

Adrenal Support



Clinical Applications

- Improves Stress Resilience.*
- Supports Healthy Energy Levels.*
- Improves Mental and Physical Performance.*
- Strengthens the Body's Stress Response.*
- Supports Healthy Cortisol Level.*

Adrenal Support is an adaptogenic adrenal formulation designed to support normal cortisol levels. Adrenal Support contains no glandular material and is appropriate for vegetarians.

All Omnivits Formulas Meet or Exceed cGMP Quality Standards

Discussion

Adrenal Support provides nutritional support for the adrenals in a non-glandular formula, consisting of herbal adaptogens, and supportive vitamins and minerals. It aids in supporting bodily functions when the body is under stress, and in supporting normal cortisol values, which may be especially important in obesity, Syndrome X and hyperinsulinism. Stress, a poor diet and environmental toxins are also contributors of adrenal malfunction, as referred to by Hans Selye's as "diseases of civilization."⁶⁶ **Adrenal Support** contains a blend of adaptogenic botanicals and nutrients specifically formulated to counteract the effects of daily stress and support healthy energy levels. Adrenal Support provides a unique blend of "stress adapting botanicals" that support the body's resistance to fatigue and help to maintain balanced cortisol and DHEA levels.


Stress is defined as any disturbance –extreme cold or heat, psychological stress, sleep deprivation, work overload, physical trauma, as well as toxic exposure- that can trigger the stress response. The body's stress response system is comprised of the hypothalamic-pituitary-adrenal (HPA) axis. Prolonged stress triggers the HPA axis and consists of three stages: alarm, resistance and exhaustion. The initial, short-lived phase is the body's normal fight - or flight response to danger, characterized by elevated cortisol levels. The subsequent resistance phase allows the body to continue buffering extended stress exposure, long after the initial fight-or-flight response has dissipated. Hormones released by the adrenals, such as **Cortisol and DHEA**, help support the "resistance" reaction. Extended periods of stress not only burden the system, creating an imbalance in cortisol and DHEA production, but can result in mental and physical fatigue, nervous tension, irritability and poor memory- all of which are characteristic of stage.

Vitamins associated with Adrenal Support:-

Vitamin C (as ascorbic acid)

The concentration of vitamin C in the adrenal glands is among the highest in the body, being roughly 100 times that of blood plasma levels.¹ As such they are extremely sensitive to deficiencies in vitamin C. In catecholamine synthesis, vitamin C is required as a co-factor in the conversion of dopamine to norepinephrine.² In humans vitamin C secretion occurs as part of the stress response via hormone regulation, specifically in response to stimulation via the hormone adrenocorticotrophic (ACTH). Following ACTH stimulation the mean adrenal vein vitamin C level increases approximately four fold, and then subsequently returns to near pre-stimulation levels approximately 15 minutes thereafter. Peak adrenal vitamin C and cortisol concentrations have been strongly correlated ($r_2 = 0.35$, $P < 0.001$), suggesting a local action of vitamin C on the adrenal glands. Additionally, it has been noted that, although being of unknown function, the increase in vitamin C secretion suggests that "adrenal vitamin C secretion is an integral part of the stress response".³ Stress, fever and viral infections, as well as habitual actions, such as smoking and alcohol use, cause a rapid decline in the blood level of vitamin C.⁴

Pantothenic Acid (as calcium pantothenate) Pantothenic acid is a cofactor in the synthesis of coenzyme A (CoA). CoA plays an important part in cellular respiration, as well as in the biosynthesis of many important compounds including fatty acids, cholesterol and acetylcholine.⁵ Animal studies have documented morphological damages in the adrenal cortex with pantothenic acid deficiency.^{6,7,8,9,10,11} Early experiments in animals also indicated that following prolonged pantothenic acid deficiency, extensive damage to the adrenal resulted, which was attributed to the adrenals inability to immediately utilize pantothenic acid. It was thus concluded that pantothenic acid deficiency results in an imposed stress upon the adrenal cortex, which in turn results in exhaustion and consequently adrenal hypofunction.¹² In spite of the fact that deficiencies are generally thought of as being rare, a deficiency in pantothenate results in fatigue and generalized malaise.¹³



