

Wolfberry: World's Most Nutritious Food?

Gou qi zi (“goo-chee-zee”), the Mandarin name for wolfberry, is a red berry of the Solanaceae nightshade family that includes tomato, eggplant, chile pepper and potato.

In vernacular English, gou qi zi (literally “wolf”, “energy”, “berry”) has become “goji”. For at least 2000 years, wolfberry has grown wild in China and used in common recipes and traditional Chinese medicine. 18th century Chinese farmers nicknamed gou qi zi “wolfberry” when they saw wolves feasting among the berry-laden vines during late summer at prime harvest time.

The Chinese revere wolfberry as a national treasure among the most nutrient dense of the nation's plants. This premise has stimulated scientific investigation about its potential health benefits and systematic cultivation, commercialization and now increasing export to first-world countries mainly in Europe and the USA.

Macronutrients

Wolfberry contains significant percentages of a day's macronutrient needs – carbohydrates, protein, fat and dietary fiber. 68% of the mass of a wolfberry exists as carbohydrate, 12% as protein, and 10% each as fiber and fat, giving a total caloric value of 370 for a 100 gram serving.

Soybean, another ancient Chinese plant among the world's most complete foods, is comparable across macronutrients. Although wolfberries and soybeans are similar for macronutrient content, wolfberries provide a significantly higher source of calories as energy from carbohydrates (soybeans = 173 calories). Blueberries, by contrast, do not have as much macronutrient or caloric value.

Seeds contain the wolfberry's main complement of polyunsaturated fats such as linoleic (omega-6) and linolenic (omega-3) acids.

Micronutrients

Wolfberry's diversity and high concentration of micronutrients brand it as an exceptional health food. 11 essential minerals, 22 trace minerals, 7 vitamins and 18 amino acids profile extraordinary micronutrient richness, with examples below:

7. **Calcium.** The primary constituent of teeth and bones, calcium has a diverse role also in soft tissues where it is involved in cardiac, neuromuscular, enzymatic, hormonal, and transport mechanisms across cell membranes. Wolfberries and soybeans contain 112 mg and 102 mg per 100 gram serving, respectively, providing about 8-10% of the RDI.
8. **Potassium.** An essential electrolyte and enzyme cofactor, dietary potassium can lower high blood pressure. Giving about 24% of a RDI (1132 mg/100 gram), wolfberries are an excellent source, providing more than twice the amount of soybeans.
9. **Iron.** An oxygen carrier on hemoglobin, iron also is a cofactor for enzymes involved in numerous metabolic reactions. When intake is deficient, low iron levels cause iron deficiency anemia affecting millions of children worldwide. Wolfberry's exceptional iron content, 100% DRI at 9 mg/100 grams, is twice that provided by soybeans, often regarded as the best plant source of iron.
10. **Zinc.** Essential for making proteins, DNA and functions of over 100 enzymes, zinc is involved in critical cell activities such as membrane transport, repair and growth, especially in infants. Zinc in wolfberries (2 mg/100 grams) has a high content (double the amount of soybeans), meeting 20% of RDI.
11. **Selenium.** Sometimes called the "antioxidant mineral", selenium is often included in supplements. Selenium has unusually high concentration in wolfberries (50 micrograms/100 grams), nearly equal to RDI whereas blueberries and soybeans are not important sources (8 micrograms or less).
12. **Riboflavin (vitamin B2).** An essential vitamin supporting energy metabolism, riboflavin is needed for synthesizing other vitamins and enzymes. A daily wolfberry serving (1.3 micrograms) provides the complete RDI whereas soybeans and blueberries have only trace levels of this important mineral.
13. **Vitamin C.** A universal antioxidant vitamin protecting other antioxidant molecules from

free radical damage, vitamin C content in wolfberries (20 mg/100 grams) is a multiple of equal weights of fresh oranges, blueberries or soybeans.

Phytochemicals

Wolfberries contain dozens of phytochemicals whose properties are under scientific study. Three of particular interest:

Beta-carotene. A carotenoid pigment in orange-red foods like wolfberries, pumpkins, carrots and salmon, beta-carotene is important for synthesis of vitamin A, a fat-soluble nutrient and antioxidant essential for normal growth, vision, cell structure, bones and teeth and healthy skin. Wolfberry's beta-carotene content per unit weight (7 mg/100 grams) is among the highest for edible plants.

Zeaxanthin. Wolfberries are an extraordinary source for this carotenoid important as a retinal pigment filter and antioxidant. Wolfberries contain 162 mg/100 grams.

Polysaccharides. Long-chain sugar molecules characteristic of many herbal medicines like mushrooms and roots, polysaccharides are a signature constituent of wolfberries, making up 31% of pulp weight in premium quality wolfberries. Polysaccharides are a primary source of fermentable fiber in the intestinal system. Upon colonic metabolism, fermentable or "soluble fibers" yield short-chain fatty acids which 1) are valuable for health of the colon epithelial lining, 2) enhance mineral uptake, 3) stabilize blood glucose levels, 4) lower pH and reduce colon cancer risk and 5) stimulate immune functions. Polysaccharides also display antioxidant activity.

Functional Food and Beverage Applications

Cultivated for a variety of food and beverage applications within China, but increasingly today for export as dried berries, juice and powders of pulp or juice, wolfberries are prized for their versatility of color and nut-like taste in common meals, snacks, beverages and medicinal applications. A major effort is underway in Ningxia, China to process wolfberries

for “functional” wine.

Despite no evidence from clinical research, myths of wolfberry’s traditional health benefits endure, including longevity, aphrodisia, analgesia, anti-cancer, anti-inflammatory, antiviral, and immune-stimulating properties, muscular strength, energy, and vision health.

In laboratory and preliminary human research to date, wolfberries have potential benefits against cardiovascular and inflammatory diseases, some forms of cancer, diabetes, premature aging, memory deficits, vision degeneration and lung disorders, among other diseases of oxidative stress.

Although not adequately demonstrated yet in published research, a synergy of antioxidant carotenoids (primarily beta-carotene and zeaxanthin) with polysaccharides may make wolfberries an exceptionally rich antioxidant food source.

Micronutrient density combined with key health phytochemicals like carotenoids and polysaccharides give wolfberries remarkable nutritional qualities making this berry perhaps the most nutritious plant food on Earth.

Reading

Wolfberry data from independent contract laboratories, courtesy of Rich Nature Nutraceutical Labs, Seattle; blueberries and soybeans, World’s Healthiest Foods, <http://www.whfoods.com>

Gross PM, Zhang X, Zhang R. *Wolfberry: Nature’s Bounty of Nutrition and Health*, Booksurge Publishing, North Charleston, 2006, ISBN 1-4196-2048-7

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