

# A Formulator's Guide to **Sleep Supplement Ingredients**



**Genell** 123



## A Formulator's Guide to Sleep Supplement Ingredients

Sleep plays a vital role in our ability to remain healthy and perform well throughout our days. While numerous studies have revealed tips for falling asleep faster and achieving more restorative sleep, many adults struggle to get enough. Statistics from the Centers for Disease Control and Prevention indicate that the use of sleeping pills has doubled over the past 10 years.

Sleep disorders like insomnia affect men and women throughout many stages of life. According to a study found in the National Library of Medicine, up to 75% of older adults experience some form of insomnia. Today, over 8% of adults report using some form of sleep aid medication four times per week or more.



While the number of Americans who turn to over-the-counter sleep aids is estimated to be in the millions, these drugs offer no permanent solution to chronic sleep disorders. The most commonly used active ingredients, such as GABA, tryptophan, and melatonin all feature challenges that can hinder their effectiveness. As we look toward the next generation of sleep supplements, **ergothioneine** is emerging as a powerful ingredient. This formulator's guide will explore the most common sleep supplement ingredients, particularly ergothioneine, and their role in improving sleep.





## Common Sleep Supplement Ingredients

There are several common ingredients supplement formulators use when creating sleep aids. Each works in a unique way to either promote relaxation, help regulate circadian rhythms, or stimulate sedation.



**GLYCINE, THEANINE, &  
GAMMA-AMINO  
BUTYRIC ACID (GABA)**



**TRYPTOPHAN**



**MELATONIN**



## GLYCINE, THEANINE, & GAMMA-AMINO BUTYRIC ACID (GABA)

Glycine, theanine, and gamma-aminobutyric acid (GABA) are all derived from foods and are thought to improve sleep by regulating nerve activity to promote relaxation. Yet, there are several issues with the effectiveness of these ingredients. For example, intake timing is limited to before bedtime, and studies have shown these ingredients cannot easily penetrate the blood-brain barrier.





## TRYPTOPHAN

Tryptophan is an essential amino acid that plays an important role in the production of serotonin and melatonin. After consumption, it is believed to stimulate sedation and is also associated with sleep efficiency, improved sleep latency, and greater total sleep time. The most helpful dose is at least 1 gram per day.



## MELATONIN

Melatonin is a hormone that plays an important role in regulating circadian rhythms. It is produced naturally in the brain's pineal gland and can also be obtained in low concentrations through food sources like cherries, bananas, and rice. In the evening, its levels rise, signaling to the body that it is time to sleep. Melatonin production is influenced by light exposure and decreases when large amounts of light are present.





## The Importance of Ergothioneine

Ergothioneine (EGT) is a potent antioxidant, capable of preventing or limiting free radical damage within the body. It was first isolated by a French pharmacist in 1909, from an ergot fungi. Over time, it has also been found in other mushroom species, such as *ganoderma lucidium* and *tricholoma matsutake*.




## This ingredient offers numerous benefits:

- Protects DNA and proteins from oxidative harm
- Slows skin aging
- Protects against UV damage
- Helps maintain cellular health
- Improves sleep difficulties
- Anti-depressant properties
- Boosts memory, particularly for individuals with cognitive decline
- Mitigates telomere shortening brought out by oxidative stress
- Shown to decrease biomarkers of oxidative damage
- Possible therapeutic potential for vascular and neurodegenerative diseases (dementia)
- Potentially reduces the risk of developing pre-eclampsia
- Associated with reduced mortality and decreased likelihood of cardiovascular disease







Another primary advantage of EGT is its potent anti-inflammatory properties. In particular, it has been shown that EGT can inhibit UV-induced production of inflammatory factors in keratinocytes. Because it can reduce inflammatory factors in cells, EGT could be a good candidate for the treatment of inflammatory diseases.

Additionally, unlike certain other sleep aids, EGT is more effective at assessing the brain thanks to a specific protein called OCTN1. This transporter, conveniently present within the blood-brain barrier, allows ergothioneine to pass through, granting it direct access to the central nervous system.





## How Ergothioneine May Improve Sleep

EGT's unique antioxidant properties may improve sleep quality in several ways. For example, not only can it prevent the formation of free radicals, such as OH, but it also directly scavenges free radicals and reactive oxygen species, including hypochlorite acid (HClO) and peroxynitrite. Ergothioneine has been the subject of multiple scientific studies that have explored its effects on sleep.



