Processed food has a bad reputation as a diet saboteur. It's blamed for our nation's obesity epidemic, high blood pressure and the rise of Type 2 diabetes. But processed food is more than boxed macaroni and cheese, potato chips and drive-thru hamburgers. It may be a surprise to learn that whole-wheat bread, homemade soup or a chopped apple also are processed foods.

While some processed foods should be consumed with caution, many actually have a place in a balanced diet. Here’s how to sort the nutritious from the not-so-nutritious.

**What Is Processed Food?**

"The term processed food includes any food that has been purposely changed in some way prior to consumption," says Torey Armul, MS, RD, CSSD, LDN, a spokesperson for the Academy of Nutrition and Dietetics. "It includes food that has been cooked, canned, frozen, packaged or changed in nutritional composition with fortifying, preserving or preparing in different ways." For example, Armul considers white bread refined since most of the healthy fiber has been removed during the processing. "Any time we cook, bake or prepare food, we're processing food. It's also the origin of the term ‘food processor,' which can be a helpful and convenient tool for preparing healthy meals."

Processed food falls on a spectrum from minimally to heavily processed:

- Minimally processed foods — such as bagged spinach, cut vegetables and roasted nuts — often are simply pre-prepped for convenience.
- Foods processed at their peak to lock in nutritional quality and freshness include canned tomatoes, frozen fruit and vegetables, and canned tuna.
- Foods with ingredients added for flavor and texture (sweeteners, spices, oils, colors and preservatives) include jarred pasta sauce, salad dressing, yogurt and cake mixes.
• Ready-to-eat foods — such as crackers, granola and deli meat — are more heavily processed.
• The most heavily processed foods often are pre-made meals including frozen pizza and microwaveable dinners.

The Positives of Processed

Processed food can be beneficial to your diet. Milk and juices sometimes are fortified with calcium and vitamin D, and breakfast cereals may have added fiber. Canned fruit (packed in water or its own juice) is a good option when fresh fruit is not available. Some minimally processed food such as pre-cut vegetables are quality convenience foods for busy people.

"The trick is to distinguish between foods that have been lightly processed versus heavily processed," says Armul. "Lightly processed foods include pre-cut apple slices, hard-boiled eggs, canned tuna and frozen vegetables. These are nutritious choices and can make healthy eating more convenient for busy people. Heavily processed foods can be recognized as food not in its original form, like potato chips and crackers, or food that is not naturally occurring, such as sodas, donuts, cookies and candy."

"Ultimately, you have to familiarize yourself with the Nutrition Facts Label and ingredient list," she says. "Do more cooking and food prep at home to maximize control over the food processing."

Look for Hidden Sugar, Sodium and Fat

Eating processed food in moderation is fine, but consumers should be on the lookout for hidden sugar, sodium and fat.

Added Sugars

"Added sugars are any sugar that is not naturally occurring in the food and has been added manually," says Armul. "Just because a food is labeled 'organic' or 'natural' doesn't mean it's free of added sugars, either. The same holds true with reduced-fat and fat-free products. Added sugars often are used in low-fat foods to improve taste and consistency. Compare food labels to find the product with more protein and fiber and less saturated fat and sugars."

Added sugars aren't just hidden in processed sweets. They're added to bread to give it an appealing browned hue, and there often is a surprising amount added to jarred pasta sauces and cereal. The grams of carbohydrate on the Nutrition Facts Label also includes naturally occurring sugars which may be a significant amount in foods such as yogurt and fruit. Instead, review a product's ingredient list and look for added sugars among the first two or three ingredients including sugar, maltose, brown sugar, corn syrup, cane sugar, honey and fruit juice concentrate. Beginning in July 2018, grams of added sugars will be included on the Nutrition Facts Label.

Sodium

Most canned vegetables, soups and sauces have added salt. "Processed foods are major contributors of sodium in our diets, because salt is commonly added to preserve foods and extend shelf life," says Armul. "Choose foods labeled no salt added, low-sodium or reduced-sodium to decrease the amount of salt you’re consuming from processed foods."

