

EMULSION



ARTEMISININ EMULSION

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Quicksilver Scientific's Artemisinin Emulsion is a concentrated emulsified extract of *Artemisia annua*, a botanical used for millennia in Traditional Chinese Medicine (TCM) as a remedy for inflammatory, infectious, and digestive system complaints.



Supplement Facts

Serving Size: 5 mL (1 tsp.)
Servings Per Container: 24

	Amount Per Serving	% Daily Value
Artemisinin	40mg	**
Phosphatidylcholine (from purified soy bean lecithin)	450mg	**

**Daily Value not established

Other Ingredients: Water, glycerin, ethanol, phospholipids (from purified sunflower seed lecithin), natural citrus oils

EDUCATION

ARTEMISIA ANNUA: AN ANCIENT BOTANICAL WITH MODERN-DAY APPLICATIONS

Artemisia annua, also known as sweet wormwood or qinghaosu, is an herbaceous plant with delicate feathery foliage and a pleasant, sweet smell that belie its powerful health-enhancing properties. Artemisinin is the primary bioactive compound found in *Artemisia annua*. It was identified in 1972 by Tu Youyou, a Chinese scientist tasked with searching the traditional Chinese botanical compendium for herbs with antimalarial properties.¹ The discovery of artemisinin's antimalarial effects prompted the development of synthetic artemisinin-based drugs. These drugs rapidly became the gold-standard treatment for malaria. In 2015, Dr. Tu received the Nobel Prize in Physiology or Medicine for her discovery of artemisinin.

Exciting health benefits of artemisinin continue to emerge, with recent studies demonstrating beneficial effects of this phytochemical on the gut, immune system, and brain. It is thus uniquely positioned to address an array of modern-day health concerns, ranging from stubborn bacterial overgrowth to chronic inflammation.

ARTEMISININ IS A POTENT ACTIVATOR OF BITTER TASTE RECEPTORS

Artemisinin is a sesquiterpene lactone, a phytochemical found in plants from the Asteraceae (daisies, artichoke, endive, and *Artemisia annua*) and Umbelliferae (celery, carrots, parsley) families. Sesquiterpene lactones possess a powerfully bitter taste that deters or temporarily incapacitates hungry pests and pathogens, thus protecting the plant from predation and disease.²

Interestingly, plant-based sesquiterpene lactones also interact with the human body. However, rather than harming us, sesquiterpene lactones, such as artemisinin, interact favorably with pathways and receptors throughout our bodies. Most notably, artemisinin activates bitter taste receptors found on the tongue and in other locations throughout the body, including the GI tract and heart. Activation of bitter taste receptor transduction enhances bile flow and modulates inflammation, exerting various health benefits throughout the body.

BALANCE THE BODY'S MICROBIAL ECOSYSTEM

Artemisinin and its synthetic derivatives have been used for decades in the treatment of malaria, a parasitic infection caused by *Plasmodium*, a small protozoan that invades and damages its host's red blood cells. Artemisinin reduces the viability of *Plasmodium* thanks to its unique chemical structure. Artemisinin possesses a peroxide group that breaks apart upon encountering iron inside red blood cells (RBCs). The destruction of the peroxide bridge releases free radicals that destroy Plasmodium congregated inside the cell.³

The antimicrobial effects of artemisinin are not limited to malaria. Emerging research indicates that artemisinin also has antiparasitic effects against the parasitic disease schistosomiasis and antiviral effects against Herpes family viruses, including cytomegalovirus, Epstein-Barr virus, and hepatitis C. It appears to inhibit viral infection by impeding pathways that enable viral replication and invasion of host cells.⁴ It also has activity against *Borrelia burgdorferi*, the bacterium responsible for Lyme disease.⁵

Artemisinin also has antimicrobial effects against opportunistic and pathogenic gut microbes such as *Helicobacter pylori*, apparently without disturbing commensal gut bacteria.^{6,7} Simultaneously, it appears to increase the Bacteroidetes: Firmicutes bacterial ratio; a higher ratio is associated with superior gut and metabolic health.⁸