**EXPERIMENT  
1****ORAL ERGOTHIONE'S EFFECT ON SLEEP ABNORMALITIES**

In one study, it was hypothesized that EGT may have antidepressant effects. The antioxidant is primarily absorbed in the upper gastrointestinal tract and is a metabolite of the gut bacterium *Lactobacillus reuteri*. As expected, the study revealed that oral EGT had a preventative effect on SDS-induced depressive behaviors, including depressive sleep abnormalities, especially within REM sleep. EGT protects against stress-induced sleep disturbances, particularly those associated with depression. Multiple scientific studies have explored its effects on sleep.

**EXPERIMENT  
2****ORAL ERGOTHIONEINE 20 MG 4-WEEK STUDY**

Another series of experiments were conducted at Japan's Kanazawa University School of Pharmacy. In this study, 92 volunteers with sleep problems and high levels of anxiety were given 20 mg of ergothioneine daily for four weeks. Using EEG sleep monitoring, it was determined that the group given EGT experienced shorter latency into slow-wave sleep, improved levels of REM sleep, and fewer wakings after falling asleep.

In addition, a serum metabolome analysis showed that EGT reduced the consumption of serum glutamate and inhibits histamine N-methyltransferase and aldehyde dehydrogenase activities while binding to  $\alpha 3\beta 4$  nicotinic acetylcholine receptors. As a result, it is believed that EGT improves sleep difficulties through multiple mechanisms.

# Formulating with Ergothioneine

For supplement formulators, ergothioneine offers many benefits compared to other sleep supplement ingredients.

## EGT'S ANTIOXIDANT BENEFITS

Extensive research has shown that EGT is capable of entering the mitochondria to remove free radicals and that it exhibits strong antioxidant capacity. For example, laboratory data shows that EGT's free radical scavenging capacity is:

- 6 times greater than glutathione
- 46 times greater than coenzyme Q10
- 6 times greater than astaxanthin
- 60,000 greater than vitamin E

It is also shown to provide improved antioxidant capabilities compared to anthocyanins and flavonoids. In addition, EGT can activate the intracellular antioxidant pathway involving MAPKs and can help regulate levels of antioxidant enzymes.

## GENEIII & ERGOTHIONEINE

In 2023, GeneIII introduced Ergothioneine Capsules containing 25mg of high-purity ergothioneine per capsule. This is the equivalent of 1lb of fresh reishi mushroom. Our innovative product makes EGT more affordable and accessible than ever before. In fact, before 2017 ergothioneine could only be extracted from rare fungi and cost as much as \$30 million USD or more per kilogram.

