GENESTRA BRANDS®

Liquid B Complex

Dietary Supplement

Broad-spectrum B-vitamin complex

- Helps to maintain cognitive function, normal immune function and energy production‡
- Aids in the maintenance of healthy hair, nails and skin‡
- Convenient liquid format
- Great-tasting, natural tangerine-cherry flavor
- **Improved**
  - Now available in a 15.2 fl oz bottle

Liquid B Complex is a delicious combination of seven B vitamins, plus choline and inositol. It provides the daily requirements for thiamin, riboflavin, niacinamide, vitamin B_6, vitamin B_{12}, biotin and pantothenic acid. B vitamins play an important role in energy metabolism as cofactors for numerous biochemical reactions in the body. Vitamins B_6, B_{12} and riboflavin are particularly critical in the metabolism of the amino acid metabolite homocysteine. Vitamin B_{12} has an additional role supporting immune system function and is involved in red blood cell formation alongside vitamin B_6. In addition, biotin helps maintain cognitive functions as well as healthy hair, nails, mucous membranes and skin. Liquid B Complex also provides choline, a lipotrope that helps support liver function, plus inositol, an important second messenger and component of the phospholipid membrane.‡

Supplement Facts

Serving Size 1 Teaspoon (5 ml)
Servings per Container 90

	Amount Per Serving	% DV
Calories	10	
Total Carbohydrate	3 g	1%^
Total Sugars	1 g	*
Includes 1 g Added Sugars		3%^
Thiamin (as thiamin hydrochloride)	50 mg	4167%
Riboflavin	50 mg	3846%
Niacin (as niacinamide)	75 mg	469%
Vitamin B_6 (as pyridoxine hydrochloride)	50 mg	2941%
Vitamin B_{12} (as hydroxocobalamin acetate/ methylcobalamin)	75 mcg	3125%
Biotin	200 mcg	667%
Pantothenic Acid (as *d*-panthenol)	75 mg	1500%
Choline (as choline chloride)	50 mg	9%
Chloride	60 mg	3%
Inositol	50 mg	*

* Daily Value (DV) not established
^ Percent Daily Values are based on a 2,000 calorie diet

Other ingredients: Purified water, concentrated apple juice, glycerin, natural flavors, citric acid, rebaudioside A (stevia leaf extract), xanthan gum, potassium sorbate

Recommended Adult Dose: Take one teaspoon two times daily with meals or as recommended by your healthcare practitioner. Shake well before each use.

Product Size: 15.2 fl oz (450 ml) **Product Code:** 02131A

Non GMO · Gluten Free · Dairy Free · Vegan

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The information contained herein is for informational purposes only and does not establish a doctor-patient relationship.
Please be sure to consult your physician before taking this or any other product. Consult your physician for any health problems.

‡ These statements have not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure, or prevent any disease.

Liquid B Complex

Dietary Supplement

Scientific Rationale:

Thiamin (vitamin B_1) is involved in nutrient metabolism and energy production through its coenzyme form thiamin pyrophosphate (TPP), also known as thiamin diphosphate.[1‡] Within the mitochondria, TPP is an important coenzyme for the production of acetyl-CoA, succinyl-CoA and branched-chain amino acid metabolites, which play key roles in the Krebs cycle (a metabolic pathway that helps produce energy from food).[1,2‡] TPP is also necessary for the hexose monophosphate shunt (also known as the pentose phosphate pathway).[1] This pathway helps generate pentoses and NADPH, a niacin-containing enzyme involved in various biosynthetic reactions.[1‡]

Riboflavin (vitamin B_2) is an important component of flavin mononucleotide (FMN) and flavin adenine dinucleotide (FAD).[2] These coenzymes are responsible for electron transfer in many oxidation-reduction (red-ox) reactions.[2‡] Riboflavin-dependent enzymes are particularly essential for nutrient metabolism and can help activate pyridoxine and folate to their respective coenzyme forms.[1‡] Riboflavin also helps to maintain normal red blood cells by protecting them against oxidative stress.[1‡] In its coenzyme form FAD, riboflavin is required for the function of glutathione reductase, which supports intracellular levels of reduced glutathione, an important intracellular antioxidant.[1‡] Furthermore, riboflavin can form complexes with divalent cations, such as Fe^{2+}.[1] As such, it may influence iron bioavailability and metabolism.[1‡]

