

The BEETing of your Heart

An informational Newsletter about Beneficial Beets and Heart Health by Annabel Rusoff
Lehman College Dietetic Internship, February 2017



The benefits of beets - both roots and greens - are manifold, and the simple beet is more popular than ever. Beets continue to become more mainstream, and a variety of beet preparations - beet juices, beet chips, pickled beets, beet hummus, and fermented beet products are increasingly prevalent in the supermarket aisles. Beet roots are not only a great source of fiber, folate, potassium, manganese, vitamin C, and iron, they also contain polyphenols, phytosterols, and are abundant in nitrates, all of which have been shown to protect the heart.

Beets come in many varieties: white, yellow, pink, spiraled red and white, and of course, the traditional and most commonly seen *Beta vulgaris* L., or red beet root ⁽¹⁾. It is this variety of beet which has been studied most.

The pigments which make *Beta vulgaris* L. that unmistakable, gorgeous, deep red color are called betalains, which are polyphenols (natural chemicals which have antioxidant properties ⁽²⁾). Recent studies have shown that betalains can lower cancer risk and/or slow cancer progression ^(3, 4, 6). Betalains have also been shown to be anti-inflammatory agents which can lower risk of many chronic diseases and contribute to overall optimal health ⁽⁶⁾. A specific form of betalain called betanin - which is abundant in red beet roots - protects LDL cholesterol from oxidation, consequently reducing the risk of cardiovascular disease ^(3,5). Red beets also contain phytosterols, chemical structures found in plants very similar to cholesterol, which can help lower the body's cholesterol levels by promoting cholesterol excretion, also decreasing risk of cardiovascular disease.

Beets can also help with blood pressure. Beet roots contain a significant number of nitrates (NO₃) which can be converted to nitrites (NO₂) and further converted to nitric oxide (NO) in the body. Nitric oxide signals blood vessels to dilate, thereby lowering blood pressure ^(8,9,11). Clinical studies and meta analyses have repeatedly found that ingesting beets causes a significant decrease in both systolic and diastolic blood pressure as well as increased dilation of blood vessels. ^(6, 7,10,11,13).

Higher levels of nitrites are associated with increased physical activity endurance ⁽⁶⁾, and beet root ingestion has specifically been linked to improved running performance ⁽¹⁵⁾ and aerobic endurance ⁽¹⁷⁾. Since exercise is the very best way to protect your heart, endurance adds to nitrates' cardio-protective effects.

As previously mentioned, beet roots are an excellent source of potassium, a macronutrient needed for muscle contractions, therefore essential for a healthy heartbeat. Potassium is a main component of the Dietary Approaches to Stop Hypertension (DASH) diet and is readily recommended to patients with hypertension. Potassium also helps the body void excess sodium through urine and reduces tension in blood vessels. Both mechanisms reduce blood pressure and contribute to a happy, healthy heart ⁽¹²⁾.

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HOW TO ENJOY THE BENEFICIAL BEET

No matter how you slice, dice, shred, or juice them, beets are hard to beat! To get the most out of beets, raw beet root juice has been shown to have the most beneficial effects with all their nutrients intact ⁽¹³⁾. If you don't like raw beets, don't fret. Cooked, fermented, or pickled beets retain much of their nutritious value, although some of the nitrates and other nutrients may be lost during preparation ^(13, 18, 19, 20). Canned and pickled beets likely contain high amounts of sodium, so if it's heart health you're after, these choices should be limited. Current research shows little difference in chemical composition between organic and conventional beet roots ⁽¹⁶⁾, so that choice is up to you.

Whichever variety you choose, be warned that beet pigments are also an excellent dye. They'll stain your hands (and everything else), so wearing gloves is a good idea. If your urine turns red after eating beets, don't worry! This is a common after-effect of beet ingestion called beeturia ⁽²¹⁾.

And don't forget the beet greens, which are also exceptional for your health, but that's another story for a different day.

References:

- (1) USDA Natural Resources Conservation Service - Plant Classifications:
<http://plants.usda.gov/java/ClassificationServlet?source=display&classid=BEVM2>
- (2) Merriam Webster Dictionary
<https://www.merriam-webster.com/dictionary/polyphenol>
- (3) Esatbeyoglu, T., Wagner, A. E., Schini-Kerth, V. B., & Rimbach, G. (2014). Betanin- A food colorant with biological activity. *Molecular Nutrition & Food Research*, 59(1), 36-47. doi:10.1002/mnfr.201400484
- (4) Esatbeyoglu, T., Wagner, A. E., Motafakkerazad, R., Nakajima, Y., Matsugo, S., & Rimbach, G. (2014). Free radical scavenging and antioxidant activity of betanin: Electron spin resonance spectroscopy studies and studies in cultured cells. *Food and Chemical Toxicology*, 73, 119-126. doi:10.1016/j.fct.2014.08.007
- (5) Tesoriere, L., Allegra, M., Butera, D., Livrea, M.A. (2004). Absorption, excretion, and distribution of dietary antioxidant betalains in LDLs: Potential health effects of betalains in humans. *Am. J. Clin. Nutr.*, 80(4), 941-5.
- (6) Clifford, T., Howatson, G., West, D., & Stevenson, E. (2015). The Potential Benefits of Red Beetroot Supplementation in Health and Disease. *Nutrients*, 7(4), 2801-2822. doi:10.3390/nu7042801
- (7) Hobbs, D. A., Kaffa, N., George, T. W., Methven, L., & Lovegrove, J. A. (2012). Blood pressure-lowering effects of beetroot juice and novel beetroot-enriched bread products in normotensive male subjects. *British Journal of Nutrition*, 108(11), 2066-2074. doi:10.1017/s0007114512000190