We need some sodium, but we often consume much more than the Dietary Guidelines for Americans' recommendation of less than 2,300 milligrams a day.
Fats

Added fats can help make food shelf-stable and give it body. Trans fats — which raise our bad cholesterol while lowering our good cholesterol — are on the decline in processed foods, but you should still read food labels.

"The FDA has banned artificial trans fats from the food supply, but companies have until 2018 to comply," says Armul. "In the meantime, check both the Nutrition Facts Label and ingredient list for trans fats. Look for zero grams of trans fats on the label and no partially hydrogenated oils in the ingredient list. These oils contain trans fat, which does not have to be listed on the Nutrition Facts Label if it amounts to less than 0.5 grams per serving. However, even this amount is not safe to consume. If the food lists partially hydrogenated oil as an ingredient, put it back."

Reviewed October 2016

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Dr. Weil’s Anti-Inflammatory Diet And Food Pyramid

16 top sources of anti-inflammatory foods:

**Healthy Sweets**
- **HOW MUCH:** Sparingly
- **HEALTHY CHOICES:** Unsweetened dried fruit, dark chocolate, fruit sorbet
- **WHY:** Dark chocolate provides polyphenols with antioxidant activity. Choose dark chocolate with at least 70 percent pure cocoa and have an ounce a few times a week. Fruit sorbet is a better option than other frozen desserts.

**Red Wine**
- **HOW MUCH:** Optional, no more than 1 to 2 glasses per day
- **HEALTHY CHOICES:** Organic red wine
- **WHY:** Red wine has beneficial antioxidant activity. Limit intake to no more than 1 to 2 servings per day. If you do not drink alcohol, do not start.
Supplements

- **HOW MUCH:** Daily
- **HEALTHY CHOICES:** High quality multivitamin/multimineral that includes key antioxidants (vitamin C, vitamin E, mixed carotenoids, and selenium); coenzyme Q10; 2 to 3 grams of a molecularly distilled fish oil; 2,000 IU of vitamin D3
- **WHY:** Supplements help fill gaps in your diet when you are unable to get your daily requirement of micronutrients. Learn more about supplements and get your free recommendation.

Tea

- **HOW MUCH:** 2 to 4 cups per day
- **HEALTHY CHOICES:** White, green, oolong teas
- **WHY:** Tea is rich in catechins, antioxidant compounds that reduce inflammation. Purchase high-quality tea and learn how to brew it correctly for maximum taste and health benefits.

Healthy Herbs And Spices

- **HOW MUCH:** Unlimited amounts
- **HEALTHY CHOICES:** Turmeric, curry powder (which contains turmeric), ginger and garlic (dried and fresh), chili peppers, basil, cinnamon, rosemary, thyme
- **WHY:** Use these herbs and spices generously to season foods. Turmeric and ginger are powerful natural anti-inflammatory agents.

Other Sources Of Protein

- **HOW MUCH:** 1 to 2 servings a week (one portion is equal to 1 ounce of cheese, one 8-ounce serving of dairy, 1 egg, or 3 ounces cooked poultry or skinless meat)
- **HEALTHY CHOICES:** High-quality natural cheese and yogurt, omega-3 enriched eggs, skinless poultry, grass-finished lean meats
- **WHY:** In general, try to reduce consumption of animal foods. If you eat chicken, choose organic, cage-free chicken and remove the skin and associated fat. Use organic, high-quality dairy products moderately, primarily yogurt and natural cheeses such as Emmental (Swiss), Jarlsberg, and true Parmesan. If you eat eggs, choose omega-3-enriched eggs (from hens that are fed a flax-meal-enriched diet) or organic eggs from free-range chickens.

Cooked Asian Mushrooms

- **HOW MUCH:** Unlimited amounts
- **HEALTHY CHOICES:** Shiitake, enokitake, maitake, oyster mushrooms (and wild mushrooms if available)
- **WHY:** These mushrooms contain compounds that enhance immune function. Never eat mushrooms raw, and minimize consumption of common commercial button mushrooms (including cremini and Portobello).