Niacin is necessary for the synthesis of the pyridine nucleotides NAD(H) and NADP(H), the primary electron carriers in cells.[1‡] These enzyme co-substrates participate in nearly all aspects of metabolism, including more than 200 reactions involving intracellular respiration and the oxidation of fuel molecules.[2‡] NAD, the oxidized form, accepts hydrogen ions to form NADH, which can donate hydrogen ions to the mitochondrial respiratory chain for ATP production.[1‡] NAD can be phosphorylated to NADP and reduced to NADPH, important compounds in the biosynthesis of steroids and fatty acids.[1‡] NADPH is also involved in the oxidation of glucose 6-phosphate in the hexose monophosphate shunt.[1‡]

The metabolically active form of **vitamin B_6** is pyridoxal 5'-phosphate (PLP).[1] PLP is a coenzyme of more than 140 enzymes primarily involved in the synthesis and breakdown of amino acids.[1,2‡] It has an important role in gluconeogenesis, the production of glucose from non-carbohydrate precursors, including amino acids.[1‡] As a coenzyme for glycogen phosphorylase, PLP is also required for the release of glucose from glycogen.[1‡] Although most of the body's vitamin B_6 is present in the muscle (70-80%), red blood cells contain high levels of the vitamin.[1] PLP supports red blood cell formation through the synthesis of heme, an iron-containing part of hemoglobin.[1‡] In addition, vitamin B_6 is a cofactor for two enzymes in the tryptophan-kynurenine pathway, which converts tryptophan into the niacin coenzyme NAD.[1‡]

Vitamin B_{12} plays an important role in metabolism through its coenzyme forms methylcobalamin.[1‡] Methylcobalamin is required for methionine synthase, an enzyme that converts homocysteine to methionine.[1,2‡] In turn, methionine is needed for the production of S-adenosylmethionine (SAM), a donor of methyl groups for more than 100 metabolic reactions, including creatine, phospholipid and acetylcholine synthesis.[1] In addition, vitamin B_{12} helps in immune system and cognitive function, as well as red blood cell formation.[1,2‡] As this vitamin is synthesized by bacteria and rarely present in plant-based foods, individuals consuming strict vegetarian or vegan diets may benefit from vitamin B_{12} supplementation.[1‡]

Biotin is involved in nutrient and energy metabolism as a component of five biotin-dependent carboxylases.[1,2‡] These carboxylases play important roles in gluconeogenesis, as well as fatty acid synthesis, elongation and oxidation.[1‡] Biotin is also associated with cognitive function and healthy hair, nails, mucous membranes, and skin.[1‡]

Pantothenic acid (vitamin B_5) has a key role in metabolism as a component of coenzyme-A (CoA) and acyl-carrier protein (ACP).[1‡] CoA is a cofactor for 4% of known enzymes.[1] It is involved in the transfer of acyl groups in reactions primarily associated with energy metabolism.[1‡] CoA also has an important role in the production of fatty acids, membrane phospholipids, cholesterol, amino acids, vitamins A and D, and the neurotransmitter acetylcholine.[1,2‡] Similarly, ACP is required for the function of fatty acid synthase, an enzyme complex responsible for the production of fatty acids.[1‡]

Choline is found in all tissues as an important structural component of the phospholipid membrane.[2‡] Choline helps support liver function by promoting the export of very low density lipoproteins (VLDL) from the liver.[1‡] Furthermore, choline is required for the production of the neurotransmitter acetylcholine and has a role in methyl metabolism, including the transfer of methyl groups for homocysteine metabolism.[1‡]

Inositol plays a key role in membrane structure and function in the form of phosphatidylinositol.[1‡] It also serves as a second messenger in the form of inositol 1,4,5-triphosphate (IP3), which helps release calcium ions from intracellular storage.[1‡]

REFERENCES

1. Combs, GF. (2012). The Vitamins (4th ed.). USA: Elsevier.
2. Otten, JJ, Pitzi Hellwig, J, Meyers, LD. (2006). Dietary Reference Intakes: The Essential Guide to Nutrient Requirements. USA: National Academies Press

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