

# Price-Pottenger®

*Journal of Health and Healing™*

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**How to  
Make the  
Best Food  
Choices**

**SALLY K.  
NORTON**  
on the  
Dangers  
of Oxalate

**Dining with  
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# Price-Pottenger

*Journal of Health & Healing™*

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*Cover photo of Sally K. Norton by Kenneth Brayden Matthews*  
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Founded in 1952 and known early on as the Weston A. Price Memorial Foundation, the organization later became the Price-Pottenger Nutrition Foundation to honor the invaluable contributions made by Weston A. Price, DDS, and Francis M. Pottenger, Jr., MD, to our understanding of diet and disease. Price-Pottenger is the repository for their work and that of other prominent researchers in the health and nutrition field. The Foundation continues to publish Dr. Price's *Nutrition and Physical Degeneration* as well as *Pottenger's Cats: A Study in Nutrition*, the book documenting Dr. Pottenger's classic experiment.

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## FROM THE EXECUTIVE DIRECTOR

Dear Members and Friends,

Of the many things that uplift us as we gather to celebrate the holidays and ring in the New Year, there is one health factor whose importance rivals the quality of food on the table: social connection. According to the UK-based Mental Health Foundation, “People who are more socially connected to family, friends, or their community are happier, physically healthier, and live longer, with fewer mental health problems than people who are less well connected.”

Recently, in *Hidden Brain*, a podcast hosted by Shankar Vedantam, the significance of casual connections and how they bring joy to our lives and to those of others was explored with psychologist Gillian Sandstrom, PhD. In the episode “Relationships 2.0: The Power of Tiny Interactions,” Dr. Sandstrom informs us that interactions with acquaintances—what she refers to as “weak ties”—can reduce loneliness in the face of social isolation. Her work reminds us that gestures of connection bring joy and health to the giver and receiver; this is a practice that I hope we all adopt, during the holidays and every day.

I casually met Sally K. Norton, MPH, whose “Toxins in the Kitchen” interview is featured in this issue of the Journal, at the 2021 Ancestral Health Symposium. She was heading home from the symposium by plane via LAX, which was along my route back to San Diego, and I offered her a ride. From this small gesture, a friendship and deep respect for Sally’s research into the risks of oxalate toxicity have emerged. For a vital understanding of plants that we identify as superfoods and their role in our diet, please read this interview.

Also featured in this issue is “Alice Waters Through the Years,” an interview with (and recipes from) the renowned founder of the famed restaurant Chez Panisse in Berkeley, CA, and the Edible Schoolyard Project (a nonprofit establishing organic gardens and kitchen classrooms in middle schools). Alice unexpectedly joined a Price-Pottenger hosted dinner with ancestral health leaders last summer at Lulu, a restaurant conceived by her and led by David Tanis at the Hammer Museum at UCLA. Shared interests connected us and inspired her contribution to this Journal, for which I am very grateful.

The inevitability of life and connection is that they also come with loss. With the recent passing of David Getoff, we say goodbye to a dear friend, a stalwart advocate of natural health practices, and the vice president of Price-Pottenger. On pages 27-35, we reflect on David’s many contributions and have reprinted one of his illuminating articles as a small measure to carry on his legacy of teaching.

This holiday season, my wish is that you pause the news, embrace life’s gifts, and reconnect with family, friends, and acquaintances. And, as you fill your table with a bounty of health-giving foods, remember to envelop your community with gratitude and love.

Wishing you good health and much joy,

A handwritten signature in black ink that reads "Steven Schindler". The signature is written in a cursive, flowing style.

Steven J. Schindler  
Executive Director  
executivedirector@price-pottenger.org

# Toxins in the Kitchen

## The Hidden Dangers of High-Oxalate Foods

### *An Interview with Sally K. Norton, MPH*

by Steven Schindler

*Our executive director, Steven Schindler, first met nutritionist and researcher Sally K. Norton at the Ancestral Health Symposium held in August 2021 at UCLA. This fortuitous meeting led to two recent, in-depth conversations about the dangers of dietary oxalate, a little known subject on which Sally is a leading expert. These sessions have been edited down into a single interview format providing vital information on the importance and practice of oxalate-aware eating.*

• • •

**Steven Schindler: What are oxalates and why should they be avoided or minimized?**

**Sally Norton:** Oxalates are chemical toxins that hide within many of our most popular foods, even ones that we consider “superfoods.” They are invisible culprits behind a wide range of contemporary health problems. Because many of these foods are so deeply trusted, almost no one is making the connection between their consumption and our most common maladies, including digestive issues, aches and pains, low energy, poor sleep, and worse problems. Oxalate-aware eating is critically important today, and to understand why, some knowledge of the science surrounding them is needed.

Although there are people who have never heard the term, oxalate is a very ubiquitous family of chemicals. Its parent compound is oxalic acid, a naturally occurring corrosive acid that is highly reactive. Oxalic acid is a chelator of metals, and it bonds with minerals including calcium and iron. As it interacts with these minerals, it can precipitate out to form crystals. In

scientific terminology, when oxalic acid has minerals attached to it, it is called an oxalate. But, in popular usage, the crystals, together with oxalate salts and oxalic acid, are collectively known as oxalates.

Oxalic acid is made by plants—which use it for various purposes, including defending themselves against being eaten by predators—as well as by fungi and bacteria. It is even formed in clouds and can be a component in acid rain. In addition, some oxalate is naturally produced in the human body as a metabolic waste product. Metabolic oxalate is usually made at a rate and quantity that the body is equipped to excrete, but our consumption of oxalates in plant-based foods, even at moderate levels, can lead to a condition of overload.

When we consume a high-oxalate food, such as a kiwi, we are actually eating both oxalic acid and calcium oxalate crystals. That can cause a lot of oxidative stress and cellular damage. Tiny oxalate crystals can attach to our cell membranes and cellular debris, particularly at sites where there are inflamed, infected, dying, or regenerating cells. If the cells are unable to dissolve and discard an attached crystal, the crystal will attract more oxalate particles and grow. Because we tend to eat oxalate all the time, we suffer acute stress following high oxalate meals and create a buildup in our bodies. This combination of daily stress and a toxic backlog contributes to many disease processes.

**Steven Schindler: Would you tell us more about how oxalate affects the body and what plants we commonly find it in?**

**Sally Norton:** Although most plants produce oxalate, not all of them make it at the same rate. Some contain so much oxalate that they are considered inedible. Rhubarb is a classic example of a high-oxalate plant that we use as food. If you grew up around rhubarb, you were taught not to eat the leaves because they are quite poisonous. It's oxalic acid and oxalate crystals that make them toxic. But we don't stop to think how much of the rhubarb stalk we should be eating or whether it's okay for children to consume it. In actuality, children can get sick not just from the leaves, but from the "edible" stalk itself. While rhubarb is typically not a staple used routinely, many other foods with a high oxalate content are extremely popular. Such day-to-day high-oxalate foods include potatoes, peanuts, almonds, chocolate, spinach, chard, beets, bran, buckwheat, and beans.