Whole-Soy Foods

- **HOW MUCH:** 1 to 2 servings per day (one serving is equal to ½ cup tofu or tempeh, 1 cup soy milk, ½ cup cooked edamame, or 1 ounce of soynuts)
- **HEALTHY CHOICES:** Tofu, tempeh, edamame, soy nuts, soymilk
- **WHY:** Soy foods contain isoflavones that have antioxidant activity and are protective against cancer. Choose whole-soy foods over fractionated foods like isolated soy-protein powders and imitation meats made with soy isolate.

Fish And Shellfish

- **HOW MUCH:** 2 to 6 servings per week (one serving is equal to 4 ounces of fish or seafood)
- **HEALTHY CHOICES:** Wild Alaskan salmon (especially sockeye), herring, sardines, and black cod (sablefish)
WHY: These fish are rich in omega-3 fats, which are strongly anti-inflammatory. If you choose not to eat fish, take a molecularly distilled fish-oil supplement that provides both EPA and DHA in a dose of 2-3 grams per day.

**Healthy Fats**

WHAT: 5 to 7 servings per day (one serving is equal to 1 teaspoon of oil, 2 walnuts, 1 tablespoon of flaxseed, 1 ounce of avocado).

HEALTHY CHOICES: For cooking, use extra-virgin olive oil and expeller-pressed grapeseed oil. Other sources of healthy fats include nuts (especially walnuts), avocados, and seeds, including hemp seeds and freshly ground flaxseed. Omega-3 fats are also found in cold-water fish, omega-3 enriched eggs, and whole-soy foods. Organic, expeller-pressed, high-oleic sunflower or safflower oils may also be used, as well as walnut and hazelnut oils in salads and dark roasted sesame oil as a flavoring for soups and stir-fries.

WHY: Healthy fats are those rich in either monounsaturated or omega-3 fats. Extra-virgin olive oil is rich in polyphenols with antioxidant activity.

**Whole And Cracked Grains**

WHAT: 3 to 5 servings a day (one serving is equal to about ½ cup of cooked grains).

HEALTHY CHOICES: Brown rice, basmati rice, wild rice, buckwheat groats, barley, quinoa, steel-cut oats.

WHY: Whole grains digest slowly, reducing frequency of spikes in blood sugar that promote inflammation. Whole grains means grains that are intact or in a few large pieces, not whole-wheat bread or other products made from flour.

**Pasta (Al Dente)**

WHAT: 2 to 3 servings per week (one serving is equal to about ½ cup cooked pasta).

HEALTHY CHOICES: Organic pasta, rice noodles, bean-thread noodles, and part whole-wheat and buckwheat noodles like Japanese udon and soba.

WHY: Pasta cooked al dente (when it has “tooth” to it) has a lower glycemic index than fully cooked pasta. Low-glycemic-load carbohydrates should be the bulk of your carbohydrate intake to help minimize spikes in blood glucose levels.

**Beans And Legumes**

WHAT: 1 to 2 servings per day (one serving is equal to ½ cup of cooked beans or legumes).

HEALTHY CHOICES: Beans like Anasazi, adzuki and black, as well as chickpeas, black-eyed peas and lentils.

WHY: Beans are rich in folic acid, magnesium, potassium and soluble fiber. They are a low-glycemic-load food. Eat them well cooked either whole or pureed into spreads like hummus.

**Vegetables**

WHAT: 4 to 5 servings per day minimum (one serving is equal to 2 cups salad greens or ½ cup vegetables cooked, raw, or juiced).

HEALTHY CHOICES: Lightly cooked dark leafy greens (spinach, collard greens, kale, Swiss chard), cruciferous vegetables (broccoli, cabbage, Brussels sprouts, kale, bok choy and cauliflower), carrots, beets, onions, peas, squashes, sea vegetables and washed raw salad greens.

WHY: Vegetables are rich in flavonoids and carotenoids with both antioxidant and anti-inflammatory activity. Go for a wide range of colors, eat them both raw and cooked, and choose organic when possible.