Vitamin B6 (as pyridoxal-5-phosphate and pyridoxine HCl) Vitamin B6 serves as a coenzyme in well over 100 reactions, most of which are transaminase reactions. It plays an important role in the synthesis of the neurotransmitters g-aminobutyric acid (GABA), serotonin, dopamine, norepinephrine and epinephrine.¹⁴ As a physiological modulator of steroid hormone action, Vitamin B6 has been associated with modulation of the expression of a diverse array of hormonally responsive genes¹⁵ For efficient function both the nervous and immune systems require an adequate supply of vitamin B6.^{16,17,18,19} Vitamin B6 is also required for the conversion of tryptophan to niacin and serotonin,^{20,21} as well as for the conversion of tyrosine to dopamine. In one study a deficiency in vitamin B6 was correlated to a slower extracellular dopamine release (43% longer with deficiency).²² Dopamine is known to be an active participant in the secretory modulation of both aldosterone and catecholamine from the adrenal gland.²³ Dopamine depletion is correlated with physical and/or psychological stress.

Vitamin E (as d-alpha tocopheryl acetate) Vitamin E is found in all cells in the human body, and functions primarily as an antioxidant. The adrenal cells, along with the pituitary, platelet and testicular cells contain the highest cellular concentration of vitamin E¹⁴ In animal studies vitamin E deficiency was demonstrated to predispose tissues to lipid peroxidation²⁴ Conversely, vitamin E therapy affords protection against the effects of mineral toxicity, attributed to reversing the alterations in adrenocortical activities brought on by toxic mineral levels. In another study treatment with alpha tocopherol during times of significant stress was demonstrated to decrease lipid peroxidation in both the liver and the brain, while simultaneously preventing depletion in glutathione levels, which are routinely depleted by stress²⁶ Adrenal sensitivity to ACTH is also increased with vitamin E therapy.²⁷

Thiamin (as thiamin mononitrate) Thiamin, a water-soluble B-complex vitamin, is involved in many bodily functions, including its requirement in the metabolism of carbohydrates, as part of the coenzyme thiamin pyrophosphate (TPP). In the absence of thiamin, a slowing or complete blocking of enzymatic activity occurs. As part of the citric acid cycle, essential for energy production, thiamin functions as a component in the decarboxylation of a-ketoglutaric acid to succinyl CoA.¹⁴ In animal studies corticosterone levels, have shown to be significantly increased with thiamin deficiency.^{28,29}

Riboflavin. Like thiamine, riboflavin is also a water-soluble vitamin. It participates in normal cell function, growth and energy production. Riboflavin serves as a crucial component in converting food into energy via the manufacturing of flavin adenine dinucleotide (FAD). FAD is required for electron transport and ATP production in the Krebs cycle. Ariboflavinosis (riboflavin deficiency) is associated with weakness, cheilosis (fissures in the skin at the angles of the mouth), angular stomatitis (inflammation of the mucous lining of the mouth) and anemia. Individuals particularly susceptible to deficiency include the elderly, those with chronic illnesses or those with alcohol dependency.³⁰ Stress increases the need for riboflavin due to an increase in fatty acid oxidation. Riboflavin deficiency has been correlated to adrenal cortex dysfunction in animals.³¹

Niacin. Niacin's primary cellular function is as a coenzyme for NAD+ and NADP+ , both of which function in the maintenance of cellular oxidation-reduction reactions. In addition to its varied cellular functions, NAD is used as a substrate for the production of poly-ADP-ribose (PARP). PARO is a nuclear enzyme activated by DNA strand breaks, which functions to synthesize polymers of ADP-ribose molecules, making it an important component in DNA repair.³² Niacin intake has also been correlated with anxiety reduction.

Minerals associated with Adrenal Support Minerals can also be a beneficial component for adrenal support, as an aide to sustaining the adaptogenic response of the adrenals.