CREATE A STRONG FOUNDATION FOR SUCCESSFUL DETOXIFICATION

Endotoxins, pro-inflammatory byproducts of Gram-negative gut bacteria, block bile acid transporters involved in cellular detoxification.⁹ Artemisinin protects these vital transporters and may help create a strong foundation for successful detoxification.¹⁰

ALLEVIATE INFLAMMATION AND MODULATE THE IMMUNE SYSTEM

In addition to defending the body against harmful microbes, artemisinin exerts anti-inflammatory and immunomodulatory effects. It inhibits brain inflammation triggered by bacterial endotoxins by inhibiting the pro-inflammatory NF- κ B pathway.¹¹ Artemisia extracts, of which artemisinin is a major component, protect the gastrointestinal tract against stress-induced inflammation by upregulating Nrf2, the body's premier antioxidant signaling system.¹²

Artemisinin may also have applications in the management of autoimmune disease. It selectively suppresses pathogenic T cell proliferation, blocks B cell-induced antibody production, and inhibits pro-inflammatory signaling.¹³ Dihydroartemisinin, an active metabolite of artemisinin, increases CD8+ T cells and T regulatory cells that promote self-tolerance. Self-tolerance is an essential physiological mechanism that prevents the body from attacking its own cells; when self-tolerance is lost, autoimmunity may ensue.^{14,15} Unlike many drugs used for autoimmune diseases that act on single targets, artemisinin acts on multiple checkpoints within the immune system, beneficially modulating its overarching function.

PROTECT COGNITION

Neurodegeneration is an age-related deterioration in the structure and function of neurons that causes deficits in cognition, including mild cognitive impairment and Alzheimer's disease. Preliminary research suggests that artemisinin may protect the brain against degenerative processes by modulating inflammatory signaling pathways such as the NF- κ B pathway.¹⁶ It may also protect cells from amyloid-beta, a misfolded protein involved in the progression of Alzheimer's disease.

PROMOTE METABOLIC HEALTH

Hyperglycemia, or chronically high blood sugar levels, wreak havoc on the body, adversely impacting the brain, peripheral nervous system, and heart. Artemisia exerts hypoglycemic effects of a magnitude similar to the gold-standard type 2 diabetes drug metformin, suggesting that it may be beneficial for managing blood sugar levels.¹⁷

SUPPORT NORMAL CELLULAR GROWTH AND DIVISION

A growing body of research indicates that artemisinin helps regulate cell growth and division, inhibiting abnormal cellular proliferation. It also regulates the microenvironment of the body, making it inhospitable to mutated cells.¹⁸

LIPOSOMAL FORMULATIONS ENHANCE ARTEMISININ BIOAVAILABILITY

Standard artemisinin extracts have low oral bioavailability due to poor oil and water solubility and extensive hepatic first-pass metabolism. Liposomal delivery systems have been found to significantly boost the bioavailability of artemisinin.¹⁹ Liposomal artemisinin has a longer half-life compared to non-liposomal artemisinin, prolonging the time it spends in the circulation. Liposomal formulations of artemisinin may thus have greater efficacy in the management of immune system and infectious conditions.

Artemisinin Emulsion delivers artemisinin in our proprietary liposomal formulation. However, we have chosen to use larger liposomes of approximately 300 nm in size; this allows artemisinin to act locally in the gut, balancing the intestinal microbial ecosystem before entering the lymphatic system and traveling to cells and tissues throughout the body.

Quicksilver Delivery Systems® improves upon liposomal and emulsification technology with smaller, more stable particles made from the highest-grade ingredients available. In addition to exceptional absorption rates, these tiny liposomal and nanoemulsified particles increase diffusion across mucous membranes, enhance lymphatic circulation of nutrients and support cellular delivery.

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References available at quicksilverscientific.com/artemisininemulsionreferences

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