

## What Is L-Theanine?

L-theanine (chemical name  $\gamma$ -ethylamino-L-glutamic acid) is a rare amino acid. This amino acid, with apparently only one exception, is found only in certain species of tea plants. It constitutes between 1 and 2% of the dry weight of tea leaves and accounts for approximately one half of all the free amino acids present in the leaves. First discovered in 1949, L-theanine not only is an important health-giving constituent of tea, but also is the major flavor component of green tea.

## The Relaxation Factor

Researchers have often wondered why it is that tea, despite its caffeine content, tends to relax individuals without making them drowsy. Similarly, those engaging in meditation practices may drink tea to dispel mental sluggishness and yet not become mentally agitated, as is typical with the consumption of too much coffee. L-theanine appears to be the component in green tea which is responsible for these particular benefits. This is good news for the 65% of adult Americans who suffer from daily stress.

Various tests have demonstrated the anti-stress effects of L-theanine. One of the more revealing of these experiments examined brain wave patterns after the ingestion of L-theanine. This research built upon the knowledge that humans produce specific patterns of electrical pulses on the surface of the brain which mirror brain states. The four primary wave patterns are known as the alpha, beta, delta and theta (a, b, d and q) brain waves, representing, respectively, 1) relaxed wakefulness, 2) excitation, 3) sound sleep, and dozing sleep.

In one experiment, 50 women volunteers (aged 18-22 years old) were divided into high-anxiety and low-anxiety groups. Each group was given either 50 or 200 mg L-theanine in water once a week. Their brain waves were measured during the 60 minutes after ingestion. The measurements were repeated twice during a two-month test period. The results were a marked increase in a-waves starting roughly 40 minutes after ingestion. Researchers concluded that L-theanine rapidly enters the system when ingested and that it heightens the index of the brain wave which is known to be linked to a state of relaxed wakefulness. Researchers also have explored whether the response to L-theanine might be influenced by the level of anxiety found in test subjects. As might be expected, the greater degree of change is found in those manifesting high anxiety.

## Improved Learning

Animal tests have been used to find out if L-theanine exerts an impact upon memory and learning ability. In one memory experiment based upon learned avoidance, both active and passive in nature, the L-theanine-treated animals were more successful than controls, and their superiority increased in proportion to the number of tests. In another test which measured learning ability, the L-theanine-treated animals, similarly, out-performed the controls, especially as the tests became more advanced.

Various experiments have attempted to determine how L-theanine achieves its benefits in the areas of relaxation and learning. These tests have shown that the amino acid influences the levels of neurotransmitters in the brain. The metabolism of dopamine and serotonin is influenced by L-theanine ingestion.

#### Benefits for the Liver and Nerve Health

Yet another trial with L-theanine looked at its effects upon liver health. A known liver toxin, D-galactosamine, was employed. L-theanine was shown to be active in preventing injury to the liver, whereas glutamine in equal amounts showed no protective effect. Studies using other models of liver injury also have demonstrated benefits.

L-theanine, furthermore, appears to protect against certain so-called "excitotoxins." It modulates the motor-stimulation associated with caffeine, and it inhibits some of the actions of norepinephrine in the central nervous system, for instance. In tests with gerbils, L-theanine protected against the destruction of neurons induced ischemia, a condition which can lead to a rapid increase in glutamate in neurons and result in the death of these cells.

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