Zinc. Zinc participates as an active component in over 300 different enzymes, and plays a vital role in many biological processes. As a cofactor for the antioxidant enzyme superoxide dismutase (SOD) it is an important component in cellular protection. It also functions in enzymatic reactions in both carbohydrate and protein metabolism.³⁰ Zinc deficiency and adrenal stress have been associated. One study noted a correlation between zinc deficiency and prostaglandin production, designating that with deficiency interference in the production and/or function of the prostaglandins ensues.³³

Copper. Like zinc and iron, copper is also involved in gene regulation and expression, specifically for the metallothioneins, or metal-binding proteins. Studies have suggested that copper plays a role in mitochondrial gene expression, noting a decrease in oxidative phosphorylation with deficiency. A number of enzymes require copper as a cofactor and copper is necessary to balance zinc.

Manganese. Manganese (Mn) is a required mineral for optimal adrenal glandular activity. It serves as a component for energy metabolism, as a cofactor for enzymes of the citric acid cycle, as well as a functional cofactor as a as part of the enzymatic structure of several additional enzymes. As an essential cofactor for Mn superoxide dismutase (MnSOD), it is an important participant in the cellular antioxidant defense mechanism.³⁴ It also functions as an important modulator in signal transduction pathways.³⁵ Recent evidence has denoted a correlation between Mn deficiency and the balance of endothelium-derived prostanoids, indicating the presence of oxidative stress in Mn deficiency, as a result of reduced activity MnSOD, a major antioxidant enzyme.³⁶

Lithium and Rubidium. Trace amounts of these two minerals are included as both are regarded as relaxant minerals. Additionally, lithium has been shown to have general neuroprotective effects,³⁷ as well as to offer protection against glutamate excitotoxicity, and to offer CNS neuroplasticity, which was demonstrated in animals via molecular mechanisms.³⁸ The trace mineral rubidium (Rb) resembles potassium in terms of its method of absorption and excretion. In one study treatment with lithium or rubidium resulted in a decreased dopamine output.³⁹

Botanical Extracts for Adrenal Support

A number of botanicals have properties identified as an aide in normalizing either excessive or deficient pathologies, with corresponding negligible disturbance in physiological function. In addition to established nutrients, several herbal extracts help support normal adrenal function. Many of these have their origins in Chinese or Ayurvedic traditions.

Achyranthes (extract) (root). In the Chinese pharmacology the action of *Achyranthes* is said to invigorate the blood, and to expel blood stasis. It is used in Yang tonic formulations. Its functionality is said to revolve around its ability to guide other herbs to the kidneys, genitals, and legs.

Damiana (extract) (herb) (*Turnera diffusa*). Damiana is a small shrub with an aromatic leaf, found predominantly in Mexico, Southern and Central America. Like *Achyranthes*, Damiana is also designated as a yang tonic, and is suggested to aide with energy. It is considered a strengthener for the nervous system, and is viewed as a nervous restorative.^{42,43} Its properties are indicated as nerve stimulating, diuretic, aphrodisiac, and as being superior for impotence in men and frigidity in women.^{44,45} Traditional use is as a general tonic for the nervous, endocrine, and reproductive systems.³⁰

Gotu Kola (extract) (herb) (*Centella asiatica*)—In Ayurvedic medicine Gotu Kola is an herb viewed as an important component in rejuvenation, as well as one of the chief herbs for revitalizing the nerves and brain cells. The following properties have been attributed to its actions; mildly antibacterial, anti-viral, anti-inflammatory, anti-ulcerogenic, anxiolytic, a cerebral tonic, a circulatory stimulant, a diuretic, nervine and vulnerary.⁴⁵ Punturee, et al demonstrated that *C. asiatica* has immunostimulating activity regarding both non-specific cellular immune responses and humoral immune responses. Additionally, they noted the inhibition of TNF α with an ethanol extract of *C. asiatica*, implicating that it may be an important component in down regulating inflammation.⁴⁶

Sichuan Teasel (extract) (root) (*Dipsacus asperoides*) According to the Chinese tradition, *Dipsacus asperoides* (DA) is said to tonify the liver and kidneys, and to promote the movement of blood.⁴⁷ A crude polysaccharide fraction (DAP-1) from the root of DA has been shown to have a stimulating effect on the mitogenic activity of lymphocytes, as well as to suppress the phagocytic activity of macrophages.⁴⁸ DA has also demonstrated antinociceptive effects in a dose-dependent manner (from 3.75 to 30 mcg).⁴⁹

