

LE Magazine November 2007

Super FOODS

Watercress

Benefits for Cancer Protection, Vision, and Heart Health

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A startling 30-40% of cancers are directly linked to improper diet and related factors, according to a report published this year by the World Cancer Research Fund UK.¹ Accordingly, there is no better time than now to diligently incorporate nature's most powerful cancer-fighting foods into your daily diet.

The cruciferous vegetables such as broccoli, cauliflower, Brussels sprouts, and cabbage have long been held in regard for their anticancer effects. Their little-known cousin, watercress, also shows extraordinary potential in the realm of cancer prevention and management, as well as offering the culinary versatility of a delicious leafy green. The anticancer benefits of watercress may arise from its ability to increase the level of antioxidants in the blood and to protect DNA against damage.² In fact, growing evidence suggests

that watercress may lower the risk of prostate, colon, and breast cancers, and may counteract certain processes by which cancers proliferate and spread.³⁻⁷

Watercress is an excellent source of the antioxidants vitamins A and C, as well as vitamin K, an essential micronutrient for bone health. It is also a rich natural source of lutein and zeaxanthin, two carotenoid nutrients that are gaining attention for their ability to protect vision and support cardiovascular health.⁸

Given this wealth of health benefits, it is not surprising that Hippocrates, the father of modern medicine, built his first hospital in close proximity to a stream where watercress grew so that his patients would have ready access to this life-sustaining green.⁹

CANCER PROTECTION

Cruciferous vegetables, such as watercress and broccoli, are well known for containing glucosinolates, phytochemicals that are hydrolyzed to produce isothiocyanates, which have been studied for their anticancer effects. Dietary intake of these compounds has been shown to counter breast, lung, colorectal, head and neck, and prostate cancers.³⁻⁷ Watercress is also an exceptionally rich dietary source of nasturtiin, the precursor of phenethyl isothiocyanate (PEITC).¹⁰ This compound inhibits the liver's phase I enzymes, which are responsible for activating many carcinogens in animals, and induces the liver's phase II enzymes, which are associated with enhanced excretion of carcinogens.

When human prostate cancer cells were exposed to PEITC, both proliferation (multiplication of cells) and tumorigenesis (production of tumors) were inhibited. This compound also triggered apoptosis, or the death of cancerous cells.¹¹

Similarly, crude watercress extract was "significantly protective" against three stages of the carcinogenic process in human colon cancer cells. The stages investigated were initiation, proliferation, and metastasis (spread of cancer).¹² Isothiocyanate compounds from watercress and broccoli were found to hinder the activity of matrix metalloproteinase-9, an enzyme that plays a role in progression of certain cancers by breaking down natural barriers in the body that impede the expansion of existing tumors. These watercress and broccoli-derived compounds were also shown to suppress a highly invasive breast cancer cell line.¹³

Furthermore, in laboratory models of cellular activity, watercress isothiocyanates restrained certain pro-inflammatory compounds that are associated with chronic inflammation and cancer.¹⁴



In addition, researchers at the University of Ulster recently published some of the most comprehensive and convincing work to date on the positive effects of raw watercress ingestion on certain biomarkers related to cancer risk. Sixty men and women, half of whom were smokers, participated in the study, which involved eating three ounces of raw watercress per day, in addition to the normal diet, for eight weeks. DNA damage to lymphocytes and plasma lutein, retinol, alpha-tocopherol, and beta-carotene were measured. Overall, there was a 17% reduction in basal DNA damage. Antioxidant blood levels increased, beta-carotene levels rose 33%, and lutein levels skyrocketed by 100%.² Furthermore, smokers experienced greater DNA-protective effects from watercress than non-smokers.

WATERCRESS CAROTENOIDS BENEFIT THE EYES AND HEART

Watercress is an abundant source of lutein and zeaxanthin, two carotenoids that may be particularly beneficial for the eyes and the heart.



High dietary intake of lutein and zeaxanthin is linked to a lower risk of advanced age-related macular (eye) degeneration, the most common cause of adult blindness.^{15,16} One cup of raw watercress contains over 1,900 mcg of lutein and zeaxanthin,⁸ suggesting that watercress consumption might help prevent the occurrence of vision-robbing macular degeneration.

Growing evidence suggests that lutein and zeaxanthin may also offer important protection for the cardiovascular system. Individuals with higher blood levels of lutein and zeaxanthin were found to have less atherosclerosis of the arteries of the neck than those with lower blood levels. Furthermore, people with higher blood levels of lutein were less likely to succumb to a heart attack than those with lower levels.¹⁶

ENJOYING WATERCRESS

Preparing watercress is simple. After trimming the stems, rinse the greens in cold water and dry on a paper towel or in a salad spinner. Use immediately, or store in a closed container in the refrigerator for up to four days. Watercress can take the place of lettuce in any salad, sandwich, or other recipe, and can be used as a nutritious garnish. Watercress can also be enjoyed lightly steamed, stir-fried, or in a soup.

Uncooked watercress may have greater cancer-fighting power than cooked watercress, as cooking inactivates the myrosinase enzyme that is responsible for hydrolyzing glucosinolates to beneficial isothiocyanates.¹⁷

CONCLUSION

While consuming plenty of fruits and vegetables is always a good health habit, new evidence reveals that the green leafy vegetable watercress may be particularly beneficial. This lesser-known member of the broccoli family provides a rich source of isothiocyanates, remarkable compounds that scientists now believe may help fight a wide range of cancers. New evidence shows that watercress consumption protects delicate DNA against damage that could trigger cancer, while increasing levels of protective antioxidants in the blood. Watercress provides a plentiful amount of lutein and zeaxanthin, carotenoids that are essential for macular (eye) and cardiovascular health, as well as essential vitamins A, C, and K. Try adding some of this versatile vegetable to your salads and meals today.