The most frequently recognized type of oxalate toxicity is the kidney stone. Eighty percent of all kidney stones consist primarily of calcium oxalate, which forms when oxalate accumulates in the kidneys and starts grabbing calcium. Often, doctors blame the calcium and talk about "calcium stones," but that's really a misunderstanding that lets oxalate off the hook. Moreover, kidney stones are not the most common manifestation of oxalate toxicity. Although they are a growing problem, impacting increasingly younger people and more and more females, they are said to affect "only" 12 to 15% of the population.

There are numerous more common problems associated with too much oxalate in the diet. These develop because oxalate doesn't just form crystals in the kidneys and urine; it also interferes fundamentally with the functioning of any cell exposed to it. Oxalate damages the mitochondria (the power plant of the cell), causes oxidative stress, and shortens the cell's life span. Its effects on your body can initially be subtle because you have trillions of cells. But, ultimately, the buildup of oxalate can start eroding the integrity of connective tissues and the function of glands and blood vessels.

Oxalic acid is absorbed from our food into the bloodstream, which carries it straight to the liver and then on to the heart and the lungs. It's toxic to blood cells, including circulating immune cells. It travels through the vascular system to the kidneys, which filter it out and concentrate it (increasing the chances of it crystalizing), and then the acid and crystals travel to the bladder, where they can cause irritation. People who wake frequently at night to urinate may have bladder irritation from too much dietary oxalate. That can develop into a chronic condition called interstitial cystitis, which can be life altering because you might need a bathroom every 15 minutes and have trouble holding urine. Oxalate is quite toxic to the nerves and muscles, including the sphincters that allow for proper elimination and swallowing.

Initially, a high-oxalate diet can result in less obvious symptoms, such as generalized malaise, poor concentration, joint stiffness or swelling, and muscle pain or weakness. But, over time, it can cause a wide variety of health problems, including kidney and intestinal damage, breathing disorders, gum and tooth issues, bone and connective tissue instability, arthritis, autoinflammation, cataract formation, and vascular disorders. Because oxalate is a neurotoxin, it affects brain function in ways that can bring on anxiety, depression, and dementia.



Rhubarb contains oxalate in its stalk, although there is more in the leaves.

High oxalate intake also promotes mineral deficiencies, especially of calcium and magnesium. Oxalate ions bind these minerals, blocking us from accessing them in our food and stealing them from our cells, body fluids, and bones. In addition to depriving us of essential minerals, oxalate overload creates extra demands for vitamins B6 and B1, contributing to functional deficiencies of those nutrients.

**Steven Schindler: Is there evidence of oxalate overload in ancestral communities? And what is it about our modern diet that causes high oxalate consumption?**

**Sally Norton:** I know of one set of studies, cited in a research article published in 1998, that talks about the severe abnormal tooth loss found

Selected High-Oxalate Foods	
Beans	Spinach
Bran	Beets
Whole grains	Potatoes
Buckwheat	Chocolate
Chia and poppy seeds	Rhubarb
Peanuts	Figs
Almonds and other nuts	Kiwi
Chard	Blackberries
	Black pepper
	Cumin

among some desert-dwelling hunter-gatherers from the Archaic period. In the lower Pecos region of west Texas where their skulls were found, prickly pear cactus and agave—which are very high in calcium oxalate crystals—were dietary staples

for 6,000 years. These people lost all their molars by age 25, and by age 40, they were completely toothless. We often talk about how the dentition in ancestral remains is quite lovely, but this was not the case in these people who were eating high-oxalate plants. Their remaining teeth had evidence of dental microwear, and the research article concluded that calcium oxalate crystals from their diet, which are harder than tooth enamel, had worn them down.

One thing missing from that conclusion, however, is the recognition that the teeth are not only damaged by abrasion from chewing the crystals. The blood flow to the teeth and jaw carries oxalic

acid to the area. In addition, the salivary glands concentrate oxalate to 10 to 30 times the amount in the bloodstream. That means the teeth are bathed in oxalic acid after a high-oxalate meal, and it can contribute to issues such as dental tartar, gum inflammation, and the erosion of our oral health.

In our modern diet, the impact of dietary oxalate is compounded by the constant availability of high-oxalate foods. We no longer eat seasonally, as our ancestors did. We have access to foods such as potatoes, peanuts, and spinach year-round, which was never the case in ancestral communities. We also eat high-oxalate foods in forms that ancestral populations never had, such as spinach smoothies and almond milk. So in our high-tech food era, we are in much bigger trouble than previous generations were from oxalate overload, which is contributing to all the major chronic diseases of our time. The lack of seasonality helps to keep oxalate damage unrecognized yet progressive.

All disease comes from deficiency and toxicity. I have mentioned that oxalates can cause nutrient deficiencies. But they also provide a great example of how we can become toxic from foods made by nature, not just the commodity products of industry. We've been so focused on how industrialized foods are malnourishing us, and so taken with the belief that plant-based diets are healthful, that we're overlooking the fact that some plants naturally contain poisons deserving our attention and respect.

**Steven Schindler: Is there a way to measure how much we are being affected by oxalate overload?**

**Sally Norton:** If it were easy to measure oxalate overload, the answer to that question would already be in the lexicon of healthcare and commonly known. In fact, that's a principal reason why we're oblivious to oxalate toxicity. There's really no good way to quantify the extent to which oxalates are affecting your cells and how much is accumulating in your body.

In clinical settings, the early signs of oxalate overload illness are recognized only in retrospect, if at all. Doctors don't suspect oxalate overload,

don't know what tests might be called for, and don't understand the limitations of the available tests. Until about 30 years ago, accurate measurement of blood and urine oxalate was a major technical problem. Now, even though we can measure oxalate levels more accurately, urine and blood tests still tell us little about how much oxalate resides in our bodies. They cannot tell us whether we are sick from oxalate overload or how sick we might be. Also, measures of blood and urine oxalate don't necessarily correlate with symptoms, for a variety of reasons. For one thing, symptoms don't neatly correspond to recent oxalate intake, but instead may flare up as the body releases oxalate during times of lower consumption.

We love our health metrics nowadays, and we think they are very scientific. A lot of people even carry a metric device on their wrist. But tests and metrics aren't a good way to determine if oxalates are harming you. It's better to gradually transition into a moderate (150 mg per day) then to a low-oxalate diet (50 mg per day) and carefully monitor your symptoms. The diet can offer some strong indicators, when it is implemented correctly and consistently.

Of course, this requires accurate data on the oxalate content of foods, and that can be difficult to obtain. One reason is that the oxalate content of any given food varies from sample to sample and test to test. But beyond that, the unreliability of some published data is a common source of error and confusion. You can find more accurate estimates of the oxalate content of common high-oxalate foods (and, in some cases, lower-oxalate counterparts), based on data from reputable labs, in the Resources section of my book, *Toxic Superfoods*.

Kidney researchers tell us that a safe intake level falls within the range of 150 to 200 mg per day. High-oxalate eating is typically defined as 250 mg or more per day, while diets containing over 600 mg per day are considered extremely high. It's easy for people who are

trying to eat a healthy diet to consume extremely high levels of oxalate, when a single spinach smoothie can contain around 1,000 mg.