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- (8) Kapil, V., Milsom, A. B., Okorie, M., Maleki-Toyserkani, S., Akram, F., Rehman, F., . . . Ahluwalia, A. (2010). Inorganic Nitrate Supplementation Lowers Blood Pressure in Humans: Role for Nitrite-Derived NO. *Hypertension*, 56(2), 274-281. doi:10.1161/hypertensionaha.110.153536
- (9) Webb, A. J., Patel, N., Loukogeorgakis, S., Okorie, M., Aboud, Z., Misra, S., . . . Ahluwalia, A. (2008). Acute Blood Pressure Lowering, Vasoprotective, and Antiplatelet Properties of Dietary Nitrate via Bioconversion to Nitrite. *Hypertension*, 51(3), 784-790. doi:10.1161/hypertensionaha.107.103523
- (10) Siervo, M., Lara, J., Ogbonmwan, I., & Mathers, J. C. (2013). Inorganic Nitrate and Beetroot Juice Supplementation Reduces Blood Pressure in Adults: A Systematic Review and Meta-Analysis. *Journal of Nutrition*, 143(6), 818-826. doi:10.3945/jn.112.170233
- (11) Webb, A. J., Patel, N., Loukogeorgakis, S., Okorie, M., Aboud, Z., Misra, S., . . . Ahluwalia, A. (2008). Acute Blood Pressure Lowering, Vasoprotective, and Antiplatelet Properties of Dietary Nitrate via Bioconversion to Nitrite. *Hypertension*, 51(3), 784-790. doi:10.1161/hypertensionaha.107.103523
- (12) American Heart Association - How potassium can help lower blood pressure
http://www.heart.org/HEARTORG/Conditions/HighBloodPressure/PreventionTreatmentofHighBloodPressure/How-Potassium-Can-Help-Control-High-Blood-Pressure_UCM_303243_Article.jsp#.WGqe8rE-KqA
- (13) Asgary, S., Afshani, M. R., Sahebkar, A., Keshvari, M., Taheri, M., Jahanian, E., . . . Sarrafzadegan, N. (2016). Improvement of hypertension, endothelial function and systemic inflammation following short-term supplementation with red beet (*Beta vulgaris* L.) juice: a randomized crossover pilot study. *Journal of Human Hypertension*, 30(10), 627-632. doi:10.1038/jhh.2016.34
- (14) Vahora, H., Khan, M. A., Alalami, U., & Hussain, A. (2016). The Potential Role of Nitric Oxide in Halting Cancer Progression Through Chemoprevention. *Journal of Cancer Prevention*, 21(1), 1-12. doi:10.15430/jcp.2016.21.1.1
- (15) Murphy, M., Eliot, K., Heuertz, R. M., & Weiss, E. (2012). Whole Beetroot Consumption Acutely Improves Running Performance. *Journal of the Academy of Nutrition and Dietetics*, 112(4), 548-552. doi:10.1016/j.jand.2011.12.002
- (16) Kazimierczak, R., Hallmann, E., Lipowski, J., Drela, N., Kowalik, A., Püssa, T., . . . Rembiałkowska, E. (2014). Beetroot (*Beta vulgaris* L.) and naturally fermented beetroot juices from organic and conventional production: metabolomics, antioxidant levels and anticancer activity. *Journal of the Science of Food and Agriculture*, 94(13), 2618-2629. doi:10.1002/jsfa.6722
- (17) Eggebeen, J., Kim-Shapiro, D. B., Haykowsky, M., Morgan, T. M., Basu, S., Brubaker, P., . . . Kitzman, D. W. (2016). One Week of Daily Dosing With Beetroot Juice Improves Submaximal Endurance and Blood Pressure in Older Patients With Heart Failure

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and Preserved Ejection Fraction. JACC: Heart Failure, 4(6), 428-437.
doi:10.1016/j.jchf.2015.12.013

- (18) Nutritiondata.com - Raw Beet Roots
<http://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2348/2>
- (19) Nutritiondata.com - Cooked beet roots, boiled with water, drained
<http://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2349/2>
- (20) Nutritiondata.com - Beets pickled, canned, solids and liquids
<http://nutritiondata.self.com/facts/vegetables-and-vegetable-products/2730/2>
- (21) Watts, A. R., Lennard, M. S., Mason, S. L., Tucker, G. T., & Woods, H. F. (1994).
Beeturia and the biological fate of beetroot pigments. *Pharmacogenetics*, 3(6), 302-311. doi:10.1097/00008571-199312000-00004