Benfotiamine SAP

Science-based nerve health support

Benfotiamine is a synthetic form of thiamine, or vitamin B1, that is highly bioavailable and has been shown to have various health benefits. It is commonly used to support nerve function and reduce symptoms of diabetic neuropathy by enhancing the body's ability to produce energy and reducing oxidative stress. Benfotiamine has also demonstrated potential in improving glucose metabolism, reducing inflammation, and protecting against complications related to diabetes. Additionally, some research suggests that benfotiamine may have neuroprotective properties and play a role in maintaining cardiovascular health. Overall, **Benfotiamine SAP** is a promising supplement that may offer support for nerve health, blood sugar regulation, and overall well-being.

ACTIVE INGREDIENTS

Each vegetable capsule contains:

Benfotiamine. . . . . 150 mg
Providing: Thiamine (vitamin B1). . . . . 85.5 mg

NON-MEDICINAL INGREDIENTS: Microcrystalline cellulose, vegetable magnesium stearate and silicon dioxide in a capsule composed of vegetable carbohydrate gum and purified water.

This product is non-GMO and vegan friendly.

Contains no: Gluten, soy, wheat, corn, eggs, dairy, yeast, citrus, preservatives, artificial flavour or colour, starch, or sugar.

Benfotiamine SAP contains 60 capsules per bottle.

DIRECTIONS FOR USE

Adults: For support of healthy nerve function in individuals with polyneuropathy: Take 1 capsule three times daily or as directed by your healthcare practitioner. For help in energy production and to help maintain the body's ability to metabolize nutrients: Take 1 capsule daily or as directed by your healthcare practitioner.
Duration of use: Consult a healthcare practitioner for use beyond 6 months.

INDICATIONS

Benfotiamine SAP can help:

- Improve pain and diabetic neuropathy symptoms
- Mitigate symptoms associated with polyneuropathy
- Promote cognitive function, alleviate mental distress, and reduce alcohol dependence
- Improve vascular and endothelial dysfunction

SAFETY, CAUTIONS, AND WARNINGS

Consult a healthcare practitioner if symptoms persist or worsen.
Do not use if seal is broken. Keep out of reach of children.

PURITY, CLEANLINESS, AND STABILITY

All ingredients listed for all **Benfotiamine SAP** lot numbers have been tested by a third-party laboratory for identity, potency, and purity.

Scientific Advisory Panel (SAP): adding nutraceutical research to achieve optimum health

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For healthcare professional use only.

Just like other B vitamins, thiamine is a crucial molecule for all living organisms, as it assists in converting food into energy and maintaining the proper functioning of the nervous system. [1] The absorption of thiamine in the intestine is limited by specific transporters, thus, it may not be absorbed efficiently. [2] Benfotiamine is a third derivative of thiamine that has better bioavailability than thiamine itself. [3] Benfotiamine has a unique open thiazole-ringed structure which closes upon absorption; it then undergoes phosphorylation by the action of the enzyme ecto-alkaline phosphatase found in the brush borders of intestinal mucosal cells to form S-benzoyl thiamine. [4] When in the bloodstream, a significant amount of S-benzoyl thiamine is captured by red blood cells and then transformed into active thiamine. [5] Therapeutically, benfotiamine has been proven to prevent AGE (Advanced Glycation End) products formation in diabetic complications like neuropathy, retinopathy, and nephropathy, compared to water-soluble thiamine. [6] A pharmacokinetic study of benfotiamine revealed that compared to thiamine hydrochloride, it has higher bioavailability of thiamine because there is a significant increase in the absorption rate and extent of benfotiamine systemic availability of thiamine. [7]

SAFETY OF BENFOTIAMINE

A clinical study to assess the safety and tolerability of benfotiamine using single and multiple ascending doses, e.g.., 150, 300, and 600 mg, revealed that the compound was well tolerated and safe. [8] A moderate accumulation of thiamine and thiamine diphosphate was observed after receiving repeated administration. [8]