Asiatic Dogwood. (extract) (fruit) (*Cornus officinalis*). *Cornus officinalis* (CO) is popular in traditional medicine and is known for its tonic, analgesic, and diuretic properties.⁵⁰ In addition to its use as a tonifier for liver and kidney deficiency, indicated by such symptoms as lightheadedness and dizziness, it is also said to tonify the essence and assist the yang.⁴⁷ The aglycons of anthocyanins have been shown to possess strong antioxidant activities.^{51,52} Likewise, the anthocyanins of CO were also demonstrated to possess strong antioxidant activity.⁵³

Basil (extract) (leaf) (*Ocimum basilicum*). Basil is a popular culinary herb, as well as a medicinal herb in Thailand, India and Turkey.⁵⁴ It is said to affect the lungs and stomach meridians, and its actions are indicated as being stimulatory to the adrenal cortex.⁵⁵ The chief compounds isolated from basil include eugenol, citral and geraniol,⁵⁶ as well as rosmarinic acid, a natural phenolic compound shown to inhibit complement-dependent inflammatory processes.⁵⁷

Schisandra (extract) (fruit) (*Schisandra chinensis*). *Schisandra chinensis* (SC) has been utilized in traditional Chinese medicine (TCM) for over 2,000 years, as both a tonic and a sedative. As a tonic, one of its uses was to improve mental functions. It is considered an adaptogenic herb, which functions in the harmonization of the system. More recently, SC has been utilized to 'increase resistance to disease and stress, boost energy levels (without the jitteriness attributed to caffeine), increase both mental and physical endurance, and to improve vision, muscular and immune system.⁵⁸ Modern Chinese research suggests that SC may have a protective effect on the liver as well as possessing immunomodulating properties.⁵⁹ Gomisins A (GA), an isolated component from SC was demonstrated to cause a concentration-dependent vascular relaxation of the rat thoracic aorta.⁶⁰

Tinospora cordifolia (extract) (stem & root) The use of *Tinospora cordifolia* (TC) for debility, fever and dyspepsia in Ayurveda is commonly recognized. The root of TC is documented as having anti-stress properties, as well as immune supporting properties.^{61,62} An aqueous extract of TC has shown to be beneficial with adrenaline-induced hyperglycemia.^{63,64,65}



Supplement Facts			Serving Size: 2 Tablets		Servings Per Container: 120	
	Amount Per Serving	% Daily Value			% Daily Value	
Vitamin C (as ascorbic acid)	100 mg	167%	L-Tyrosine		*	
Vitamin E (as d-alpha-tocopheryl acetate)	30 IU	600%	Amygdalus (Amygdalus n. dentata) (fruit) (extract)		*	
Thiamin (B1) (as acetylthioflavine chloride)	2 mg	133%	Camelia (Turnera diffusa) (leaf) (extract)		*	
Riboflavin (B2)	2 mg	119%	Gulu Kola (Caraka asiatica) (fruit) (extract)		*	
Niacin (as niacinamide)	12 mg	60%	Solanum Tensei (Dipsacus asper) (root) (whole & extract)		*	
Vitamin B6 (as pyridoxal-5-phosphate and pyridoxine HCl)	4 mg	200%	Asclepias Dogwood (Comus o. foliata) (fruit) (extract)		*	
Pantothenic Acid (as calcium pantothenate)	36 mg	300%	Sau (Cremum basilicum) (leaf) (extract)		*	
Zinc (as zinc gluconate)	5 mg	33%	Solanandra (Solanandra chinensis) (fruit) (extract)		*	
Copper (as copper gluconate)	0.5 mg	25%	Indian Tinospora (Tinospora cordifolia) (rhizome & root) (extract)		*	
Manganese (as manganese gluconate)	1.5 mg	75%	Rubidium (from vegetable culture *)		*	
Proprietary Blend	513 mg					
Lithium (from vegetable culture *)						

Other Ingredients: Stearic acid (vegetable source), silica, modified cellulose gum, food glaze, and magnesium stearate (vegetable source).

