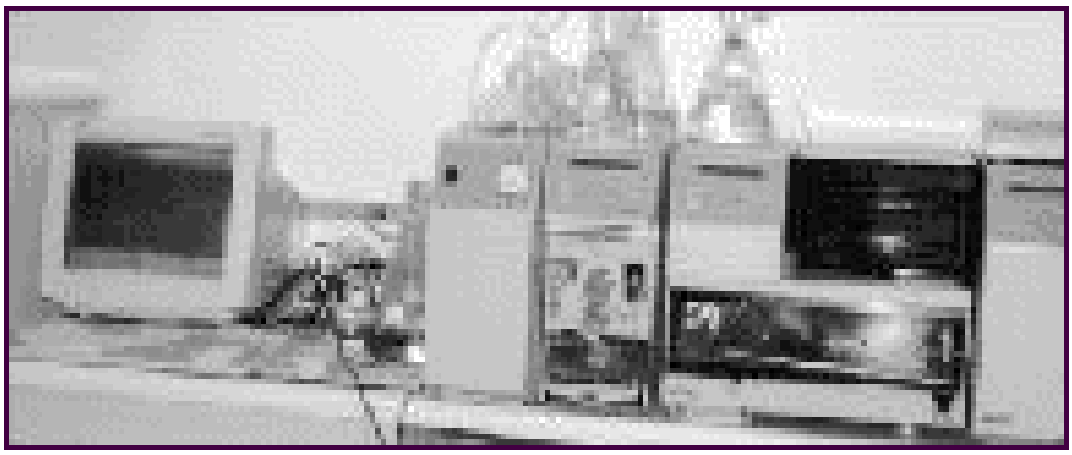
Sabinsa R & D: Focus on Analytical Method Validation

Scientists at Sabinsa R & D continuously work on developing and validating efficient methods of analysis for the wide range of herbal extracts and nutritional supplements offered by the company. The research and development facility located near Princeton, NJ is equipped with sophisticated instrumentation including state-of-the-art High Pressure Liquid Chromatograph (HPLC), UV Spectro-photometer (UV), Atomic Absorption Spectrometer (AA), Infrared Spectrophotometer (IR), Gas Chromatograph (GC) and other relatedinstrumentation. These techniques are used to identify and quantify the active principles in various products. Product identification using Thin Layer Chromatography (TLC) techniques also forms part of the method development project.



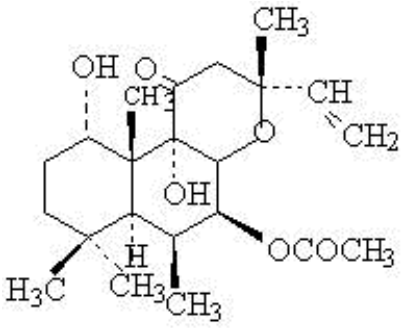
High Pressure Liquid Chromatograph with Autosampler used for Analytical Method Development

PRODUCT FOCUS :

Sabinsa Introduces Patented Product Forsleantm

Coleus forskohlii belongs to the Natural Order Labiatae (Lamiaceae), a family of mints and lavenders. This species is a perennial herb with fleshy, fibrous roots that grows wild in the warm sub-tropical temperate areas in India, Burma and Thailand. In India, it is cultivated for use as a condiment1. Coleus forskohlii is the only known natural source of the unique adenylate cyclase activating phytonutrient, forskolin2.

Chemical structure of FORSKOLIN



Adenylate cyclase is the enzyme involved in the production of Cyclic Adenosine Monophosphate (cAMP), a significant biochemical agent in metabolic processes. Cyclic AMP is a "second messenger" hormone signaling system. cAMP and therefore forskolin have marked physiological effects through such "second messenger" actions on various biological processes in the body, as schematically represented in Figure1.