**Steven Schindler: What is the best way for us to reduce our oxalate intake?**

**Sally Norton:** It's really not that hard to begin a low-oxalate diet. You don't have to eliminate oxalate completely, in the way that you would need to avoid gluten if you had celiac disease. What's important is to not exceed your body's threshold for toxicity. One of the major factors determining that threshold is how much the kidneys can get rid of effectively. I believe that people striving for good health are eating four to five times that amount.

Identifying the biggest deliverers of oxalate in your diet is partly a matter of recognizing your own diet style. Of the perhaps 20 or 30 foods to be aware of, you need to know which ones you eat habitually. Some people are quite attached to their potatoes, or their dark chocolate, or their spinach smoothies or beet kvass. If you live in Hawaii, you might be eating a lot of poi, which is very high in oxalate. So, it's a matter of answering the question: What are those daily habits that are probably taking you over the top with oxalates?



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That "healthy" spinach smoothie can contain 1,000 mg of oxalate.

Once you have identified the worst offenders in your diet, you can start by eliminating the one that you like the least. Gradually replace the high-oxalate foods in your diet with lower-oxalate alternatives. Go slowly to avoid destabilizing the oxalate deposits in your body and flooding your tissues; and be consistent.

Replacing high-oxalate foods with low-oxalate substitutes is easy. Low-oxalate foods include all the lettuces and almost all the greens, except the three bad guys—chard, beet greens, and spinach. Sorrel is a fourth one that hardly anyone uses in this country. In the fruit department, kiwi, starfruit, pomegranate, and blackberries are among the highest in oxalates. There are other fruits you can enjoy instead. For example, the cucurbit family is very low in oxalate. That would be all the melons, including watermelon, cantaloupe, and honeydew. Winter squashes and cucumber are cucurbits as well.

High-oxalate grains include both whole grains and the pseudo-grains buckwheat, quinoa, and teff. You can replace these with foods such as white rice or pearl barley. However, a lot of people in the ancestral space ask: Why bother with grains at all? I think that's a reasonable question, as you don't actually need grains in a healthy diet.

Once you've changed your diet to control oxalate exposure, there are a number of things you can do to support your recovery from overload. Lemon juice or another source of citrate can help support kidney function and facilitate the removal of crystals from your tissues. To use

fresh lemons therapeutically, consume at least two per day—in hot lemonade, for example—and sip some plain water afterward, to protect your teeth from the effects of the acid. Mineral supplementation can also be extremely helpful. You need calcium to bind the oxalate in your gut and facilitate its excretion in the feces. Magnesium is needed to bind oxalate, restore enzyme function, and support bowel function and urinary excretion of oxalate.

Often, a person with oxalate issues will experience a temporary worsening of some symptoms after being on a truly low-oxalate diet for a while. This could be a sign that your cells are moving stored oxalate out and undergoing damage in the process. Sticking with the diet is an important part of getting through this healing process. It's also important to stay with the diet during those times you are feeling better, to avoid exacerbating the root cause of your symptoms.

**Steven Schindler:** Are there factors that might make some people more susceptible to harm from oxalates?

**Sally Norton:** Yes, though some of these factors are not quite characterized as well as we would like. As individuals, we have epigenetic or genetic differences that can affect the processing of chemicals and potentially increase our oxalate load. These differences may affect your ability to transport oxalate or may cause your body to hold

onto it in ways that hide what is going on. For example, the immune system can wrap oxalate crystals in dead white blood cells or extruded DNA, effectively keeping their effects invisible to you for a long time. Meanwhile, they might be making your bones more brittle or your tendons stiff, or they might start damaging your vision. You won't necessarily feel bad in the short term; you might not have the inflammation, pain, fatigue, and sleep problems that can occur when oxalate is actively affecting your nerves and muscles. However, you will be building up a toxic debt that will eventually come due.



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Beautiful low-oxalate salad: arugula, mango, and blueberries.

Another factor is your absorption level. How much oxalate you put in your mouth isn't the same thing as how much enters your bloodstream. While a lot of the oxalate you eat stays in your digestive system, a certain percentage passes from the intestines into the blood, and that's called the absorption rate. According to current estimates, our normal absorption rate is between 10 and 15%—but your absorption rate can be as high as 70%, especially if you have a health condition such as leaky gut.

In leaky gut, the spaces between the cells of the digestive tract are too wide, and excess fluid

flows between the cells, carrying oxalate with it. If you have leaky gut, your absorption level will be high, and you won't need a high-oxalate diet to make yourself sick from oxalate overload. People who have undergone bariatric surgery have chronic leaky

gut and intestinal inflammation, so they can easily be overexposed to oxalate.

Your ability to move oxalate quickly out of your body is another major factor. If you have sluggish kidneys, you're not going to get rid of it as well, and you will accumulate higher levels in your blood. Then the rest of your body will have to grab it and hold onto it, to get it out of the bloodstream. You can't leave oxalic acid in the bloodstream at high levels because it disturbs electrolytes, which interferes with the heart's pacemaker function. That can lead to arrhythmias or even heart block, which is a kind of electrical heart failure.

If you have chronic inflammation from any cause, including obesity, insulin resistance, or diabetes, you are at increased susceptibility to high absorption, poor excretion, and elevated

levels of endogenous production in the liver. Note that the liver creates oxalate, it doesn't detoxify it, and the amount it creates is influenced by our daily intake of precursors, such as vitamin C. In fact, taking more than 250 mg of vitamin C a day will increase the oxalate in your body quite a bit. The use of collagen can also raise your oxalate load, as its amino acids are potentially significant oxalate precursors.

Other factors that increase your likelihood of oxalate overload and associated symptoms include a diet low in calcium and other minerals (dairy-free and vegan diets are two examples), and the frequent consumption of gut-irritating foods, such as beans, bran, whole grains, and quinoa. The repeated use of antibiotic or antifungal medications and long-term use of nonsteroidal anti-inflammatory pain medications (NSAIDs) can also make you more vulnerable to oxalate accumulation and damage.

If you have a degenerative disorder, chances are your blood and tissues will be greatly overexposed to oxalate even on a fairly conservative diet. In fact, if you have any kind of metabolic weakness or are frail in any way, oxalate overload will probably impact your health much more seriously and quickly. Eventually, too much starfruit or too many spinach smoothies could even be fatal for a person who's really frail.

**Steven Schindler: Why don't we hear more about oxalate and its potential to cause disease?**

**Sally Norton:** I talk about this in *Toxic Superfoods* early on, because people are shocked to learn that many plants that we think are so fabulous are actually harmful. Why don't we know this? I used to wonder that, too. I was angry that, as a person with a nutrition degree from a great school, working in public health, I didn't know this. Our ignorance stems from that fact that it's not in our textbooks and it's not a topic of discussion.