* Specially grown, biologically active vegetable culture containing **Phytochemically Bound Trace Elements™** and other phytochemicals including polyphenolic compounds with SOD and catalase, dehydrated at low temperature to preserve associated enzyme factors.

This product is gluten and dairy free.

Suggested Use: Two (2) tablets one (1) to two (2) times each day as a dietary supplement or as otherwise directed by a healthcare professional.

Caution: Not recommended for pregnant or lactating women. KEEP OUT OF REACH OF CHILDREN.

References

- http://en.wikipedia.org/wiki/Vitamin_C.
- Levine M. New concepts in the biology and biochemistry of ascorbic acid. N Engl J Med. 1986 Apr 3;314(14):892-902.
- Padayatty SJ, Doppman JL, Chang R, Wany Y, Gill J, Papanicolaou DA, Levine M. Human adrenal glands secrete vitamin C in response to adrenocorticotropic hormone. Am J Clin Nutr. 2007 Jul;86(1):145-9.
- Naidu KA. Vitamin C in human health and disease is still a mystery? An overview. Nutrition Journal 2003, 2:7.
- http://en.wikipedia.org/wiki/Pantothenic_acid.
- Morgan AF, Simms HD. Science. 1939;89:565.
- Daft FS, Sebrell WH. Pub Health Rep., USPHS. 1939;54:2247.
- Nelson AA. Pub. Health Rep., USPHS. 1939;54:2250.
- Daft FS, Sebrell WH. Pub Health Rep., USPHS. 1940;55:1333.
- Ashburn LL. Pub Health Rep., USPHS. 1940;55:1337.
- Deane HW, McKibbin JM. Endocrinology. 1946; 38:385.
- Hurley LS, Morgan AF. Carbohydrate Metabolism and Adrenal Cortical Function in the Pantothenic Acid Deficient Rat. J. Biol. Chem. 1952 Apr;195(2):583-90.
- Tahiliani AG, Beinlich CJ. Pantothenic acid in health and disease. Vitam. Horm. 1991;46:165-228. Review.
- Berdanier C. Advanced Nutrition Micronutrients. 1998. CRC Press.
- Allgood VE, Cidlowski JA. Vitamin B6 modulates transcriptional activation by multiple members of the steroid hormone receptor superfamily. J Biol Chem. 1992 Feb 25;267(6):3819-24.
- Gerster H. The importance of vitamin B6 for development of the infant. Human medical and animal experiment studies. Z Ernahrungswiss 1996; 35:309-17. [PubMed abstract]
- Bender DA. Novel functions of vitamin B6. Proc Nutr Soc 1994;53:625-30. [PubMed Abstract].
- Chandra R. and Suthakaran L. Regulation of immune responses by Vitamin B6. NY Acad Sci 1990; 585:404- 423. [PubMed abstract]
- Trakatellis A, Dimitriadou A, Trakatelli M. Pyridoxine deficiency: New approaches in immunosuppression and chemotherapy. Postgrad Med J 1997; 73:617- [PubMed abstract]
- Leklem JE. Vitamin B6. In: Shils ME, Olson JA, Shike M, Ross AC, ed. Modern Nutrition in Health and Disease. 9th ed. Baltimore: Williams and Wilkins, 1999: 413-421.
- Shibata K, Mushiage M, Kondo T, Hayakawa T, Tsuge H. Effects of vitamin B6 deficiency on the conversion ratio of tryptophan to niacin. Biosci Biotechnol Biochem 1995; 59:2060-3. [PubMed abstract]
- Tang FI, Wei IL. Vitamin B6 deficiency prolongs the time course of evoked dopamine release from rat striatum. J Nutr. 2004 Dec;134(12):3350-4.