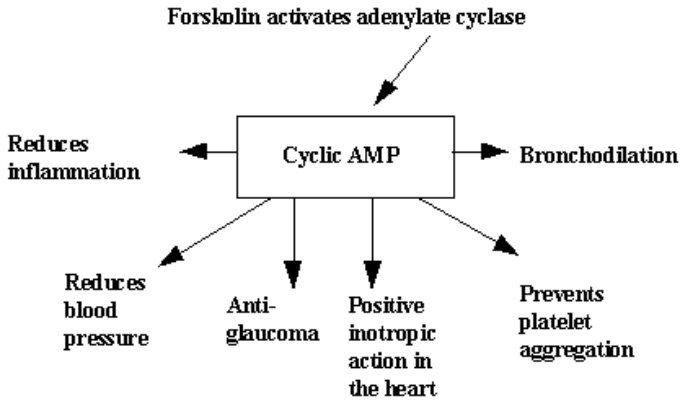


Figure 1: Biological Actions of forskolin

Sabinsa Corporation was assigned a patent (U.S. Patent #5,804,596, dated September 8, 1998) for the use of forskolin. The patent titled "Method of preparing forskolin composition from forskolin extract and use of forskolin for promoting lean body mass and treating mood disorders", describes the use of a composition comprising of 1% to 40% forskolin (extracted from Coleus forskohlii), in a suitable excipient, to promote lean body mass and treat mood disorders. The mechanism of fat breakdown is indicated in Figure 2.

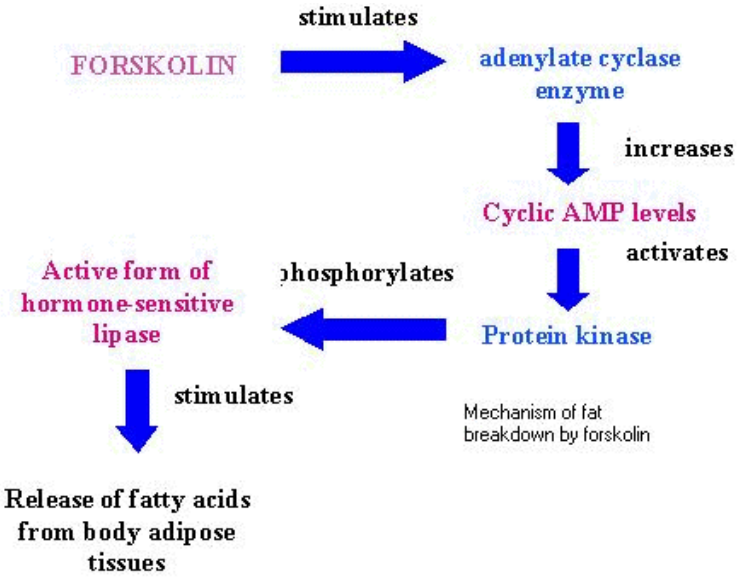


Figure 2: Mechanism of Fat Breakdown in forskolin

A clinical study sponsored by Sabinsa Corporation revealed that subjects given a dose of 250 mg of Coleus forskohlii extract (FORSLEANTM, standardized for 10% forskolin) twice daily, experienced a marked increase in lean body mass with a concurrent decrease in mean body weight in a time-dependent manner over eight weeks.

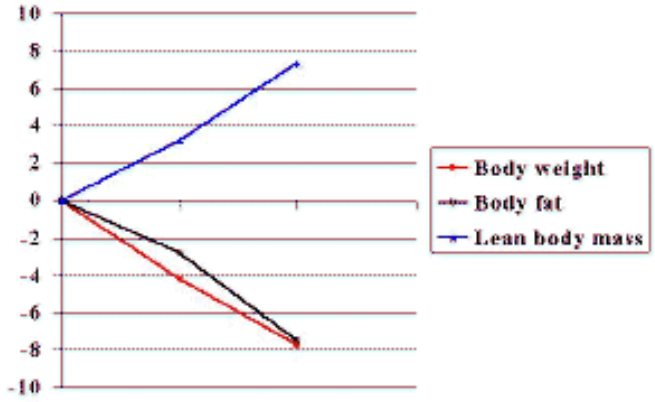


Figure 3: Relationship between changes of body weight, % of fat and lean body mass

Sabinsa Corporation supplies powdered extracts of Coleus forskohlii standardized for 1%, 10% and 20% forskolin. A soft extract standardized for 10% forskolin is also available for use in soft gel formulations.

