

Long-term support for acne control

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Acnutrol™ capsules have been formulated to provide comprehensive support for healthy acne control by focusing on the internal healing process and overall skin health. Over 80 percent of the US population between ages 12 – 24 will develop some form of microbial and inflammatory skin condition such as acne, although skin issues can affect people of all ages. There are various factors that cause and contribute to acne, the most common skin disease in the US, with two of the main culprits being bacteria and the inflammatory response. Going hand in hand with these are systemic oxidative stress, insulin resistance, hormonal imbalances and an altered intestinal microflora. The nutrients in Acnutrol™ work synergistically to target these factors, addressing the root causes of this skin condition that afflicts millions of people.

Pantothenic acid, carnitine and healthy lipid metabolism

Acnutrol™ capsules contain a generous 2500 mg of *pantothenic acid* (vitamin B5) per serving. The development of acne appears to be in some way correlated with insufficiency of this vitamin (*Leung LH, Med Hypotheses, 1995*). Pantothenic acid plays a significant role in the maintenance of keratinocytes, the predominant cell type in the epidermis, the outermost layer of the skin. Research shows that when this vitamin is depleted, keratinocyte proliferation is suppressed. In addition, with pantothenic acid insufficiency a decrease is seen in the synthesis of keratinocyte growth factor and procollagen in fibroblasts, the cells in connective tissue that produce collagen and other fibers (*Kobayashi D, J Pharmacol Sci, 2011*).

Pantothenic acid sufficiency has also been shown to reverse this process and therefore decrease the severity of acne. It also works in the transport of fats across cell membranes, assisting in the regulation and efficiency of lipid metabolism, which gets disrupted during acne breakouts. When acne occurs, bacteria cause inflammation in skin pores which are blocked with sebum, the fluid secreted from the sebaceous glands (microscopic glands in the skin). With proper lipid metabolism, there is a decrease in the excretion of sebum. The skin pores can then revert back to a smaller, more normal size, leaving the skin much smoother.

The inclusion of *carnitine* in Acnutrol™ capsules is highly advantageous, as it is an essential cofactor in lipid metabolism. Carnitine is an indispensable nutrient which supports the transport of fatty acids into the mitochondria where they can be oxidized and used for the production of cellular energy. Carnitine is also a potent anti-inflammatory and immune-supportive nutrient, and plays a key factor in decreasing oxidative stress. It is found in cells throughout the body including skin fibroblasts, and is necessary for cellular repair, preventing cells from self-destructing by fighting against free radicals. The 500 mg of carnitine in each serving of Acnutrol™ also allows for pantothenic acid to work more efficiently in regards to lipid metabolism.

Additional Highlights

Zinc is an essential mineral required for many cellular processes, including wound healing, protecting against free radicals, and the proper functioning of the immune system. A deficiency in this mineral will impair the immune response and promote systemic inflammation. Substantially high levels of zinc are found in the skin, especially in the epidermis (outer layer). It is known for helping to maintain the integrity of the skin, with many dermatologic conditions (including acne) being associated with zinc insufficiency. Thus, combining this mineral with other skin-supportive nutrients appears to be beneficial in assisting with skin conditions.

Zinc's effect on inflammatory cells and especially on granulocytes (white blood cells such as eosinophils and basophils) is the most significant mechanism in regards to acne. It has been shown to decrease the number of inflammatory lesions associated with acne such as papules and cysts (*Verma KC, et al, Acta Derm Venereol. 1980*). *Copper* is included in Acnutrol™ for maintenance of the copper to zinc ratio. Copper is also involved in the maturation of collagen where it is a cofactor in the formation of cross-links, which increase collagen's stability and tissue strength. *Selenium*'s presence is due to its role as a component of glutathione peroxidase, a strong antioxidant and detoxifying enzyme which is significantly decreased in patients with severe acne (*Michaëlsson G, Edqvist LE, Acta Derm Venereol. 1984*).

Chromium is involved in glucose metabolism, as it balances blood sugar by enhancing the effects of insulin. Thus, chromium helps to prevent insulin resistance, which has been linked to many health problems including acne. In studying the evolution of man, acne did not appear until the Western diet came about, introducing humans to excessive starches and sugars. Improper sugar metabolism is often seen with acne patients, whose skin cells do not uptake glucose because of insulin resistance, similar to what is seen in diabetics.