- Pivonello R, Ferone D, de Herder WW, de Krijger RR, Waaijers M, Mooij DM, van Koetsveld PM, Barreca A, De Caro ML, Lombardi G, Colao A, Lamberts SW, Hofland LJ. Dopamine receptor expression and function in human normal adrenal gland and adrenal tumors. J Clin Endocrinol Metab. 2004 Sep;89(9):4493-502.
- Abidi P, Leers-Sucheta S, Azhar S. Suppression of steroidogenesis and activator protein-1 transcription factor activity in rat adrenals by vitamin E deficiency-induced chronic oxidative stress. J Nutr Biochem. 2004 Apr;15(4):210-9.
- Chandra AK, Ghosh R, chatterjee A, Sarkar M. Amelioration of vanadium-induced testicular toxicity and adrenocortical hyperactivity by vitamin E acetate in rats. Mol. Cell Biochem. 2007 Dec;306(1-2):189-200.
- Tsiakitzis K, Kourounakis AP, Tani E, Rekkas EA, Kourounakis PN. Stress and active oxygen species-effect of alpha-tocopherol on stress response. Arch Pharm (Weinheim). 2005 Jul;338(7):315-21.
- Shorin IuP, Seljattitskaia VG, Kolosova NG, Kulikov Vlu. Effect of alpha-tocopherol on the adrenal reaction to cold stress. Biull Eksp Biol. Med. 1985 Jun;99(6):669-71. (Russian).
- Hastings MM, Van JL. Sodium deprivation during thiamin deficiency in rats: hormonal, histological, and behavioral responses. J Nutr. 1981 Nov;111(11):1955-63.
- Gubler, CJ, Fujiwara, M, Dreyfus, PM. (1976) Biochemical changes in thiamine deficiencies. In: Thiamine. John Wiley and Sons, New York. 1976. pp. 121-142.
- www.naturalstandard.com.
- Riboflavin and adrenal cortex. Nutr Rev 1973 31:96-97.
- Cervantes-Laurean D, McElvaney NG, Moss J. Niacin. In: Shils M, Olson JA, Shike M, Ross AC, eds. Modern Nutrition in Health and Disease. 9th ed. Baltimore: Williams & Wilkins; 1999:401-411
- O'Dell, BL, Reynolds G, Reeves PG. Analogous Effects of Zinc Deficiency and Aspirin Toxicity in the Pregnant Rat. J. Nutr. 1977 107: 1222-1228.
- Malecki EA, Greger JL. Manganese Protects against Heart Mitochondrial Lipid Peroxidation in Rats Fed High Levels of Polyunsaturated Fatty Acids. J Nutr. 1996;126(1):27-33.
- Welder FC. Biochemical and Nutritional Role of Manganese: an overview. In: Klimis-Tavantzis DJ, editor. Manganese in Health and Disease. 1st ed. Boca Raton, FL: CRC Press; 1994.p.2-37.
- Kalea AZ, Schuschke DA, Harris PD, Klimis-Zacas DJ. Cyclo-Oxygenase Inhibition Restores the Attenuated Vasodilation in Manganese-Deficient Rat Aorta. J. Nutr. 2006 136:2302-2307.
- Manji HK, Moore GJ, Chen G. Lithium up-regulates the cytoprotective protein Bcl-2 in the CNS in vivo: a role for neurotrophic and neuroprotective effects in manic depressive illness. J Clin Psychiatry. 2000;61 Suppl 9:82-96.
- Hashimoto R, Fujimaki K, Jeong MR, Senatorov VV, Christ L, Leeds P, Chuang DM, Takeda M. [Neuroprotective actions of lithium] [Article in Japanese]. Seishin Shinkeigaku Zasshi. 2003;105(1):81-6.
- Gambara C, Ghiglieri O, Masi F, Scheggi S, Tagliamonte A, De Montis MG. The effects of long-term administration of rubidium or lithium on reactivity to stress and on dopamine output in the nucleus accumbens in rats. Brain Research 1999;826(2):200-209.