References:

1. Bruneton, Jean. (1995) Coleus forskohlii. Pharmacognosy, Phytochemistry, Medicinal Plants, 521.
2. 2.de Souza, N.J. (1991) Coleus forskohlii in Recent Advances in Medicinal, Aromatic & Spice crops, Vol I: 83-91.

Quality Green Tea: The proof is in the catechins

Green tea extracts contain compounds called polyphenols of which catechins are the major antioxidant components. Polyphenols is the category name given to a group of compounds that contain more than one phenolic group (-OH functional group attached to a benzene or aromatic ring).

All catechins are polyphenols, but all polyphenols are not catechins. The major catechins in green tea include epicatechin (EC), epigallocatechin (EGC), epicatechin gallate (ECG) and epigallocatechin gallate (EGCG).

Sabinsa Corporation supplies green tea extracts standardized for 40% and 75% total catechins. A decaffeinated product (<2% caffeine) standardized for 75% total catechins is also available. The biological benefits associated with green tea catechins, especially epigallocatechin gallate, are generally attributed to their antioxidant activity. They are also reported to efficiently scavenge free radical oxygen. In studies with lard or vegetable oil, green tea catechins were found to reduce the formation of peroxides more effectively than dl-alpha-tocopherol or BHA. Epigallocatechin gallate was the most effective antioxidant. In view of epidemiological evidence linking the reduced incidence of cardiovascular diseases and certain types of cancer with tea consumption and numerous studies validating the beneficial biological effects of tea, the role of the green tea catechins in health maintenance assumes greater clinical significance.

NEW PRODUCT FOCUS:

Magnesium/Potassium Aspartate

Sabinsa Corporation is poised to introduce a mineral product with superior bioavailability, Magnesium/ Potassium Aspartate (Mg/K aspartate). This product has two important mineral nutrients, magnesium and potassium molecularly bound to an amino acid, aspartic acid. Aspartic acid is a metabolic intermediate in several biochemical pathways in the body, including the tricarboxylic acid and urea

cycles1. Aspartic acid salts are believed to be mineral transporters to the metabolizing cells, aiding in the metabolic process by replenishing vital electrolytes thereby contributing to efficient energy production. In addition, the aspartate moiety is reported to reduce oxygen consumption by the cells during the energy cycle.

Potassium and magnesium L-aspartate and DL-aspartate salts have been used clinically to treat fatigue in human subjects 2,3. Recent studies show that magnesium has cardioprotective properties, helps alleviate PMS symptoms and promotes bone and tooth integrity. It has been observed that people suffering from diabetes benefit from higher than normal levels of supplemental magnesium4. Recent research using sophisticated techniques such as NMR (nuclear magnetic resonance) spectroscopy and magnesium-sensitive electrode revealed that magnesium deficiency accompanies conditions such as diabetes, hypertension and severe headache.

Potassium plays a vital role in the transmission of electrical impulses through the central nervous system and in the maintenance of electrolyte balance in the body. Potassium also helps regulate the heart rhythms, stabilize blood pressure levels and may help in the prevention of strokes5. Potassium deficiency is often triggered by the excessive use of diuretics and laxatives or junk food diets. This may result in growth retardation, muscle weakness, heart and kidney damage, mental confusion, and apathy. Extreme cases of deficiency can lead to dehydration, heart failure and even death. Mg/K Aspartate is valued in sports nutrition to improve long term athletic performance, particularly in untrained subjects. The proposed mechanisms of action include stabilization of cellular membranes by normalization of the levels of magnesium and potassium in the cells, detoxification of ammonia or increase in the tricarboxylic acid-cycle flux1.