**Fruits**

WHAT: 3 to 4 servings per day (one serving is equal to 1 medium-size piece of fruit, ½ cup chopped fruit, ½ cup of dried fruit).

continued on p. 4
HEALTHY CHOICES: Raspberries, blueberries, strawberries, peaches, nectarines, oranges, pink grapefruit, red grapes, plums, pomegranates, blackberries, cherries, apples, and pears - all lower in glycemic load than most tropical fruits

WHY: Fruits are rich in flavonoids and carotenoids with both antioxidant and anti-inflammatory activity. Go for a wide range of colors, choose fruit that is fresh in season or frozen, and buy organic when possible.

Water

HOW MUCH: Throughout the day

HEALTHY CHOICES: Drink pure water, or drinks that are mostly water (unsweetened tea, very diluted fruit juice, sparkling water with lemon)

WHY: Water is vital for overall functioning of the body.

Learn more about Dr. Weil’s Anti-Inflammatory Diet or watch Dr. Weil explain How to Eat: The Anti-Inflammatory Diet
Could something as simple as a quick and easy blood test save your life? Absolutely.

It is called a C-reactive protein test, and it measures the degree of HIDDEN inflammation in your body.

Finding out whether or not you are suffering from hidden inflammation is critical, because almost every modern disease is caused or affected by it.

If your immune system and its ability to quell inflammation in your body are impaired, watch out. You are headed toward illness and premature aging.

Fortunately, addressing the causes of inflammation and learning how to live an anti-inflammatory lifestyle can dramatically improve your health.

Inflammation: The Good, the Bad, and the Ugly

Everyone who has had a sore throat, rash, hives, or a sprained ankle knows about inflammation. These are normal and appropriate responses of the immune — your body’s defense system — to infection and trauma.

This kind of inflammation is good. We need it to survive — to help us determine friend from foe.

The trouble occurs when that defense system runs out of control, like a rebel army bent on destroying its own country.

Many of us are familiar with an overactive immune response and too much inflammation. It results in common conditions like allergies, rheumatoid arthritis, autoimmune disease, and asthma. This is bad inflammation, and if it is left unchecked it can become downright ugly.

What few people understand is that hidden inflammation run amok is at the root of all chronic illness we experience — conditions like heart disease, obesity, diabetes, dementia, depression, cancer, and even autism.

A study of a generally “healthy” elderly population found that those with the highest levels of C-reactive protein and interleukin 6 (two markers of systemic inflammation) were 260 percent more likely to die during the next 4 years. The increase in deaths was due to cardiovascular and other causes.

We may feel healthy, but if this inflammation is raging inside of us, then we are in trouble. The real concern is not our response to immediate injury, infection, or insult. It is the chronic, smoldering inflammation that slowly destroys our organs and our ability to function optimally and leads to rapid aging.

Common treatments such as anti-inflammatory drugs (ibuprofen or aspirin) and steroids like prednisone — though often useful for acute problems — interfere with the body’s own immune response and can lead to serious and deadly side effects.

In fact, as many people die from taking anti-inflammatory drugs like ibuprofen every year as die from asthma or leukemia. Stopping these drugs would be equivalent to finding the cure for asthma or leukemia — that’s a bold statement, but the data is there to back it up.

Meanwhile, the real effects of statin drugs like Lipitor in reducing heart disease may have nothing to do with lowering cholesterol, but with their unintended side effect of reducing inflammation.

But is taking medication the right approach to addressing the problem of inflammation?
No. It is DOWNSTREAM medicine.

Here’s how UPSTREAM medicine thinks about inflammation …

**How to Locate the Causes of Hidden Inflammation**

So if inflammation and immune imbalances are at the root of most of modern disease, how do we find the causes and get the body back in balance?

First, we need to identify the triggers and causes of inflammation. Then we need to help reset the body’s natural immune balance by providing the right conditions for it to thrive.

As a doctor, my job is to find those inflammatory factors unique to each person and to see how various lifestyle, environmental, or infectious factors spin the immune system out of control, leading to a host of chronic illnesses.

Thankfully, the list of things that cause inflammation is relatively short:

- Poor diet—mostly sugar, refined flours, processed foods, and inflammatory fats such as trans and saturated fats
- Lack of exercise
- Stress
- Hidden or chronic infections with viruses, bacteria, yeasts, or parasites
- Hidden allergens from food or the environment
- Toxins such as mercury and pesticides
- Mold toxins and allergens

By listening carefully to a person’s story and performing a few specific tests, I can discover the causes of inflammation most people.