NEUROLOGICAL HEALTH

A preclinical study on diabetic rats treated with benfotiamine showed that it aided in preventing retinal damage by the NF-κB cells for a prolonged period after treatment. The study also demonstrated the potential prevention of diabetic retinopathy. [9] A similar study on rats that had streptozotocin (STZ) induced diabetes showed that it significantly reduced the formation of neural imidazole-type AGE and completely prevented the formation of glycoxidation products like carboxymethyl-lysine (CML) caused by diabetes. [10] A randomized, placebo-controlled clinical study showed that benfotiamine helped significantly improve neuropathy scores, which subsequently led to a decrease in pain-based complaints among the participants. [11] Another open-label study on diabetic patients tested the efficacy of different dosages of benfotiamine, 150, 160 or 320 mg per day, and showed that a higher dose could significantly improve the neuropathy status of the patients. [12]

A six weeklong phase-III study showed that receiving a dosage of 300 or 600 mg of benfotiamine per day can significantly improve neuropathy symptom score, pain, numbness, burning, and paresthesia. [13] Similarly, a pilot study by Stirban et al. showed a significant improvement in the Michigan Neuropathy Screening Instrument questionnaire. [14] Benfotiamine proved its efficiency in ceasing cognitive decline in two clinical studies. 600 mg of the compound per day helped show a substantial improvement in the Alzheimer's Disease Assessment Scale-Cognitive Subscale and an increase in positron emission tomography with Pittsburgh compound B. [15, 16]

Thiamine deficiency is often related to the erosion of neural pathways, and alcoholism is one of the strong links to neurological health, like Wernicke's encephalopathy and vitamin deficiency. [5, 17] The efficiency of 600 mg of benfotiamine in relieving psychiatric distress in alcohol-dependent men and women was analyzed in a clinical intervention. It proved to help the female population and was suggested to be used as an adjuvant in alcohol rehabilitation. [18] A significant decrease in alcohol consumption was also noticed in another similar randomized, placebo-controlled, double-blind study. [19]

CARDIOVASCULAR AND METABOLIC HEALTH

A preclinical study on rats that had nicotine and uric acid-induced vascular endothelial dysfunction (VED) was supplemented with 70 mg per kg of benfotiamine. The compound exhibited a noteworthy antioxidant potential, which subsequently helped ameliorate the integrity of vascular endothelium and prevented nicotine and uric acid-induced experimental VED. [21] A similar study explored the effect of benfotiamine on diabetic-induced cardiomyopathy. The affected mice, after treatment with the thiamine derivative, showed a potential improvement in cardiac perfusion and a decline in cardiomyocyte apoptosis and interstitial fibrosis. [22] Three different clinical studies by Stirban et al. tested the potency of benfotiamine in counteracting endothelial dysfunction. [23, 24, 25] While in a study in patients affected by type 2 diabetes, 900 mg of benfotiamine did not help in improving the macrovascular and microvascular function, 1050 mg per day showed significant prevention of microvascular and macrovascular dysfunction (induced by an AGE-rich test meal). [23, 24] Likewise, vascular dysfunction in smokers was significantly attenuated by benfotiamine, which also helped in preventing smoke-induced increases in soluble vascular cell adhesion molecules. [25] Another clinical trial showed that benfotiamine can significantly normalize the increase in AGE formation, also control the rise of monocyte hexosamine-modified proteins and decrease prostacyclin synthase activity. [26]

IMMUNOMODULATORY EFFECTS

A preclinical study showed that benfotiamine can significantly decrease the pro-inflammatory mediators, including the inducible form of nitric oxide synthase (iNOS) and NO, cyclooxygenase-2 (COX-2), heat-shock protein 70 (Hsp70), tumor necrosis factor-α (TNF-α), and interleukin-6 (IL-6). In contrast, it boosted the production of anti-inflammatory interleukin-10 (IL-10) in LPS stimulated BV-2 microglia. [27] Another similar study showed that it can attenuate the LPS-induced oxidative stress and protein-HNE adduct formation. The LPS-induced macrophage death and monocyte adhesion to endothelial cells were also significantly controlled by benfotiamine. [28] A clinical intervention by Schupp et al. focused on the outcome measures including micronucleus frequency test, AGE-associated fluorescence, and transketolase activity. Benfotiamine treatment led to a significant decrease in the genomic damage of peripheral blood lymphocytes (PBLs), additionally, a substantial antioxidant effect resulting in amelioration of DNA damage was also observed. [29] A study on patients affected by end-stage renal disease (ESRD) demonstrated an improvement in erythrocyte transketolase activity. [30]

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INDICATION SPECIFIC DOSAGE SUMMARY BASED ON HUMAN CLINICAL RESEARCH#

#Please note these suggestions are guidelines based on the clinical studies. Evidence for efficacy and safety have been qualitatively (study quality in terms of study design, sample size, appropriate methods of analysis, use of appropriate placebo/control, bias etc) assessed and have been rated using a 5 star ★ rating classification.