The Fat Soluble Vitamins: A, D, & E

Generous doses of *vitamins A and D* are present in Acnutrol™. Vitamin A is a powerful antioxidant that helps support the immune system and prevents oxidative stress from free radicals. It is essential for the maintenance and repair of tissue, such as skin and mucous membranes. Vitamin A helps to strengthen the skin and reduces the production of sebum.

Vitamin D's inclusion is three-fold: for proper balance with vitamin A (necessary anytime you have higher levels of A), for immune system support and for skin health. The skin is an important target tissue for vitamin D, where it regulates growth and differentiation in keratinocytes. Research shows that vitamin D has the ability to break up comedones (clogged pores, pimples) and that sebaceous gland cells are vitamin D-responsive target cells, making them sensitive to this vitamin (*Reichrath J, Exp Dermatol, 2007*).

Vitamin E is an antioxidant and anti-inflammatory that enhances tissue repair and prevents cell damage by inhibiting the oxidation of lipids and the formation of free radicals. The highest levels of vitamin E in the body are found in the sebum and in sebum-rich areas. Supplementation of tocopherols leads to significant increases of vitamin E levels in skin sites such as the face, where there is a high density of sebaceous glands. Research shows that blood levels of both vitamins E and A are significantly lower in those with acne, and that administration of these two fat soluble vitamins was shown to improve acne conditions (*El-Akawi Z, Clin Exp Dermatol. 2006*).

Additional B Vitamins

In addition to pantothenic acid, Acnutrol™ capsules contain *niacin* (vitamin B3, non-flushing niacinamide), *vitamin B6*, and *biotin*. Research shows *niacinamide* possesses anti-inflammatory capabilities in keratinocytes, making it effective in fighting inflammatory skin conditions such as acne (*Grange PA, J Dermatol Sci. 2009*). *Vitamin B6* is required for the proper growth and development of tissues in the body, including the skin. It plays a role in glucose tolerance and hormonal balance, and its inclusion in Acnutrol™ capsules may be of benefit in women with premenstrual acne. While the main functions of biotin lie in its participation in glucose and lipid metabolism, this B vitamin is best known for its role in skin (along with hair and nail) health, where it facilitates the growth of skin tissue and helps to regulate the secretion of sebum.

How to Take Acnutrol™ capsules

- Therapeutic dose – 6 capsules per day with meals for 3-6 months (ages 13 and up)
- Maintenance dose – 3 capsules per day

Consider combining with Acnutrol™ Gel for comprehensive support for skin conditions

Acnutrol™ Gel topical gel includes a blend of ingredients designed to help support skin and acne breakouts on the face or other skin surfaces. It contains Bakutrol™ and Silvercillin™, two broad-spectrum antimicrobial and anti-inflammatory agents, along with zinc sulfate. While many topical skin support creams, ointments, and gels can often cause skin irritations and dryness, Acnutrol™ Gel is an effective and safe product without any unwanted side effects. Please see the corresponding technical sheet for complete details on this product.

Supplement Facts

Serving Size 6 capsules
Servings Per Container 30

Amount Per Serving	% Daily Value	Amount Per Serving	% Daily Value		
Vitamin A (as Palmitate)	50000 IU	1000%	Copper (TRAACS® Copper Glycinate Chelate)	2 mg	100%
Vitamin D (as Cholecalciferol)	2000 IU	500%	Chromium (TRAACS® Chromium Nicotinate Glycinate Chelate)	400 mcg	333%
Vitamin E (as d-alpha tocopherol)	18 IU	60%	L-Carnitine (from L-Carnitine Tartrate)	500 mg	*
Niacin (Vitamin B-3)(as Niacinamide)	500 mg	2500%	High Gamma Mixed Tocopherols (as d-gamma, d-delta, d-alpha, d-beta)	120 mg	*
Vitamin B-6 (as Pyridoxine HCL 40 mg; Pyridoxal-5-Phosphate 10 mg)	50 mg	2500%	Biotin	500 mcg	*
Pantothenic Acid	2500 mg	25000%			
Zinc (TRAACS® Zinc Glycinate Complex)	50 mg	333%			
Selenium (as Selenium Glycinate Complex)	100 mcg	143%			

*Daily Value not established.

Other Ingredients: Microcrystalline cellulose, silicon dioxide, vegetable stearate.

For a list of references cited in this document, please visit the product landing page at <http://www.ncbi.nlm.nih.gov/sites/myncbi/collections/public/1fi6NxlisyZEuioy8g8u0d9Qa/>