It’s important to understand that this concept of inflammation is not specific to any one organ or medical specialty. In fact, if you read a medical journal from any field of medicine, you will find endless articles about how inflammation is at the root of problems with the particular organ or area they focus on.

So what’s the problem?

There is almost no communication between specialties. Everyone is treating the downstream effects of inflammation, but addressing the causes of inflammation that are upstream could help people who have multiple problems that are really linked together by this common root cause.

Take, for example, a man who came to see me recently. He wanted to climb a mountain and asked for my help to get healthy. He was 57 years old and took about 15 medications for six different inflammatory conditions: high blood pressure, pre-diabetes, colitis, reflux, asthma, and an autoimmune disease of his hair follicles called alopecia.

Yet when I asked him how he felt, he said “great”. I told him I was surprised because he was on so many medications.
Yes, he said, but everything was very well controlled with the latest medications prescribed by the top specialists he saw in every field—the lung doctor for his asthma, the gastroenterologist for his colitis and reflux, the cardiologist for his high blood pressure, the endocrinologist for his pre-diabetes, the dermatologist for his hair loss.

But did any of those specialists ask him why he had six different inflammatory diseases and why his immune system was so pissed off? Was it just bad luck that he “got” all these diseases — or was there something connecting all these problems?

He looked puzzled and said “no”.

I then searched for and uncovered the cause of his problems: gluten. He had celiac disease, an autoimmune disease related to eating gluten, the protein found in wheat, barley, rye, spelt, and oats.

Six months later he came back to see me. He had lost 25 pounds, had no more high blood pressure, asthma, reflux, or colitis, and said he had normal bowel movements for the first time in his life. His hair was even growing back. And he was off nearly all his medications.

7 Steps to Living an Anti-inflammatory Life

So once you have figured out the causes of inflammation in your life, gotten rid of them, the next step is to keep living an anti-inflammatory lifestyle. But how do you do that?

Here is what I recommend. It’s a disarmingly simple but extraordinarily effective way to transform your health:

- **Whole Foods** — Eat a whole foods, high-fiber, plant-based diet, which is inherently anti-inflammatory. That means choosing unprocessed, unrefined, whole, fresh, real foods, not those full of sugar and trans fats and low in powerful anti-inflammatory plant chemicals called phytonutrients.

- **Healthy Fats** — Give yourself an oil change by eating healthy monounsaturated fats in olive oil, nuts and avocados, and getting more omega-3 fats from small fish like sardines, herring, sable, and wild salmon.

- **Regular Exercise** — Mounting evidence tells us that regular exercise reduces inflammation. It also improves immune function, strengthens your cardiovascular systems, corrects and prevents insulin resistance, and is key for improving your mood and erasing the effects of stress. In fact, regular exercise is one among a small handful of lifestyle changes that correlates with improved health in virtually ALL of the scientific literature. So get moving already!

- **Relax** — Learn how to engage your vagus nerve by actively relaxing. This powerful nerve relaxes your whole body and lowers inflammation when you practice yoga or meditation, breathe deeply, or even take a hot bath.

- **Avoid Allergens** — If you have food allergies, find out what you’re allergic to and stop eating those foods—gluten and dairy are two common culprits.

- **Heal Your Gut** — Take probiotics to help your digestion and improve the balance of healthy bacteria in your gut, which reduces inflammation.

- **Supplement** — Take a multivitamin/multimineral supplement, fish oil, and vitamin D, all of which help reduce inflammation.
Taking this comprehensive approach to inflammation and balancing your immune system addresses one of the most important core systems of the body.

In the future, medicine may no longer have specialties like cardiology or neurology or gastroenterology, but new specialists like “inflammologists”.

But by understanding these concepts and core systems that are the basis of healthy living now, you don’t have to wait.
Inhibition of pro-inflammatory responses and antioxidant capacity of Mexican blackberry (Rubus spp.) extracts.

Cuevas-Rodríguez EO¹, Dia VP, Yousef GG, García-Saucedo PA, López-Medina J, Paredes-López O, Gonzalez de Mejia E, Lila MA.

