

Background

Vitamin B complex typically consists of the water-soluble vitamins biotin, folic acid, thiamin, riboflavin, niacin, pantothenic acid, pyridoxine, and the cobalamins (vitamin B12).¹ Choline, para-aminobenzoic acid, and inositol are also found in some B complex supplement products.¹ Thiamin, riboflavin, niacin, vitamin B6, pantothenic acid, and biotin are necessary for energy metabolism at rest and during physical activity; folate and vitamin B12 are essential for red blood cell production, tissue repair, and protein synthesis.² Vitamin B complex purportedly has enhancing effects on energy metabolism, cell regeneration, and cognitive function.^{3,4} An adequate intake of B vitamins is essential to maintain health and optimum exercise performance.² Low levels of B vitamins may result in decreased physical ability, particularly during high-intensity situations.⁴

Dose Range and Upper Limit

Food and Nutrition Board DRIs⁵

RDA/AI & Upper Limit:			
	RDA/AI Men 19-50	RDA/AI Women 19-50	Upper Limit (UL)
B Vitamin			
B1 – Thiamin (mg)	1.2	1.1	Not established
B2 – Riboflavin (mg)	1.3	1.1	Not established
B3 – Niacin (mg)	16	14	35
B5 – Pantothenic acid (mg)	5*	5*	Not established
B6 – Pyridoxine (mg)	1.3	1.3	100
B7 – Biotin (mcg)	30*	30*	Not established
B9 – Folic acid (mcg)	400	400	1000
B12 – Cobalamin (mcg)	2.4	2.4	Not established

*RDA not established; Adequate Intake (AI) provided

Doses Used in Randomized Clinical Trials: No data were found for combinations of B vitamins for enhancing performance.

Toxicology Data: No data were found for combinations of B vitamins. The following have been reported for specific B vitamins:

B1/Thiamin. No data found; generally recognized as nontoxic.¹

B2/Riboflavin. Doses of 400 mg per day may cause diarrhea and polyuria (excessive urine production).¹

B3/Niacin. For doses larger than three grams per day, side effects may include liver problems, gout, digestive tract ulcers, loss of vision, high blood sugar, irregular heartbeat, and other problems.¹

B5/Pantothenic acid. Consumption up to 10 grams has not shown adverse effects. Large amounts can cause diarrhea.¹

B6/Pyridoxine. The tolerable upper intake level is 100 mg/day for adults. Doses greater than 1000 mg daily pose a risk for sensory neuropathy (nerve damage).¹

B7/Biotin. No data found; doses of 10 mg per day did not produce adverse effects.¹

B9/Folic acid. The tolerable upper intake level is 1000 mcg for adults. Some research suggests that doses of 800-1200 mcg daily for 3-10 years may increase the risk of cancer and heart attack in people who have existing heart problems.¹

B12/Cobalamin. No data found.

Evaluation of Potential Benefits

There is no scientific evidence that supplementing with vitamin B complex improves energy metabolism or cognitive function. Based on controlled studies, the current requirements for increasing the B vitamin content of combat rations could enhance physical and mental performance of soldiers.⁶ Currently the MRE contains more than two times the Nutritional Standards for Operational Rations (NSOR) for B vitamins.

Potential Detrimental Effects on...

Military Performance: Severe folate and vitamin B12 deficiencies could result in anemia and decreased physical performance.⁷

Military Survivability: No data found.

Other Health Risks

No data found for vitamin B complex. At certain doses and for some people, high doses of riboflavin, pantothenic acid, and vitamin B12 can cause diarrhea.¹ Depending on the form and dose, vitamin B6 supplementation can cause nausea, vomiting, headache, and loss of appetite.¹

Interactions with Medications or Other Bioactive Substances

B1/Thiamin. No known drug interactions. Chewing of bétel nuts may cause thiamin deficiency. For those at risk of thiamin deficiency, avoid the use of the herb horsetail (equisetum).¹

B2/Riboflavin. Anxiolytics (Phenobarbital) – minor interaction.¹ In healthy women, psyllium reduces riboflavin absorption from supplements.¹

B3/Niacin. NSAIDs (aspirin) – minor interaction.¹ Taking niacin and chromium together may lower blood sugar. Taking niacin with androstenedione, borage leaf, chaparral, comfrey, DHEA, germander, kava, pennyroyal oil, or red yeast can increase the risk of liver damage, especially with higher doses of niacin. Taking zinc and niacin together may increase the risk of niacin side effects such as flushing and itching.¹

B5/Pantothenic acid. No known drug interactions. Note that royal jelly contains pantothenic acid; the effects of taking them together are not known.¹

B6/Pyridoxine. Anxiolytics (Phenobarbital) – moderate interaction.¹

B7/Biotin. No known interactions.

B9/Folic acid. Anxiolytics (Phenobarbital) – moderate interaction.¹ Green tea may decrease folic acid activity.¹

B12/Cobalamin. No known drug interactions. Large doses of folic acid can mask vitamin B12 deficiency. For some, potassium supplements may decrease the absorption of vitamin B12.¹

For details of these and other potential interactions, visit the Natural Medicines Comprehensive Database.¹

Withdrawal Effects

No data found.

Concern and Benefit Estimate (see Dietary Supplement Risk Matrix)

Benefit potential: Moderate

Risk (safety concern): Minimal

Classification score: **3**

B vitamins are essential to maintain health and optimum performance. However, no data exist as to the effects of combinations of B vitamins, so consumption must be based on individual vitamin dosages and potential interactions. Caution should be used not to take excessive amounts.

References

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4. Woolf K, Manore MM. B-Vitamins and Exercise: Does Exercise Alter Requirements? *Int. J. Sport Nutr. Exerc. Metab.* 2006;16(5):453-84.
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