Oxalate overload hasn't been addressed by the medical community in the modern era, even though we now have tests and techniques that would enable us to do so. For about a hundred years, starting in the 1800s, people could get diagnosed with oxalic diathesis, which was basically the tendency to get really sick if they ate a

**Selected Low-Oxalate Foods**

Meat, dairy, and eggs	Cilantro
Fats and oils	Cucumber
Pumpkin seeds (sprouted)	Garlic
Arugula	Green peas
Avocado	Kohlrabi
Blueberries	Lettuce
Bok choy	Melons
Cabbage	Mustard greens
Cauliflower	Mushrooms
	Watercress

lot of rhubarb. They would have to stop eating the rhubarb, and then they would recover. But this diagnosis, which was later called oxalic acid syndrome, fell out of favor when modern medicine tried to get more scientific, focusing on things that we can test and develop remedies for—and oxalate toxicity is hard to test for. We hadn't even perfected some of the tests for measuring oxalate in body fluids or in foods until relatively recently. (Today, the proper execution of these tests requires knowledgeable handling of collected samples, which is rare.)

In addition, the oxalate research that has been conducted focuses exclusively on kidney stones. Oxalate does show up as a factor in cell biology and rheumatology studies because it causes problems, and there have even been some studies demonstrating that it induces breast cancer, yet these things haven't been pursued. Mostly, researchers just use oxalate as a reagent in lab vials. When we test blood for glucose, oxalate is one of the preservatives used because it destroys the cell's ability to use the glucose. This suggests that it interferes with our metabolism and probably contributes to blood sugar dysregulation. However, that is not in any of our textbooks because a lot of the basic science hasn't been completed.

Since the 1970s, the literature has shown over and over again what I think is conclusive evidence that eating a high-oxalate diet is the major driver of kidney stones. It's the same with chronic kidney disease. The major toxin that creates chronic kidney disease is oxalic acid from foods. Yet the scientific community has not

admitted that, partly due to issues around funding future research.

Nowadays, what seems to get people's attention is what can we solve with a product. Research is funded based on fads and interest levels, and things like oxalate are never going to be that popular. Telling people to eat less almonds and spinach so they won't get kidney stones just isn't sexy in today's world. And I'm sad to say that my colleagues in integrative medicine and nutrition show very little interest in this topic.

There are actually a lot of reasons why we don't hear more about oxalate. As far back as the 1930s, we knew that eating spinach could deplete the body of calcium and retard children's growth. The AMA Council on Foods and Nutrition refrained from mentioning that because of the beta-carotene and other nutrients in spinach. There's been a certain denial of the value of such information for over a hundred years, and the situation hasn't gotten any better because we believe that plants are always benevolent and benign, when in fact that's not really the case.

**Steven Schindler: Would you tell us about your personal experience with oxalates?**

**Sally Norton:** I love natural foods, and gardening and cooking at home, and I thought I knew how to eat in a healthful way. I followed the prevailing health advice, cutting salt, gluten, and sugar out of my diet, and limiting red meat and fats. For 16 years, I was a vegetarian or vegan, and after giving that up, I continued to embrace

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Dairy (and other animal source) products are naturally low in oxalate.

plant-based whole foods. Yet, beyond their connection with kidney stones, I was oblivious to the inherent problems of regularly eating high-oxalate foods. I never suspected that they could be the cause of my life-long health problems.

Starting at the age of 12, I suffered through three decades of health challenges. Over the years, I had chronic foot, joint, muscle, and back pain; sinus infections; irritable bowel syndrome; thyroid issues; reproductive problems; and a debilitating sleep disorder. At age 35, I added sweet potatoes to my diet as a daily staple to replace wheat and beans, to which I had become intolerant. Very quickly, I started developing age spots on my skin and wrinkles around my eyes, and getting stabbing muscle pains in my upper back, but I didn't see any connection with the sweet potatoes. My symptoms continued to worsen, and by age 46, I was so mentally and physically fatigued, and my back pain was so out of control, that I had to leave my career as a health researcher and grant writer.

It wasn't until three years later that I started to recognize that oxalates and arthritis pain could be connected. I began to consistently avoid my go-to high-oxalate foods—mainly, sweet potatoes and chard—and multiple personal miracles began to unfold. The sleep disorder vanished, decades of pain and joint problems receded, and I started to feel younger. Within months, my feet finally worked properly after 30 years of problems, and my ability to read, function, and do research was restored, eventually enabling me to write my book.

**Steven Schindler: What led you to write *Toxic Superfoods*?**

**Sally Norton:** Throughout my career, I basically avoided telling people how to live. I stayed in academia and designed, wrote, and supervised grants for research. I led an integrative medicine project to bring alternative and complementary therapies into the curriculum of conventional healthcare providers in medicine, dentistry, nursing, public health, and pharmacy. I was hiding out in academia because I never wanted to be in a food argument or tell people what to eat. So, it was a heavy lift for me to start working

one-on-one with people and getting into the food advice business.

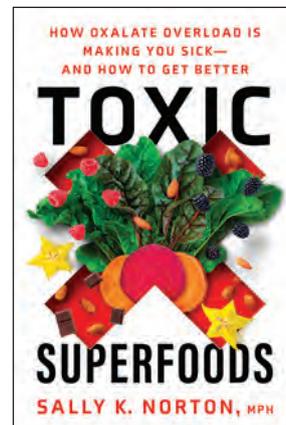
I guess the real thing that made me want to write this book and bring its message forward is that I had followed all the dietary rules in my efforts to be healthy, and I paid a dear price for it. They were wrong, and I was wrong. I was going on false notions and what amounts to a huge sin of omission by my own profession of public health nutrition. And there are many people in the same situation who are struggling with their health and don't have access to the information and resources they need.

Mostly, what we've achieved in my profession is a worldwide epidemic of obesity, diabetes, and other chronic illnesses. There has been an explosion of autoimmune conditions and all of these new, complex problems that involve immune system dysregulation and the breakdown of various systems of the body. Often, by the time we reach what should be our golden years, we're hobbling off to a lot of doctor appointments.

I know we're not meant to age like that. People who are trying to get healthy deserve to have a lot more energy, health, and well-being than I ever got to have. So I decided that I would be a tiny lighthouse at this edge of the sea, warning people: "Don't hit these shoals! Don't do what I did!" It's been an interesting trip, finding out how many people really need this information. It's gone way beyond anything I imagined.

**Steven Schindler: How does your book dispel the myth that eating plants will make us all happy and healthy?**

**Sally Norton:** One entire chapter looks at the dangerous trends and myths around plants. It discusses how our present-day dietary fashions and plant-centric food culture keep us from recognizing the nutritional shortcomings and



toxicity of high-oxalate foods. Various popular diet movements—such as the gluten-free, keto, and paleo movements—are really pushing foods such as spinach and nuts. They are leading us into an increasingly toxic way of eating, and we’re not willing to see it.

Take bran, for example, which is commonly recommended to support intestinal health, even though we have lots of long-standing science that shows the basic idea doesn’t hold up. In actuality, the less bran and fiber you eat, the better your colon will function. Today, we have the new theory that a high-fiber diet is necessary to properly feed the microbiome. However, the truth remains that scrubbing ourselves with bran and indigestible fiber to make ourselves healthier hasn’t worked out.