Indication	Suggested dosage	Supporting evidence and study outcome	Study design	Outcome measures	Safety	Evidence quality rating
Neurological Health						
Diabetic Neuropathy[1, 2, 3]	3 vegetable capsules/day	A significant improvement in neuropathy score, also substantial decrease on pain-based complaints	Randomized, placebo-controlled, double-blind, pilot study. n=40; 3 weeks 400 mg benfotiamine/day	Neuropathy score, vibration perception threshold, HbA1, triglycerides, creatinine, erythrocyte sedimentation	No severe adverse effects were reported	★★★
	1 to 2 vegetable capsules/day	A significant improvement in neuropathy status, a substantial change was noted in the high dose benfotiamine group	Randomized, open-label study. n=36; 6 weeks 150, 160 or 320 mg benfotiamine/day	Pain sensation, vibration sensation, current perception threshold (CPT)	No severe adverse effects were reported	★★
	6 vegetable capsules/day	A significant improvement in thiamine status	Randomized, placebo-controlled, double-blind study. n=82; 12 weeks 900 mg benfotiamine/day	Thiamine concentration in whole blood and plasma, change in urinary albumin excretion (UAE)	No severe adverse effects were reported	★★★
Polyneuropathy[4,5,6]	2 vegetable capsules/day	A significant improvement in symptoms of alcoholic polyneuropathy, also a substantial improvement in motor function and vibration perception	Randomized, placebo-controlled, double-blind, three-armed, multicenter study. n=84; 8 weeks 320 mg benfotiamine/day	Assessment of peripheral nerve function, intensity of pain, motor function score, serum glutamate-oxaloacetate aminotransferase (SGOT), serum glutamate-pyruvate aminotransferase (SGPT), triglycerides, cholesterol, creatinine, blood alcohol, fasting blood sugar	No severe adverse effects were reported	★★★
	2 to 4 vegetable capsules/day	A significant improvement in neuropathy symptom score, also a substantial improvement in pain, numbness, burning, paresthesia	Randomized, placebo-controlled, double-blind, phase-III study. n=165; 6 weeks 300 or 600 mg benfotiamine/day	Neuropathy symptom score, total symptom score, Neuropathy disability score	No severe adverse effects were reported	★★★
	4 vegetable capsules/day	A substantial improvement in symptoms according to Michigan Neuropathy Screening Instrument - MNSI questionnaire	Randomized, placebo-controlled, double-blind study, parallel-group, pilot study. n=22; 3 months 600 mg benfotiamine/day	Michigan Neuropathy Screening Instrument - MNSI questionnaire (MNSIq) and examination (MNSIe), Quality of life (Neuro-QoLTM), neuropathic pain (numerical rating scale - NRS)	No severe adverse effects were reported	★★★
Cognition[7,8]	4 vegetable capsules/day	A substantial improvement in AD Assessment Scale-Cognitive Subscale indicating less cognitive decline, also a significantly lower worsening in clinical dementia rating	Randomized, placebo-controlled, double-blind, early phase II study.n=70; 12 months 600 mg benfotiamine/day	AD Assessment Scale-Cognitive Subscale (ADAS-Cog), Clinical dementia rating (CDR), The Buschke Selective Reminding Test (SRT), Neuropsychiatric Inventory (NPI), Alzheimer's Disease Cooperative Study-Activities of Daily Living (ADCS-ADL)	No severe adverse effects were reported	★★★
	4 vegetable capsules/day	An average increase of 3.2 points was noticed after 18 months of benfotiamine supplementation, a 36.7% increase in positron emission tomography with Pittsburgh compound B	Open, uncontrolled study. n=5; 18 months 600 mg benfotiamine/day	Mini-Mental Status Examination (MMSE), Measurement of Blood Thiamine Metabolites, positron emission tomography with Pittsburgh compound B (PiB-PET)	No severe adverse effects were reported	★★
Psychiatric distress[9]	4 vegetable capsules/day	A substantial reduction in psychiatric distress, also benfotiamine can be a possible adjuvant for alcohol rehabilitation	Randomized, placebo-controlled, double-blind study. n=85; 6 months 600 mg benfotiamine/day	Derived Lifetime Alcoholism Severity Score (AS), Symptom Checklist 90R (SCL-90R), and the Barratt Impulsivity Scale (BIS)	No severe adverse effects were reported	★★★
Alcohol dependence[10]	4 vegetable capsules/day	A significant decrease in alcohol consumption, also a substantial decline in alcohol consumption was noticed in women treated with benfotiamine	Randomized, placebo-controlled, double-blind study. n=70; 24 weeks 600 mg benfotiamine/day	The change in the mean daily alcohol consumption recorded in standard drinks of alcohol per day, The Alcohol Severity Scale (ASS), Symptom Checklist 90-R (SCL-90-R)	No severe adverse effects were reported	★★★