References:

1. Bucci, L. (1993) Metabolic Intermediates. In "Nutrients as Ergogenic Aids for Sports and Exercise". CRC Press. 45-47.
2. Northwest Med (1961) 60:597.
3. Am. J. Med. Sci. (1962) 243:758.
4. Am. J. Hypert. 10: 368-370.
5. Circulation (1998) 98(12): 1198-204.

Angela Lee: Customer Service Representative

Angela Lee recently joined the sales and marketing group at Sabinsa Corporation. Angela graduated from Rutgers University in May 1999 with a Bachelor's degree in Biology and a minor course of study in Economics. During her summer vacations she gained valuable office experience working for the U.S. Army in Fort Monmouth, NJ. Angela has also spent time volunteering in the Emergency Room at Robert Wood Johnson Hospital in New Brunswick, NJ.

Angela's interest and background in the biological sciences provides her a wider perspective towards understanding the chemistry and applications of nutraceutical products. Additionally, her strong inter-personal skills enable her to field various questions and effectively meet the needs of our broad customer base. We take this opportunity to welcome Angela aboard!

Cosmeceuticals from Sabinsa Corporation

A cosmeceutical is defined as an ingredient with medicinal properties which manifests beneficial topical actions or provides protection against degenerative skin conditions.

Cosmeceuticals generally exert one or more of the following actions:

- Antimicrobial action
- Anti-irritant/Anti-inflammatory action
- Free-radical scavenger (antioxidant) effects
- Skin-bleaching action
- Maintenance of skin texture

Sabinsa has recently introduced several ingredients that are being used in cosmetic formulations:

Tetrahydrocurcuminoids (THC) (patent pending): These are white curcuminoids derived from the yellow colored curcuminoids (the antioxidant principles in Curcuma longa). This color free product is included in cosmetics as an antioxidant and anti-inflammatory agent.

Aleuritic acid: Chemically 9, 10, 16-trihydroxypalmitic acid, aleuritic acid is a major constituent acid (~35%) of lac resin (shellac). Aleuritic acid is a potential substitute for alpha-hydroxy acids and is valued for its antioxidant action on the skin.

Boswellin(r)-CG: A standardized extract from the gum resin of Boswellia serrata, Boswellin(r)-CG (cosmetic grade) contains 40% beta-boswellic acids. Boswellic acids are proven anti-inflammatory agents for topical as well as oral use.

Ursolic acid is a pentacyclic triterpenoid compound. It is an isomer of oleanolic acid. Natural sources include Rosemary (Rosmarinus officinalis) and Tulsi (Ocimum sanctum). Cosmeceutical benefits include facilitating collagen and elastin synthesis, restoring the overall health and functions of photoaged skin as well as facilitating tissue repair.

Over the past few months, Tetrahydrocurcuminoids (THC) have found increasing acceptance in cosmetic applications. An antioxidant used in cosmetic applications should have the capability to efficiently quench free radicals on the surface of the skin. In this context, studies performed by Rutgers University revealed the superior free radical scavenging ability of THC. In a standard test procedure known as DPPH (1,1 diphenyl-2-picrylhydrazyl)-radical scavenging method, Curcuminoids and THC were shown to be effective antioxidants. Their efficacy is concentration dependent, with THC being more effective even at lower concentrations. Besides, THC has zero irritation potential on the skin.

Besides topical applications, the use of THC as a dietary antioxidant supplement has also been explored. Although higher priced than the parent curcuminoids on account of the additional processing cost, THC are valued as the ultimate metabolites of the Curcuminoids in vivo. Several independent studies reported the superior antioxidant effects of THC1-5.

1. Osawa, T. et al. (1995). Biosci. Biotechnol. Biochem. 59(9): 1609-12.
2. Sugiyama, Y. (1996) Biochem Pharmacol, 52(4):519-25 Aug 23
3. Nakamura, Y. et al. (1998) Jpn J Cancer Res, 89(4):361-70
4. Mukhopadhaya, A. et al. (1982). Agents and Action. 12:2287.
5. Rao, T.S., et al. (1982). Ind J. Med.Res., 75, 574-578

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