We’ve also bought into the mistaken idea that phytonutrients are doing something great for us. Around the 1980s, people started talking about phytonutrients as antioxidants, when in fact they are pro-oxidant toxins that stimulate healing responses from the body as a defensive mechanism. We get antioxidant responses from cells in petri dishes, but that is not how the body actually works. In the digestive process, our body’s

machinery is trying to protect us from absorbing these phytochemicals, and then to quickly disarm them with liver and digestive enzymes. In *Toxic Superfoods*, I discuss a handful of studies that demonstrate when you remove these supposed antioxidant compounds from the diet, the oxidative stress of the body goes down. The evidence is that the body is much happier without them.

I share that in the book because I want people to be okay with the idea that you don’t have to eat chard and spinach. Avoiding them won’t put you in a nursing home or make you sick. Rather, these foods can cause illness and make you feel old before your time. In fact, there isn’t a strong argument to keep eating any high-oxalate foods.

When you eliminate high-oxalate foods from your diet, you may find that the way your body responds will be dramatic. This is very real to those of us who have lived it. Many people have found relief from—or even reversed—a wide range of conditions and syndromes, simply by swapping their high-oxalate foods for low-oxalate alternatives. In the long term, oxalate-aware eating can potentially prevent injury, arthritis, and osteoporosis, and can slow age-related degeneration. Undertaken correctly, it can dramatically improve your health and quality of life. 📖

## BIOGRAPHICAL NOTES

**Sally K. Norton, MPH**, is a nutritionist with a unique specialty: warning us that healthy eating can get us into trouble. Sally earned her nutrition degree from Cornell University and a master’s degree in Public Health from UNC-Chapel Hill. Her prior career included health professions education in the principles and practices of integrative medicine at the University of North Carolina at Chapel Hill, and public health research design and administration at Virginia Commonwealth University. She is the author of the book *Toxic Superfoods* (December 2022). Sharing her own experience and knowledge of oxalates has helped many people improve their health and recover from serious illnesses, chronic pain, kidney problems, osteopenia, and even chronic infections just by making simple changes to their diet. You can find Sally and learn more at [sallyknorton.com](http://sallyknorton.com) or on Instagram @[toxicsuperfoods\\_oxalate\\_book](https://www.instagram.com/toxicsuperfoods_oxalate_book).

**Steven Schindler** is the executive director of Price-Pottenger. A nonprofit strategist and business management expert, Steven is leading a community-informed evolution of Price-Pottenger’s mission to advance the organization’s impact on public health.



Photo by Sharona Dayan, DDS, DMSc

Sally K. Norton and Steven Schindler

# Alice Waters Through the Years

## Interview by Price-Pottenger

*Alice Waters is a chef, author, and food activist, and founder of the renowned Chez Panisse restaurant in Berkeley, CA. We are extremely pleased to share with you this interview and a selection of classic recipes from Chez Panisse.*

• • •

*What types of food were you exposed to growing up?*

I grew up in New Jersey in the 1950s, right at the dawn of what I call “fast food culture.” For children those days, it was all fish sticks and fruit cups. I was a picky eater as a child, and although my mother never really learned to cook, my parents planted a victory garden in our yard. I loved picking the vegetables with my sisters in the summer.

*How did your first trip to France change your perspective on food?*

It wasn't until my first trip to Paris, my junior year of college, that I realized food was going to change my life. I tell the story often, but while I was in Paris, someone gave me a tiny strawberry grown in the French countryside, and I had never tasted anything like it before in my life. The beauty I experienced in that strawberry was transformative for me. France was truly a slow food nation then—they only ate food that was grown nearby and without pesticides. It was such a stark contrast to the fast food culture of my childhood in America.

*Did the political activism of the 1960s affect your understanding of our food system?*

The energy of that time permeated everything for me. Seeing what we were able to accomplish through activism, with the war in Vietnam, with civil rights, with free speech, made me believe that if we all worked together, we could really save the world. And I still believe it.

*Why did you start Chez Panisse, and what made it different from other restaurants?*

I just wanted a place to eat with my friends where I could recreate that experience I had in France. Something simple and beautiful. I loved the idea of a fixed menu because you would eat things you might not have ordered otherwise, and when everyone's eating the same thing, you can have a wonderful shared sensory experience. I wanted Chez Panisse to feel like you're eating at home with your friends.

*What is the Slow Food movement, and have you seen changes in its focus over the past 30 years?*

My dear friend Carlo Petrini, who founded the international Slow Food movement, wanted to change the world by focusing on what we all



Photo by Amanda Marsalis

have in common—food. I share his belief that the way we’re going to transform the world and reverse climate change starts with how we feed ourselves and our communities. The focus has not changed, but I have certainly felt the urgency of this movement grow more and more intense as our planet is ravaged by greed, convenience culture, and unsustainable food procurement practices.

*Would you tell us about the Edible Schoolyard Project?*

I started the Edible Schoolyard Project because I know that beauty is the language of care, and that children deserve beauty in their lives. By preparing something beautiful and delicious for children, you can communicate to them that they matter. The curriculum is meant to help deepen their understanding of and relationship with food, facilitate learning the skills of cooking and gardening, build their capacity for critical examination of the food system, and develop their agency to effect change in their own lives and in their communities.

*Why is it so important to include food education in the schools?*

Everybody eats and everybody goes to school, so to me it just makes sense. It’s crucial that we teach our children the values they need to live on

The Edible Schoolyard Project is a nonprofit organization dedicated to the transformation of public education by using organic school gardens, kitchens, and cafeterias to teach both academic subjects and the values of nourishment, stewardship, and community.

Founded in 1995 by chef, author, and activist Alice Waters, the Edible Schoolyard Project began as an idea to transform the food experience at a public middle school in Berkeley, California. As the idea took shape, a coalition of educators, families, farmers, cooks, and artists joined the effort, working closely with students to create a flourishing garden and kitchen classroom.

Edible education provides hands-on experiences that connect students to food, nature, and each other; and it systematically addresses the crises of climate change, public health, and social inequality.

—edibleschoolyard.org

this planet together: nourishment, stewardship, and community.

*What is the significance of eating seasonally?*

Eating seasonal food is the only way to taste food the way it’s supposed to taste—ripe and fresh. Chez Panisse was built around seasonality.

*How can our food choices address our current environment and climate crises?*

Of course, the way our food is produced drastically impacts our climate. It is critical that we address our food systems and mitigate the impacts of climate change before the converse is also true. It is also critical that we take care of our workers who care for the land that grows our food, and support small local farmers who grow food organically and regeneratively. Or plant your own garden!

*How can people best incorporate organic and regenerative foods into their lives on a limited budget?*

Grow your own food. Growing your own food is like printing your own money. You don’t even need a dirt patch—you can grow almost anything in a clay pot!

