Dietary Supplements

Usage, considerations, and efficacy

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01 – Definition

Dietary supplements

- Product intended to supplement the diet
- Taken by mouth
- Not intended to treat, prevent, or cure a disease or health problem
- Contains one or more of the following:
  - Vitamin
  - Mineral
  - Herb or botanical (excluding tobacco)
  - Amino acid
  - Concentrate, metabolite, constituent, extract
    - Phytochemicals: lycopene, caffeine, isoflavones
    - Zoochemicals: royal jelly, creatine
    - Other: probiotics, melatonin, glucosamine

Food enrichment
- replace nutrients lost in processing
- bread: thiamin, niacin, riboflavin, iron

Food fortification
- adding nutrients at higher levels than naturally present in foods
- milk: vitamin D

Development of supplements
- ~1/3 of US adults take a multivitamin
- Top consumer reasons for use
  - Fill nutrient gaps
  - Maintain or improve health

<table>
<thead>
<tr>
<th>Vitamin</th>
<th>Deficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>scurvy</td>
</tr>
<tr>
<td>B1</td>
<td>beriberi</td>
</tr>
<tr>
<td>B3</td>
<td>pellagra</td>
</tr>
<tr>
<td>D</td>
<td>rickets</td>
</tr>
</tbody>
</table>
02 – History and regulation
Legislation

- Dietary Supplement Health Education Act (DSHEA) of 1994
- Regulated as food not drugs
- Label must include: manufacturer, packer, or distributor, supplement facts panel, disclaimer
- FDA must prove “a significant or unreasonable risk of illness or injury” to ban supplement
- **FDA does not approve effectiveness or contents**
  - No mandatory formulation standards
  - Manufacturer is responsible for amount and serving size of ingredient

![Estimated Dietary Supplement Market Size](https://www.futuremarketinsights.com/reports/dietary-supplements-market)
Dietary Reference Intakes

- **Recommended Dietary Allowance (RDA)**
  - Average daily intake sufficient to meet nutrient requirements of nearly all (97–98%) healthy individuals
- **Tolerable Upper Intake Level (UL)**
  - Maximum daily intake unlikely to cause adverse health effects
- **Adequate Intake (AI)**
  - established when evidence is insufficient to develop RDA
  - Intake assumed to ensure nutrition adequacy
- **Estimated Average Requirement (EAR)**
  - intake estimated to meet requirements of 50% of healthy individuals; typically used for group assessments

