

5-Hydroxytryptophan (5-HTP)

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General Features

5-HTP is a naturally occurring agent that is extracted from the seed of an African plant, known as the “Griffonia Simplicifolia”. 5-HTP, unlike the amino acid tryptophan, easily crosses the blood-brain barrier. As a result, while only three percent of an oral dose of tryptophan is converted to serotonin in the brain, studies indicate that over seventy percent of an oral dose of 5-HTP is converted to serotonin. As serotonin is a neurotransmitter that elevates mood and improves sleep quality, 5-HTP has been used in clinical trials to treat depression, insomnia and other conditions where a rise in serotonin levels may be desirable. Some evidence suggests that 5-HTP also increases endorphin and other neurotransmitter levels as well.¹

Serotonin and Melatonin Synthesis: In the brain the amino acid tryptophan is converted into 5-hydroxytryptophan (5-HTP). The coenzyme required is tetrahydrobiopterin, which donates two hydrogen atoms to this reaction, thereby becoming dihydrobiopterin. 5-HTP is then converted to serotonin via a decarboxylase enzyme (decarboxylation reactions require vitamin B6). In the pineal gland serotonin can be converted to N-acetylserotonin and then to melatonin. The first reaction requires the B-vitamin Pantothenic acid and the second reaction requires the presence of S-adenosyl methionine (which requires folic acid and vitamin B12 for its formation). It is therefore important to note that certain B-vitamins, such as vitamin B6, Pantothenic acid, folic acid and vitamin B12 play vital roles in optimizing neurotransmitter synthesis throughout our lifetime. Some studies have shown that supplementation with folic acid, vitamin B12 and/or S-adenosyl methionine, can reverse depression and certain aspects of cognitive dysfunction, especially in older subjects.

In the central nervous system serotonin has been shown to affect the control of appetite, sleep, memory, learning, temperature regulation, behavior (including sexual and hallucinogenic) and is well known as a neurotransmitter that elevates mood.

Melatonin is known for its ability to induce sleep, counter the effects of jet lag, stimulate immune function, provide antioxidant protection to the brain and elevate mood.

Supplementation Studies and Clinical Applications

1. Depression

In several clinical trials 5-Hydroxytryptophan has been tested on its own or against other antidepressant drugs, including selective serotonin re-uptake inhibitor drugs (SSRI) such as fluvoxamine (Luvox). Fluvoxamine exerts anti-depressant activity comparable to Prozac, Zoloft, and Paxil.

In general, 5-Hydroxytryptophan has been shown to be as effective as other traditional antidepressants and tends to be associated with fewer and less severe side effects. The usual dosage for this application is 100 mg, three times daily.¹⁻⁵ However, patients with

depression should be under the care of a qualified health professional and combining 5-Hydroxytryptophan supplementation with other anti-depressant drugs or supplements is contraindicated and may result in life-threatening side effects (i.e. serotonin syndrome).⁶

2. Insomnia

5-HTP has been shown to improve insomnia and quality of sleep in affected subjects. For insomnia, a single 100 mg dose of 5-HTP, one hour before bedtime has been shown to improve duration and depth of sleep in one placebo-controlled study.⁷

3. Fibromyalgia

Some evidence suggests that 100 mg (5-HTP) taken three times per day may reduce symptoms of fibromyalgia, including pain and insomnia. People with fibromyalgia often have low serotonin levels in their blood. Supplementation with 5-HTP may increase serotonin synthesis in these cases. Both preliminary and double-blind trials have reported that 5-HTP supplementation (100 mg three times per day) relieves some symptoms of fibromyalgia.⁸

4. Migraine

Migraine Headache Studies have provided evidence that patients who suffer from migraine headaches may experience a reduction in frequency and severity of attacks with a dosage range of 400-600 mg per day, in divided doses. The cause of migraine headache is believed to be related to abnormal serotonin function in blood vessels, and 5-hydroxytryptophan may therefore affect these levels. In one study, 40 people with recurrent migraines received either 5-HTP (200 mg per day) or methysergide (a drug used to prevent migraines) for 40 days. Both compounds reduced the frequency of migraines by about 50%. Larger amounts of 5-HTP (600 mg per day) were also found to be as effective as medications for reducing migraine headache attacks in adults in two double-blind trials. Migraine attacks were reduced in frequency, severity, and duration in 90% of those taking 400 mg per day of 5-HTP in a double-blind placebo-controlled trial, though not all migraine studies have reported success with 5-HTP. Children, who suffered from migraines and had problems sleeping, responded well to a daily amount of 5-HTP equal to 20 mg for every 10 pounds of body weight in a controlled trial. However, other studies have failed to show success using 5-HTP for childhood migraines⁹⁻¹³

Dosage Ranges

1. Depression: 100 mg, three times daily²
2. Insomnia: a single dose of 25-100 mg, one hour before bedtime.⁴
3. Fibromyalgia: 100 mg, three times daily⁸
4. Migraine headaches: 150 mg, three times per day⁹
5. Anxiety: 100 mg, three times daily⁸

Adverse Side Effects

In clinical studies using the above dosages, some patients experience gastrointestinal upset (i.e. nausea) or, less often, headache, sleepiness, muscle pain, or anxiety.¹⁻¹³

Drug-Nutrient Interactions and Contraindications

5-HTP should not be taken with other antidepressants, weight control drugs, other serotonin-modifying substances, or agents known to cause liver damage. Individuals with liver disease or scleroderma should also avoid 5-HTP.^{2,6,14}

Herb-Nutrient Interactions

St. John's Wort

5-HTP may potentiate the effect of St. John's Wort on brain neurotransmitters and vice versa. These supplements should not be taken concurrently.¹⁷

Toxicity

Animal studies have shown that high doses of 5-HTP can cause muscle jerks in guinea pigs, and when injected has caused kidney damage in rats. To date, these problems and serotonin syndrome have not been reported in humans, but the potential for serotonin syndrome to develop under certain circumstances (i.e. in combination with antidepressant drugs) is very plausible.^{6,15,16}

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