*Do you have any plans that you would you like to let us know about?*

Currently, I am working with the University of California, Davis to develop plans for an Institute for Regenerative Agriculture and Edible Education in Sacramento. I’m thrilled to partner with the UC system because I truly believe that in order to spark global change, our school food procurement systems are the best place to start. We want to create a model to help schools in California (and eventually around the world) to develop relationships with and buy food directly from local farmers and purveyors without the middle men; that will provide the tools needed for schools to provide students with food that’s diverse and affordable. I’ve been advocating for years for free, nutritious, organic lunches in all public schools, and that dream has now expanded to the Institute. 📖

*Alice Waters is the author of numerous books, including We Are What We Eat: A Slow Food Manifesto (2021). Learn more about her work and the Edible Schoolyard Project at edibleschoolyard.org.*

# Classic and Seasonal Recipes from Alice Waters

## BAKED GOAT CHEESE WITH GARDEN LETTUCES

*This dish has been on the menu of the upstairs café at Chez Panisse since it opened. Delicious as a first course, it can also be served as a meal, or as a combination salad-and-cheese course. The goat cheese and crumbs can be prepared ahead.*

Serves 4

½ pound fresh goat cheese log (about 2 inches wide and 5 inches long)  
1 cup extra-virgin olive oil  
3 to 4 sprigs fresh thyme, chopped  
1 small sprig rosemary, chopped  
½ sour baguette, preferably a day old

1 tablespoon red wine vinegar  
1 teaspoon sherry vinegar  
Kosher salt and freshly ground pepper, to taste  
¼ cup extra-virgin olive oil, walnut oil, or a combination  
½ pound garden lettuces, washed and trimmed

### Instructions:

Carefully slice the goat cheese into 8 disks. Pour the olive oil over the disks and sprinkle with the chopped thyme and rosemary. Cover and refrigerate for several hours or up to a week.

Preheat the oven to 300° F. Cut the baguette in half lengthwise and dry out in the oven for 20 minutes or so, until dry and lightly colored. Grate into fine crumbs on a box grater or in a food processor. If made ahead, store in a self-sealing plastic bag.

When ready to assemble the salad, preheat the oven to 400° F. Spread the breadcrumbs on a plate. Remove the cheese disks from the marinade and roll them in the breadcrumbs, coating them thoroughly. Place the crumb-coated cheese on a small baking sheet and bake for 6 minutes, until the cheese is warm and the crust is browned.

Place the vinegars in a small bowl and season with salt and freshly ground pepper to taste. Whisk in the olive oil. Taste for seasoning and adjust.

Toss the lettuces lightly with the vinaigrette and arrange on 4 salad plates. With a spatula, carefully place two disks of the baked cheese on each plate, and serve.



Photo courtesy of Alice Waters

## PORK RIB ROAST WITH ROSEMARY AND SAGE

*At Chez Panisse, the pork is spit-roasted over an open hearth, but this can be cooked on a grill or in the oven. When you buy the roast, ask the butcher to remove the chine bone and separate the thin layer of meat on the ribs, stopping about an inch from the end of the bones. This allows you to season the interior of the meat. Season the meat 1 to 2 days before cooking, if possible. Serve this with Fresh Shelling Beans (see recipe on next page).*

### Serves 4 to 6

1 bone-in 4- or 5-rib pork loin (about 2½ to 3 pounds)  
4 garlic cloves, peeled and chopped  
Kosher salt

Freshly ground black pepper  
2 tablespoons chopped rosemary  
2 tablespoons chopped sage leaves  
Water or stock

### Instructions:

Starting on the rib side, use a sharp knife to cut closely along the bones to separate most of the roast from the ribs; leave the last ½ inch or so attached to make retying easier. Rub the garlic on bones and into the loin meat. Sprinkle liberally with salt, ground pepper, and half the rosemary and sage. Rub the seasonings into the meat.

Reassemble the roast and secure with several pieces of kitchen string. Liberally season then rub the exterior with salt, pepper, and the remaining herbs. Lightly cover the meat and refrigerate.

Remove the roast from the refrigerator an hour or so before cooking it to let it come to room temperature.

Preheat the oven to 400° F. Put the meat in a roasting pan, bone side down; the bones make a sort of natural roasting rack. Roast for about 30 minutes, then turn the meat over, and cook another 30 minutes or so, until the internal temperature registers 130° F and the exterior is browned.

Remove the roast from the pan and place on a cutting board, but leave the oven on. Let the roast rest for 15 or 20 minutes before carving.

Meanwhile, skim off and discard some of the fat from the roasting pan. Pour some water or stock into the pan, and set over two burners. Bring to a simmer, scraping up all the browned bits on the bottom of the pan. Pour the juices into a small saucepan and keep warm.

When ready to serve, remove the strings from the roast, and cut the meat into thick, bone-in chops. You can also fully remove the rib bones from the meat. Slice between the bones to separate them, then return the bones to the oven for a few minutes to make them crustier while you slice the roast.

Add any juices released from the roast to the juices in the pan. Serve the roast with the warm juices, the rib bones, and Fresh Shelling Beans.



## FRESH SHELLING BEANS

*While dried beans are wonderful, there is a moment in time when fresh shelling beans are superb. Chez Panisse uses this recipe for all sorts of varieties, including cranberry, cannellini, flageolet, lima, and butter beans.*

### Serves 4

3 pounds fresh cranberry or cannellini beans  
in the pod ( 3 to 4 cups shelled beans)  
Extra virgin olive oil, to taste  
Kosher salt, to taste

1 bay leaf  
A few sage leaves or a sprig of rosemary  
or thyme  
Freshly ground black pepper

### Instructions:

Shell the beans. Put them in a large heavy pot or an earthenware bean pot and cover with water by 2 inches. Add a splash of olive oil, a good pinch of salt, the bay leaf, and the sage leaves or sprig of rosemary or thyme. Bring to a boil, reduce to a simmer, and cook gently for 30 to 45 minutes, until the beans are tender throughout. Taste one to ensure that they are cooked through.

Turn off the heat, and let the beans cool down in the broth. Reheat gently when ready to serve. Pour off most of the broth (save it for soup or some other use), season the beans with salt and black pepper, and drizzle with olive oil.

*Note: You can add chard, collards, large rocket leaves, and kale to the beans. If the greens are tough, boil them a little, then sauté them with olive oil, garlic, maybe a little hot pepper (particularly good with broccoli rabe), salt, pepper, and a splash of red wine vinegar. Serve as a side or folded through the beans.*



Photo courtesy of Alice Waters

## KING SALMON IN FIG LEAVES

*It's worth taking the time to hunt down fig leaves, perfect for keeping salmon moist. Sauced with a little nasturtium butter, this fish dish is easy, beautiful, and wonderfully aromatic. You can also cook the filets, or a whole salmon, on a grill; the fig leaves will prevent the fish from sticking. Nasturtium blossoms are generally available in the produce section of upscale grocers or at farmers' markets.*

### Serves 4 to 6

6 skinless salmon filets (about 2 pounds total),  
pin bones removed  
Extra virgin olive oil  
Kosher salt and freshly ground black pepper,  
to taste  
6 large young fig leaves, washed

6 tablespoons butter, softened  
1 teaspoon lemon juice  
½ teaspoon finely chopped lemon zest  
1 medium shallot, finely diced  
24 nasturtium blossoms (see note)

### Instructions:

Preheat the oven to 400° F. Lightly coat the salmon with olive oil, and season with salt and freshly ground pepper.