### Supplement Facts

**Serving Size:** 4 Capsules

<table>
<thead>
<tr>
<th>Ingredient</th>
<th>Amount Per Serving</th>
<th>%DV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vitamin A (as Beta Carotene)</td>
<td>4,500 mcg</td>
<td>500%</td>
</tr>
<tr>
<td>Vitamin C (as Calcium Ascorbate)</td>
<td>500 mg</td>
<td>556%</td>
</tr>
<tr>
<td>Vitamin D3 (as Cholecalciferol)</td>
<td>50 mcg</td>
<td>250%</td>
</tr>
<tr>
<td>Vitamin E (as D-Alpha Tocopherol)</td>
<td>147 mg</td>
<td>880%</td>
</tr>
<tr>
<td>Thiamin (as Benfotamine)</td>
<td>50 mg</td>
<td>4.167%</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>50 mg</td>
<td>3.846%</td>
</tr>
<tr>
<td>Niacin (as Nicotinamide)</td>
<td>50 mg</td>
<td>313%</td>
</tr>
<tr>
<td>Vitamin B6 (as Pyridoxal-5-Phosphate</td>
<td>50 mg</td>
<td>2.941%</td>
</tr>
<tr>
<td>Folate (as Quaterefolic* 1360 mcg DFE [6S]-5-Methyltetrahydrofolic Acid Glucosamine Salt)</td>
<td>340%</td>
<td></td>
</tr>
<tr>
<td>Vitamin B12 (as Methylcobalamin 99%)</td>
<td>750 mcg</td>
<td>31.250%</td>
</tr>
<tr>
<td>Biotin</td>
<td>1,000 mcg</td>
<td>3.333%</td>
</tr>
<tr>
<td>Pantothenic Acid (as D-Calcium Pantothenate)</td>
<td>50 mg</td>
<td>1.000%</td>
</tr>
<tr>
<td>Choline (as VitaCholine® Choline L(+) Bitartrate)</td>
<td>50 mg</td>
<td>9%</td>
</tr>
<tr>
<td>Calcium (as Albion® Di-Calcium Malate)</td>
<td>160 mg</td>
<td>12%</td>
</tr>
<tr>
<td>Magnesium (as Albion® Magnesium Bisglycinate Chelate, Buffered – Magnesium Bisglycinate Chelate, Magnesium Oxide)</td>
<td>150 mg</td>
<td>36%</td>
</tr>
<tr>
<td>Zinc (as Albion® Zinc Bisglycinate Chelate)</td>
<td>15 mg</td>
<td>136%</td>
</tr>
<tr>
<td>Selenium (as Albion® Selenium Glycinate)</td>
<td>200 mcg</td>
<td>364%</td>
</tr>
<tr>
<td>Iodine (as Potassium Iodide)</td>
<td>300 mcg</td>
<td>200%</td>
</tr>
<tr>
<td>Copper (as Albion® Copper Bisglycinate Chelate)</td>
<td>2 mg</td>
<td>222%</td>
</tr>
<tr>
<td>Manganese (as Albion® Manganese Bisglycinate Chelate)</td>
<td>5 mg</td>
<td>217%</td>
</tr>
<tr>
<td>Chromium (as Albion® Chromium Nicotinate Glycinate Chelate)</td>
<td>500 mcg</td>
<td>1.429%</td>
</tr>
<tr>
<td>Molybdenum (as Albion® Molybdenum Glycinate Chelate)</td>
<td>200 mcg</td>
<td>444%</td>
</tr>
<tr>
<td>Green Tea Leaf Extract (Std. to 98% Polyphenols, 50% EGCG)</td>
<td>75 mg</td>
<td>**</td>
</tr>
<tr>
<td>Citrus Bioflavonoid Complex</td>
<td>50 mg</td>
<td>**</td>
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<tr>
<td>Inositol Powder</td>
<td>50 mg</td>
<td>**</td>
</tr>
<tr>
<td>Para-Aminobenzoic Acid (PABA)</td>
<td>30 mg</td>
<td>**</td>
</tr>
<tr>
<td>Trans-Resveratrol (Polygongium cuspidatum Root Extract)</td>
<td>20 mg</td>
<td>**</td>
</tr>
<tr>
<td>Grape Seed Extract (Std. to 98% Polyphenols)</td>
<td>20 mg</td>
<td>**</td>
</tr>
<tr>
<td>Pine Bark Extract (Pinus massoniana; Std. to 50% Proanthocyanidins)</td>
<td>20 mg</td>
<td>**</td>
</tr>
<tr>
<td>Bilberry Extract (Std. to 25% Anthocyanosides)</td>
<td>10 mg</td>
<td>**</td>
</tr>
<tr>
<td>Lutein</td>
<td>5 mg</td>
<td>**</td>
</tr>
<tr>
<td>Lycopene</td>
<td>3 mg</td>
<td>**</td>
</tr>
<tr>
<td>Boron (as Albion® Bororganic Glycine)</td>
<td>3 mg</td>
<td>**</td>
</tr>
<tr>
<td>Astaxanthin</td>
<td>1 mg</td>
<td>**</td>
</tr>
<tr>
<td>Vanadium (as Albion® Vanadium Nicotinate Glycinate Chelate)</td>
<td>0.2 mg</td>
<td>**</td>
</tr>
<tr>
<td>Vitamin K2 (as Menaquinone-7; MenaQ7®)</td>
<td>50 mcg</td>
<td>**</td>
</tr>
</tbody>
</table>

**Daily Value (DV) not established

**Other Ingredients:** Methylcellulose Capsule, Dipotassium Phosphate
For most supplements, there isn’t evidence to support a beneficial effect on diabetes or its complications

Possibility of side effects and organ damage
“Without underlying deficiency, there is no benefits from herbal or nonherbal (i.e., vitamin or mineral) supplementation for people with diabetes.”

“For special populations, including pregnant or lactating individuals, older adults, vegetarians, and people following very-low-calorie or low-carbohydrate diets, a multivitamin may be necessary.”

-ADA standards of care
04 – Special considerations

- Pregnancy: folic acid, iron, calcium, vitamin D, choline, omega-3 fatty acids
- Vegans
  - vitamin B12, zinc, iron, calcium, vitamin D
- Adults over 50
  - B12
- Bone health
  - calcium, vitamin D, magnesium
- Hypertriglyceridemia
  - omega 3 fatty acids
- Age related Macular degeneration
  - Age-Related Eye Disease Study (AREDS)
  - Vitamin C, E, lutein, zeaxanthin, zinc, copper

05 - Recommendations and resources

- U.S. Pharmacopeia
- National Science Foundation International
- ConsumerLab

✅ Check for:
- Certified labels
- Third party testing
05 – Recommendations and resources
Choose whole foods

- Whole foods
  - Fruits
  - Vegetables
  - Whole grains
  - Legumes
  - Nuts and seeds
  - Lean meats and fatty fish

- Benefits
  - Fiber, vitamins, and minerals
  - Phytonutrients
  - Satiety
  - Flavor
Always consult a medical provider
Supplements are not replacements for diet
Be wary of claims: “natural diabetes cure” or “replace your diabetes medicine”
Check for third party independent lab testing and certified labels
  ○ Consumerlab.com
Diabetes related supplement information
  ○ NIH: National Center for Complementary and Integrative Health
Thank you!