If you have any questions about the scientific content of this article, please call a Life Extension Health Advisor at 1-800-226-2370.

NUTRITIONAL CONTENT OF WATERCRESS

In addition to its beneficial content of cancer-fighting compounds, watercress is an excellent source of vitamins A, C, and K, lutein, and zeaxanthin.

One cup of raw watercress (34 grams) contains:⁸

- Calories 4
- Total Carbohydrates 0 g
- Dietary Fiber 0 g



- Sugars 0 g
- Protein 1 g
- Total Fat 0 g

NUTRIENTS

PERCENT OF DAILY VALUE

■ Vitamin A	■ 1598 IU	■ 32%
■ Beta-carotene	■ 959 mcg	■ N/A
■ Lutein and zeaxanthin	■ 1961 mcg	■ N/A
■ Vitamin C	■ 14.6 mg	■ 24%
■ Vitamin E	■ 0.3 mg	■ 2%
■ Vitamin K	■ 85 mcg	■ 106%
■ Folate	■ 3.1 mcg	■ 1%
■ Calcium	■ 40.8 mg	■ 4%
■ Magnesium	■ 7.1 mg	■ 2%
■ Phosphorus	■ 20.4 mg	■ 2%
■ Potassium	■ 112 mg	■ 3%
■ Sodium	■ 13.9 mg	■ 1%
■ Manganese	■ 0.1 mg	■ 4%

References

1. Available at: http://www.wcrf-uk.org/cancer_prevention/index.lasso. Accessed August 2, 2007.
2. Gill CI, Haldar S, Boyd LA, et al. Watercress supplementation in diet reduces lymphocyte DNA damage and alters blood antioxidant status in healthy adults. *Am J Clin Nutr*. 2007 Feb;85(2):504-10.
3. Pledgie-Tracy A, Sobolewski MD, Davidson NE. Sulforaphane induces cell type-specific apoptosis in human breast cancer cell lines. *Mol Cancer Ther*. 2007 Mar;6(3):1013-21.
4. Higdon JV, Delage B, Williams DE, Dashwood RH. Cruciferous vegetables and human cancer risk: epidemiologic evidence and mechanistic basis. *Pharmacol Res*. 2007 Mar;55(3):224-36.
5. Fowke JH. Head and neck cancer: a case for inhibition by isothiocyanates and indoles from cruciferous vegetables. *Eur J Cancer Prev*. 2007 Aug;16(4):348-56.
6. Hu J, Straub J, Xiao D, et al. Phenethyl isothiocyanate, a cancer chemopreventive constituent of cruciferous vegetables, inhibits cap-dependent translation by regulating the level and phosphorylation of 4E-BP1. *Cancer Res*. 2007 Apr 15;67(8):3569-73.

7. Juge N, Mithen RF, Traka M. Molecular basis for sulforaphane by sulforaphane: a comprehensive review. *Cell Mol Life Sci.* 2007 May;64(9):1105-27.

8. Available at <http://www.nutritiondata.com/facts-C00001-01c20hq.html>. Accessed July 13, 2007.

9. Available at <http://www.watercress.co.uk/did/>. Accessed July 5, 2007.

10. Palaniswamy UR, McAvoy RJ, Bible BB, Stuart JD. Ontogenic variations of ascorbic acid and phenethyl isothiocyanate concentrations in watercress (*Nasturtium officinale* R.Br.) leaves. *J Agric Food Chem.* 2003 Aug 27;51(18):5504-9.

11. Chiao JW, Wu H, Ramaswamy G, et al. Ingestion of an isothiocyanate metabolite from cruciferous vegetables inhibits growth of human prostate cancer cell xenografts by apoptosis and cell cycle arrest. *Carcinogenesis.* 2004 Aug;25(8):1403-8.

12. Boyd LA, McCann MJ, Hashim Y, et al. Assessment of the anti-genotoxic, anti-proliferative, and anti-metastatic potential of crude watercress extract in human colon cancer cells. *Nutr Cancer.* 2006;55(2):232-41.

13. Rose P, Huang Q, Ong CN, Whiteman M. Broccoli and watercress suppress matrix metalloproteinase-9 activity and invasiveness of human MDA-MB-231 breast cancer cells. *Toxicol Appl Pharmacol.* 2005 Dec 1;209(2):105-13.

14. Rose P, Won YK, Ong CN, Whiteman M. Beta-phenylethyl and 8-methylsulphonyloctyl isothiocyanates, constituents of watercress, suppress LPS induced production of nitric oxide and prostaglandin E2 in RAW 264.7 macrophages. *Nitric Oxide.* 2005 Jun;12(4):237-43.

15. Coleman H, Chew E. Nutritional supplementation in age-related macular degeneration. *Curr Opin Ophthalmol.* 2007 May;18(3):220-3.

16. Ribaya-Mercado JD, Blumberg JB. Lutein and zeaxanthin and their potential roles in disease prevention. *J Am Coll Nutr.* 2004 Dec;23(6 Suppl):567S-87S.

17. Getahun SM, Chung FL. Conversion of glucosinolates to isothiocyanates in humans after ingestion of cooked watercress. *Cancer Epidemiol Biomarkers Prev.* 1999 May;8(5):447-51.

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