Wrap each portion of fish individually in a fig leaf, folding the edges of the leaf over the fish. It is all right if the fish is not completely enclosed.

Prepare the nasturtium butter: Stir together the softened butter, lemon juice, lemon zest, and shallot. Remove the stems from the nasturtiums, chop the blossoms, and stir into the butter. Season with salt and pepper. Let the butter sit for a few minutes, taste, and adjust the seasoning.

Leave the butter at room temperature while you bake the fish.

Place the salmon on a baking sheet and bake in the upper part of the oven until the fish is just cooked through, 6 to 9 minutes.

Transfer the salmon packages to a serving platter or individual plates. Peel the fig leaves back to expose the salmon and spread some of the nasturtium butter on each portion.

*Note: You can replace the nasturtiums with herb blossoms or a few chopped capers.*



Photo courtesy of Alice Waters

## PIZZA WITH SWEET AND SPICY PEPPERS, CAPERS, AND FRIED ROSEMARY

*In the 1980s, Alice Waters took pizza to a new level. Her “California-style” pies were topped with seasonal ingredients such as radicchio, wild mushrooms, tapenade, pesto, and fresh herbs. This pizza is garnished with fried rosemary. You can find “OO” flour in the baking aisle of well-stocked grocery stores.*

### Makes 1 pizza

#### For the dough:

¾ cup lukewarm water, divided  
2 teaspoons active dry yeast  
¼ cup rye flour  
1 tablespoon olive oil  
½ teaspoon kosher salt plus more  
as needed  
1 cup bread flour  
¾ cup “OO” flour

#### For the topping:

3-4 sprigs of rosemary, leaves removed  
Rice bran oil  
1 cup thinly sliced sweet pepper  
Red wine vinegar  
1 cup grated whole-milk mozzarella  
1 tablespoon capers, rinsed  
¼ cup thinly sliced red onions  
Chile flakes

#### Instructions:

Make the dough sponge by mixing together ¼ cup of water, the yeast, and the rye flour. Let it rise 20-30 minutes, then add another ½ cup of lukewarm water, the olive oil, salt, and both the bread and “OO” flours. Mix the dough with a wooden spoon, then knead on a floured board. It will be soft and a little sticky. Use quick light motions with your hands so the dough won’t stick. Add more flour to the board as you knead but no more than is absolutely necessary. A soft moist dough makes a light and very crispy crust. Knead for 10 to 15 minutes to develop strength and elasticity in the dough.

Rub a bowl with olive oil; put the dough in the bowl and oil the surface of the dough to prevent a crust from forming. Cover the bowl with a towel and put it in a warm place, approximately 90 to 110° F. An oven heated just by its pilot light is a good spot. Let the dough rise to double its size, for about 2 hours, then punch it down. Let it rise about 40 minutes more, then shape the pizza.

Meanwhile, fry the rosemary leaves: In a shallow pan, heat a half inch of rice bran oil to medium high. Test a rosemary leaf or two. If the oil sizzles, add the remaining leaves. Fry for about 10-15 seconds, watching carefully so they don’t burn. Remove with a slotted spoon to a paper towel-lined plate to drain.

Preheat the oven to 500° F. Season the sweet peppers with a pinch of salt and a few drops of red wine vinegar. Top the dough with the mozzarella, rinsed capers, red onions, a pinch of chile flakes, and sweet peppers. Bake the pizza until the crust is nicely browned. Remove and garnish the pizza with a sprinkle of the fried rosemary leaves.



Photo courtesy of Alice Waters

## BRAISED DUCK LEGS WITH LEEKS AND GREEN OLIVES

*This especially satisfying one-pan dish is delicious served with soft polenta, mashed potatoes, or shell beans. Good choices for the green olives are unpitted Lucques or Picholines.*

### Serves 4

4 duck legs (drumsticks and thighs, attached)	6 thyme sprigs, leaves only
Salt	6 parsley sprigs, leaves only
Freshly ground black pepper	1 bay leaf
2 tablespoons olive oil	1 cup green olives
2 leeks, white and pale green parts only, washed and coarsely chopped	½ cup white wine
1 carrot, peeled and coarsely chopped	1½ cups chicken broth
	1 strip of lemon zest

### Instructions:

Trim the excess fat from the duck legs. Several hours ahead or the night before, season with salt and black pepper. Cover and refrigerate.

Preheat the oven to 425° F. In an ovenproof skillet just large enough to hold the duck legs comfortably, heat the olive oil. Add the leeks and carrot, and cook over medium heat for 3 minutes. Stir in 1 teaspoon salt, thyme, parsley, bay leaf, and olives. Cook for 3 more minutes. Place the duck legs in the skillet, skin side down. Add the white wine, chicken broth, and lemon zest to the skillet.

The liquid should be about 1 inch deep; add more liquid if needed. Raise the heat, bring to a simmer, and immediately put the skillet in the oven. After 30 minutes, take the pan from the oven and turn the legs skin side up. If necessary, pour off and reserve some of the liquid so that all the duck skin is exposed. Turn the oven down to 325° F and continue cooking for 1 to 1½ hours more. The duck is done when the skin is browned and the tip of a knife slips easily in and out of the meat.



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Set the duck legs aside and pour the braising juices and vegetables into a small bowl. Allow the liquid to settle, then skim off and discard the fat. The duck legs will render a surprising amount of fat. Taste for salt and correct the seasoning if needed. If it's too thin, reduce the braising liquid to concentrate it. Pour the liquid and vegetables back into the skillet with the duck legs on top. Just before serving, return to a simmer and reheat for a few minutes.

### Variations:

- Pitted olives can be substituted, but use fewer, about ½ cup, and don't add them to the braise until the last 15 minutes of cooking.
- Substitute dry sherry for half the wine.
- Substitute dried fruit such as prunes or figs for the olives. Use red wine instead of white and add a piece of bacon or pancetta to the braise. Omit the lemon zest.
- Substitute chicken legs for the duck legs. Reduce the cooking time by 30 minutes.

## BRUSSELS SPROUTS GRATIN

Serves 4

1 pound Brussels sprouts  
2 slices bacon or 3 slices pancetta, cut into ½-inch pieces  
Salt  
Freshly ground black pepper  
½ cup half-and-half, or a mixture of half-and-half and heavy cream  
⅓ cup fresh breadcrumbs  
Thin shavings of butter



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### Instructions:

Trim the outer leaves and stems from the Brussels sprouts. Cook until tender in abundant salted boiling water, about 10 to 12 minutes. Drain the sprouts well and chop coarsely.

Put the bacon or pancetta into a heavy pan over medium heat and cook until just rendered and limp. Add the chopped sprouts. Season with salt and black pepper. Stir and cook for a few minutes.

Butter a gratin or baking dish. Add the sprouts and bacon and spread evenly. Pour the half-and-half or cream mixture over it. Sprinkle the breadcrumbs over the sprouts. Top with the butter shavings. Bake in a 400° F oven for 20 to 25 minutes or until the crumbs are golden and the liquid is bubbling.