40. Bensky D, Gamble Andrew (Compiler). Chinese Herbal Medicine: Materia Medica. Revised Edition. 1986. p. 284-85.
41. <http://www.yahwehsaliveandwell.com/achyranthes.html>.
42. Mills S. The Complete Guide to Modern Herbalism. 1994. Thorsons. Great Britain,
43. Hoffman D. The New Holistic Herbal. 1990 Element, Dorset.
44. Ody P. The Complete Medicinal Herbal. 1993. Dorling Kindersley Limited, London.
45. http://en.wikipedia.org/wiki/Centella_asiatica.
46. Punturee1 K, Wild CP, Kasinrek W, Vinitketkumnuen1 U. Immunomodulatory Activities of Centella asiatica and Rhinacanthus nasutus Extracts. Asian Pacific J Cancer Prev. 2005 6, 396-400.
47. Bensky D, Gamble A. Chinese Herbal Medicine Materia Medica. 1993. Eastland Press, Inc.
48. Zhang Y, Kiyohara H, Matsumoto T, Yamada H. Fractionation and chemical properties of immunomodulating polysaccharides from roots of Dipsacus asperoides. Planta Med. 1997 Oct;63(5):393-9.
49. Suh HW, Song DK, Son KH, Wie MB, Lee KH, Jung KY, Do JC, Kim YH. Antinociceptive mechanisms of Dipsacus saponin C administered intracerebroventricularly in the mouse. General Pharmacology: The Vascular System. 1996 27(7):1167-1172.
50. Kim, D.-K., Kwak, J. H. A Furan derivative from Cornus officinalis. Arch. Pharmacol Res. 1998, 21: 787-789.
51. Wang, H, Nair, MG, Strasburg, G M, Chang, YC, Booren, AM, Gray, IJ, Dewitt, DL. Antioxidant and anti-inflammatory activities of anthocyanins and their aglycone, cyanidin, from tart cherries. J. Nat. Prod. 1999, 62, 294-296.
52. Seeram, NP, Momin RA, Bourquin LD, Nair MG. Cyclooxygenase inhibitory and antioxidant cyanidin glycosides in cherries and berries. Phytomedicine 2001, 8, 362-369.
53. NP Seeram NP, Schutzki R, Chandra A, Nair MG. Characterization, Quantification, and Bioactivities of Anthocyanins in Cornus Species. J. Agric. Food Chem. 2002 50:2519-2523.
54. <http://www.naturalstandard.com/monographs/sweetbasil>.
55. <http://www.herbnet.com/BASIL2003.pdf>
56. Lalko J, Api AM. Investigation of the dermal sensitization potential of various essential oils in the local lymph node assay. Food chem. Toxicol 2006;44(5):739-746.
57. Renzulli C, Galvano F, Pierdomenico L, Speroni E, Guerra MC. Effects of rosmarinic acid against aflatoxin B1 and ochratoxin-A-induced cell damage in a human hepatoma cell line (Hep G2). J Appl Toxicol. 2004 Jul-Aug;24(4):289-96.
58. <http://www.naturalstandard.com/index-abstract.asp?create-abstract=/monographs/news/news200507010.asp>.
59. <http://en.wikipedia.org/wiki/Schisandra>.
60. Park JY, Lee SJ, Yun MR, Seo KW, Bae SS, Park JW, Lee YJ, Shin WJ, Choi YW, Kim CD. Gomisin A from Schisandra chinensis Induces Endothelium-Dependent and Direct Relaxation in Rat Thoracic Aorta. Planta Med. 2007 Dec 7; [Epub ahead of print]
61. Zhao TF, Wang X, Rimando AM, Che C. Folkloric medicinal plants: Tinospora sagittata var. cravaniana and Mahonia bealei. Planta Med 1991;57:505.
62. Nayampalli S, Ainapure SS, Nadkarni PM. Study of antiallergic acid Bronchodilator effects of Tinospora cordifolia. Indian J Pharm 1982;14:64-6.
63. Mahajan VR, Jolly CI. A new hypoglycaemic agent from Tinospora cordifolia Miers. Indian Drugs 1985;23:119-20.
64. Grover JK, Vats V, Rathi SS. Anti-hyperglycemic effect of Eugenia jambolana and Tinospora cordifolia in experimental diabetes and their effects on key metabolic enzymes involved in carbohydrate metabolism. J Ethnopharmacol 2000;73:461-70.
65. Stanely M, Prince P, Menon VP. Hypoglycaemic and other related actions of Tinospora cordifolia roots in alloxan-induced diabetic rats. J Ethnopharmacol 2000;70:9-15.
66. Selye H. Studies on adaptation. Endocrinology 1937 21:169

***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.**

Omnivits
5910 South University Blvd C-18269
Greenwood Village, CO 80121