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**Abstract**

Total polyphenolic and anthocyanin- and proanthocyanidin-rich fractions from wild blackberry genotypes (WB-3, WB-7, WB-10, and WB-11), a domesticated noncommercial breeding line (UM-601), and a commercial cultivar (Tupy) were evaluated for inhibition of pro-inflammatory responses [nitric oxide (NO) production, inducible nitric oxide synthase (iNOS) expression, cyclooxygenase-2 (COX-2) expression, and prostaglandin E2 (PGE2)] in RAW 264.7 macrophages stimulated by lipopolysaccharide (LPS). At 50 microM [cyanidin-3-O-glucoside (C3G) or catechin equivalent], most fractions significantly (P<0.05) inhibited all markers. The anthocyanin-rich fraction from WB-10 and the proanthocyanidin-rich fraction from UM-601 exhibited the highest NO inhibitory activities (IC50=16.1 and 15.1 microM, respectively). Proanthocyanidin-rich fractions from the wild WB-10 showed the highest inhibition of iNOS expression (IC50=8.3 microM). Polyphenolic-rich fractions from WB-7 and UM-601 were potent inhibitors of COX-2 expression (IC50=19.1 and 19.3 microM C3G equivalent, respectively). For most of the extracts, antioxidant capacity was significantly correlated with NO inhibition. Wild genotypes of Mexican blackberries, as rich sources of polyphenolics that have both antioxidant and anti-inflammatory properties, showed particular promise for inclusion in plant improvement programs designed to develop new varieties with nutraceutical potential.

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[Indexed for MEDLINE]
Quantitative comparison of phytochemical profile, antioxidant, and anti-inflammatory properties of blackberry fruits adapted to Argentina

Franco Van de Velde a, b, R, Mary H. Grace c, Debora Esposito c, María Élida Pirovani a, Mary Ann Lila c

Highlights

- Blackberries' bioactive properties characterization/quantification was performed.
- Only cyanidin-based anthocyanins were detected in all blackberry cultivars.
- Antioxidant capacity content was higher for ‘Black Satin’ and ‘Jumbo’ than ‘Dirksen’.
- ‘Black Satin’ and ‘Jumbo’ showed down-regulation of pro-inflammatory genes.
- ‘Black Satin’ and ‘Jumbo’ inhibited intracellular reactive oxidative stress production.

Abstract

The phytochemical profile by HPLC-TOF-MS of three blackberry cultivars (‘Jumbo’, ‘Black Satin’ and ‘Dirksen’), adapted to the central-east of Argentina, was determined. The antioxidant capacity by DPPH and FRAP assays, and the effect of the blackberry extracts on lipopolysaccharide (LPS)-induced nitric oxide (NO) production, reactive oxygen species (ROS) production, and biomarkers of inflammation were also evaluated. ‘Dirksen’ fruits exhibited the highest vitamin C content (24 and 14% higher than values found in ‘Black Satin’ and ‘Jumbo’, respectively). However, ‘Jumbo’ and ‘Black Satin’ fruits presented higher total phenolic contents (more than 15%) than ‘Dirksen’. Cyanidin-3-O-glucoside was the main polyphenolic compound quantified in all samples. ‘Jumbo’ and ‘Black Satin’ cultivars exhibited higher antioxidant capacity, and significantly reduced the release of ROS. The mRNA expression levels of cyclooxygenase-2 (Cox-2) and interleukin-6 (IL-6) were reduced consistently (more than 30%) by extracts of both cultivars, and showed slight suppressions on NO production. However, effective inhibition in the gene expression of interleukin-1β (IL-1β) and nitric oxide synthase (iNOS) was not observed by any extract. These results suggest the potential of blackberries...
Comparison of Watermelon and Carbohydrate Beverage on Exercise-Induced Alterations in Systemic Inflammation, Immune Dysfunction, and Plasma Antioxidant Capacity

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(This article belongs to the Special Issue Nutrition, Health and Athletic Performance)