Indication	Suggested dosage	Supporting evidence	Study design	Outcome measures/ selection criteria for studies	Safety	Evidence quality rating
Cardiovascular and Metabolic Health						
Endothelial dysfunction[11,12]	6 vegetable capsules/day	No significant difference in the macrovascular and microvascular function	Randomized, double-blind, placebo-controlled, crossover study. n=31; 6 weeks 900 mg benfotiamine/day	Macrovascular and microvascular function	No severe adverse effects were reported	★
	7 vegetable capsules/day	A significant prevention of microvascular and macrovascular dysfunction induced by an AGE-rich test meal in patients with type 2 diabetes	Randomized, single-blind, crossover study. n=13; 3 days 1050 mg benfotiamine/day (+ high glycation end products (AGEs) diet)	Macrovascular flow-mediated dilatation (FMD) and microvascular reactive hyperemia, E-selectin, vascular cell adhesion molecule-1, intracellular adhesion molecule-1), oxidative stress	No severe adverse effects were reported	★★★
Vascular dysfunction[13]	7 vegetable capsules/day	A significant decrease in smoke-related Flow-Mediated Dilatation after receiving benfotiamine, also it prevented smoke-induced increase in soluble vascular cell adhesion molecule	Randomized, single-blind, crossover study. n=20; 3 days 1050 mg benfotiamine/day	Flow-Mediated Dilatation (FMD) Measurements of Macrovascular Function, serum concentration of soluble vascular cell adhesion molecule (sVCAM)-1	No severe adverse effects were reported	★★★
Diabetes[14]	4 vegetable capsules/day	A significantly normalized increase in AGE formation, also a substantial decrease in the raise of monocyte hexosamine-modified proteins and decrease in prostacyclin synthase activity	Pilot study. n=9; 4 weeks 600 mg benfotiamine/day (+ slow-release α-lipoic acid 1200 mg)	HbA1c, fructosamine, fasting plasma glucose, serum levels of 6-keto-prostaglandin F	No severe adverse effects were reported	★★
Immune Health						
Genomic damage[15]	4 vegetable capsules/day	A significant decrease in the genomic damage of peripheral blood lymphocytes (PBLs), also a substantial antioxidant effect resulting in amelioration of DNA damage	Pilot, prospective study. n=15; 6 weeks 600 mg benfotiamine/day	Micronucleus frequency test, AGE-associated fluorescence, transketolase activity, thiamine pyrophosphate (TPP) effect, vitamin B1 content	No severe adverse effects were reported	★★
TDP Erythrocyte concentration[16]	1 vegetable capsule/day	A significant decrease in the thiamine diphosphate concentrations in erythrocytes, also a substantial improvement in the erythrocyte transketolase activity in patients affected by end-stage renal disease (ESRD)	Randomized, single-blind, two-group study. n=20; 24 hours 100 mg benfotiamine/day	Thiamine diphosphate (TDP) in erythrocytes, erythrocyte transketolase activity	No severe adverse effects were reported	★★

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