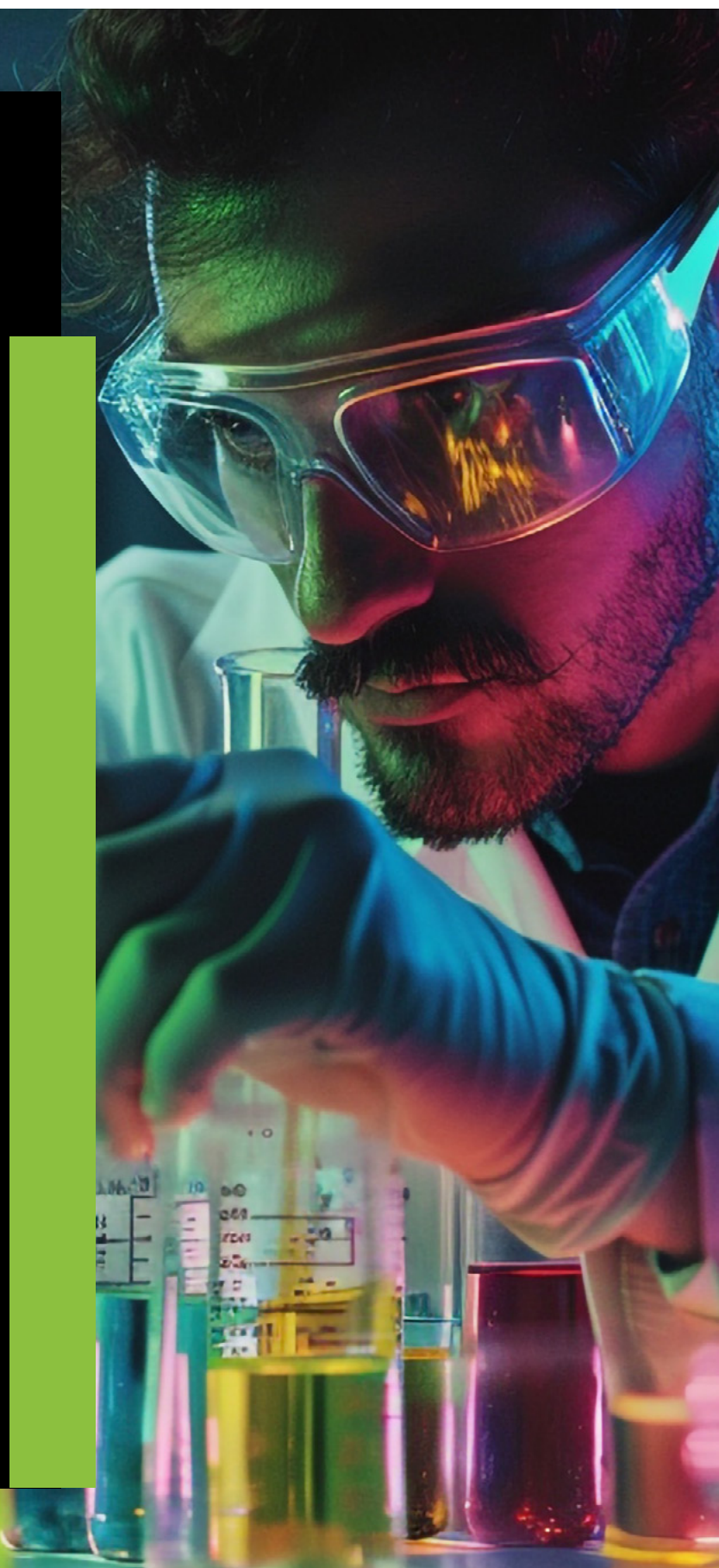
Using innovative synthetic biology, GeneIII has reduced the price of EGT to one-tenth of the market price. We offer high-production capabilities to meet virtually any level of customer demand. Compared to traditional chemical synthesis and bio-processing methods, our synthetic biology technology delivers extremely high purity EGT using environmentally safe manufacturing. Using cGMP pharmaceutical platforms, we can achieve industrial-scale, low-cost production.



## The Future of Sleep Supplements with Ergothioneine

Increasing numbers of in vitro and in vivo experiments are proving that EGT's antioxidant function is superior to many other natural antioxidants. As a non-toxic ingredient, it holds the potential to mitigate the effects of many oxidative stress-mediated diseases, or even prevent them altogether.

By partnering with GeneIII, supplement formulators can access the best ergothioneine in quality, cost, and scalable production capacity. As the world's leading manufacturer of ergothioneine, we prioritize the user experience and continuously strive to improve our services. In October 2023, our company was named on the Synthetic Biology Industry Value List, among 35,000 potential companies in China.





## Partner with Genelll for High-Purity Ergothioneine

Sleep quality is closely tied to health and quality of life, yet millions of adults struggle to fall asleep or stay asleep. While there are several existing supplement ingredients on the market to assist with this issue, they all have limitations. Many ingredients are not effective enough, or are inconvenient to take at the correct time, while others are habit-forming or unsuitable for long-term use.

Ergothioneine has been proven effective by numerous studies and offers powerful antioxidant effects. This ingredient is quickly transforming the sleep supplement industry, and Genelll is your trusted partner for high-purity, cost-effective sourcing. Compared to other manufacturers who offer average purity levels between 95% and 99%, Genelll can provide 99.99% pure Ergothioneine that is light-stable, heat-resistant, and odorless. To learn more, fill out the [contact form](#) on our website and our team will reach out to you shortly.





## ABOUT GENEIII BIOTECHNOLOGY CO.

GeneIII Biotechnology Co., Ltd. was founded in August 2021. It is a synthetic biotechnology company that integrates research and development, production, and sales. The company focuses on the field of great health and beauty, based on synthetic biology technology, and is committed to providing customers with higher quality products and services, benefiting all living beings.

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