Abstract

Consuming carbohydrate- and antioxidant-rich fruits during exercise as a means of supporting and enhancing both performance and health is of interest to endurance athletes. Watermelon (WM) contains carbohydrate, lycopene, L-citrulline, and L-arginine. WM may support exercise performance, augment antioxidant capacity, and act as a countermeasure to exercise-induced inflammation and innate immune changes. Trained cyclists (n = 20, 48 ± 2 years) participated in a randomized, placebo controlled, crossover study. Subjects completed two 75 km cycling time trials after either 2 weeks ingestion of 980 mL/day WM puree or no treatment. Subjects drank either WM puree containing 0.2 gm/kg carbohydrate or a 6% carbohydrate beverage every 15 min during the time trials. Blood samples were taken pre-study and pre-, post-, 1 h post-exercise. WM ingestion versus no treatment for 2-weeks increased plasma L-citrulline and L-arginine concentrations (p < 0.0125). Exercise performance did not differ between WM puree or...
carbohydrate beverage trials ($p > 0.05$), however, the rating of perceived exertion was greater during the WM trial ($p > 0.05$). WM puree versus carbohydrate beverage resulted in a similar pattern of increase in blood glucose, and greater increases in post-exercise plasma antioxidant capacity, L-citrulline, L-arginine, and total nitrate (all $p < 0.05$), but without differences in systemic markers of inflammation or innate immune function. Daily WM puree consumption fully supported the energy demands of exercise, and increased post-exercise blood levels of WM nutritional components (L-citrulline and L-arginine), antioxidant capacity, and total nitrate, but without an influence on post-exercise inflammation and changes in innate immune function. View Full-Text (/2072-6643/8/8/518/htm)

Keywords: endurance exercise performance (/search?q=endurance exercise performance); L-citrulline (/search?q=L-citrulline); L-arginine (/search?q=L-arginine); total nitrate (/search?q=total nitrate); ferric reducing ability of plasma (FRAP) (/search?q=ferric reducing ability of plasma (FRAP)); oxygen radical absorbance capacity (ORAC) (/search?q=oxygen radical absorbance capacity (ORAC))

▼ Figures

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Effects of watermelon supplementation on aortic blood pressure and wave reflection in individuals with prehypertension: a pilot study.

Figueroa A¹, Sanchez-Gonzalez MA, Perkins-Veazie PM, Arjmandi BH.

Abstract

BACKGROUND: Oral L-citrulline is efficiently converted to L-arginine, the precursor for endothelial nitric oxide (NO) synthesis. Oral L-arginine supplementation reduces brachial blood pressure (BP). We evaluated the effects of watermelon supplementation on aortic BP and arterial function in individuals with prehypertension.

METHODS: Heart rate (HR), brachial systolic BP (bSBP), brachial pulse pressure (bPP), aortic SBP (aSBP), aortic PP (aPP), augmentation index (Alx), Alx adjusted for HR of 75 beats/min (Alx@75), amplitude of the first (P1) and second (P2) systolic peaks, reflection time (Tr), and carotid-femoral pulse wave velocity (PWV) were evaluated in the supine position in nine subjects (four men/five women, age 54 ± 3 years) with prehypertension (134/77 ± 5/3 mm Hg). Subjects were randomly assigned to 6 weeks of watermelon supplementation (L-citrulline/L arginine, 2.7 g/1.3 g/day) or placebo followed by a 4-week washout period and then crossover.

RESULTS: There was a significant treatment effect (change in the value of watermelon minus placebo from baseline to 6 weeks) on bPP (-8 ± 3 mm Hg, P < 0.05), aSBP (-7 ± 2 mm Hg, P < 0.05), aPP (-6 ± 2 mm Hg, P < 0.01), Alx (-6 ± 3%, P < 0.05), Alx@75 (-4 ± 2%, P < 0.05), and P2 (-2 ± 1 mm Hg, P < 0.05). There was no significant treatment effect (P > 0.05) on bSBP, brachial diastolic BP (DBP), aortic DBP, Tr, P1, HR, and carotid-femoral PWV.

CONCLUSIONS: This pilot study shows that watermelon supplementation improves aortic hemodynamics through a decrease in the amplitude of the reflected wave in individuals with prehypertension.

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