**Variation:** Add chopped thyme and garlic to the sprouts with the bacon.

## LONG-COOKED BROCCOLI

*Long-cooked broccoli is cooked until it resembles a coarse purée. It's delicious on croutons, tossed with pasta, or as a side dish.*

Makes 2½ cups

1½ pounds broccoli	Salt
6 tablespoons olive oil	1 cup water
6 garlic cloves, peeled and sliced	Juice of 1 lemon
A pinch of dried chile flakes (optional)	

### Instructions:

Cut the stems from the broccoli florets. Trim off and discard the dry ends of the stems; peel the rest and slice thin. Divide or chop the florets into small pieces. Warm the olive oil in a heavy-bottomed pot over medium heat and add the broccoli, garlic, chile flakes, and salt. Cook for a few minutes, stirring occasionally.

Add 1 cup of water and bring to a boil. Lower the heat to a bare simmer, cover the pot tightly, and cook until very tender, about 1 hour. Stir occasionally, adding water if the broccoli starts to dry out and stick. When the broccoli is completely tender, stir briskly (the broccoli will be falling apart) and season with the lemon juice. Taste for seasoning and add salt, lemon juice, or oil as needed.

*Reprinted by permission of Alice Waters. The recipes on pages 15-19 are from Six Classic Recipes from the Chez Panisse Café. The remainder are from Alice's book The Art of Simple Food: Notes, Lessons, and Recipes from a Delicious Revolution.*

# Kayinja Banana (Uganda)

by Dan Saladino

The world's largest collection of banana diversity isn't in one of the regions where most bananas grow—in South East Asia, Africa or Latin America. It's in Belgium. The University of Leuven is home of the International Musa Germplasm Collection ('Musa' being the genus the banana belongs to). This is a living treasury of more than 1,500 types of banana with a bewildering array of sizes, colours and flavours. The Blue Java from Indonesia has a soft, unctuous texture and tastes of vanilla ice cream, while the Ele Ele banana, one of the plants introduced to Hawaii by South Pacific settlers, is picked green and cooked as a vegetable. Some types of banana taste like strawberries or apples; some have fuzzy skins; and one Chinese banana is so aromatic it's been given the name Go San Heong, meaning 'you can smell it from the next mountain'. Yet despite all its diversity, the banana is the fruit example par excellence of crop monoculture (crops of single variety).

Half of all the bananas in the world are globally traded and grown with the sole purpose of crossing the world in shipping containers. In 2019, this added up to more than 20 billion tonnes, £14.7 billion worth, and helped to make the banana the world's favourite fruit. The international trade is based entirely around just one variety: the Cavendish, a low-price, ubiquitous and super-specialised fruit. The Cavendish dominates the global fruit trade not just because of its taste but because of its biology, its size and shape, the thickness of its skin and the way it ripens. All of these things mean it can be grown, picked and shipped to every port in the world, transported to the biggest cities and the smallest villages. Despite the distances involved, when it arrives on supermarket shelves, it still manages to be one of the cheapest foods on offer.

What makes it the unrivalled superstar of monocultures is that every single Cavendish is a clone. This plant can't reproduce itself from seed (unlike wild bananas). Instead, some of the suckers the Cavendish grows underground are cut from the main stem and replanted (botanically speaking, the banana is a giant herb and not a tree). This makes it a highly prolific plant, but its clonal existence has drawbacks. The Cavendish has no way of evolving and its immune system can't adapt to new threats. In plantations filled with genetically identical bananas, if a pathogen can get to one plant, it can get to them all. And this is exactly what is happening.

On several continents the Cavendish is dying, entire plantations being killed off by an incurable disease, tropical race 4 (also known as TR4, Panama disease or Fusarium wilt). The global food system is now so interconnected the disease has spread between farms on different sides of the world. India, Australia, Africa and Asia have all been affected, including China. Recently, the disease was discovered for the first time in the biggest banana-growing region of all, Latin America. A few spores carried on a plant, a spade or on the clothing of a worker is all it takes to contaminate a plantation, and once it starts to spread through the soil, growing the Cavendish on that land is no longer an option. Although the crops most affected are the vast monocultures of Cavendish, the disease is so aggressive it can spread from these plantations and infect other varieties grown by small-scale farmers. If TR4 spreads further it will severely disrupt supplies of a favourite food in the West, but for half a billion people in Africa, Asia and Latin America, the consequences will be far more serious. In these parts of the world, bananas are a major source of calories, an important part of food

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"Kayinja Banana" from *Eating to Extinction: The World's Rarest Foods and Why We Need to Save Them* by Dan Saladino. Copyright © 2021 by Dan Saladino. Reprinted by permission of Farrar, Straus and Giroux. All Rights Reserved.

security, a way of making a living and a food of great cultural importance.

It's worth knowing how the Cavendish came to dominate the world not only because it's such an extraordinary example of food colonialism on a grand scale, but also because it shows how we changed the global food system (and if we can do that once, we can do it again). Its global story begins in 1826 when an Irish botanist called Charles Telfair chanced across a banana plant growing in a family garden in southern China. Impressed by what he saw and the fruit he tasted, he took the plant on the next leg of his journey, which was to Mauritius. From there, the banana came to the attention of Britain's foremost collector of tropical plants, the sixth Duke of Devonshire, William Cavendish, who planted it in the greenhouse on his Chatsworth estate in Derbyshire (where the 'Cavendish', as the variety became known, is still grown to this day). Word spread quickly about 'this highly interesting and most valuable plant ... a native of China', and when the English missionary John Williams travelled to islands in the South Pacific in the 1830s, he took some of the Chatsworth banana plants with him, along with their new name, the Cavendish. Only one of the plants survived the journey, and from its suckers came every banana grown on Samoa, Tonga, Fiji and Tahiti for the next one hundred years.

But this banana wasn't destined to become the world's number one fruit straight away. At the same time as the Cavendish was being taken from China to England and the South Pacific, another variety of banana was making its way around the world. This was the Gros Michel, aka the 'Big Mike' (a half-sibling of the Cavendish). It had been discovered by a botanist in southern China and taken to a garden in the French colony of Martinique. From there, it spread across the Caribbean and into Central America. When faster steamships started to cross the Atlantic and Pacific oceans in the 1860s, the banana trade was born. In 1866, the very first shipment of bananas arrived in New York City from Colombia. The person who realised the full potential of this relatively unknown and exotic fruit was a sea captain from Cape Cod named Lorenzo Dow Baker.

In 1870, Baker took on a commission to transport gold miners to the Orinoco River in Venezuela. On the return journey, he landed in Jamaica for repairs, and in the local markets tasted the Gros Michel. He was so impressed, he decided to take a chance by buying 160 bunches to take back to New Jersey to sell. The skin of the Gros Michel was thick enough to preserve it for the two-week journey and by the time they arrived in the US, the bananas had ripened to perfection. They caused a sensation and made Dow Baker a profit. The rise of the Gros Michel as the top banana was under way.

At this point, a 25-year-old wholesaler enters the story. Andrew Preston convinced Dow Baker he could make the obscure banana more popular than apples. The company they founded in 1885 (later called the United Fruit Company and now called Chiquita) purchased land in Latin America and established banana plantations, using a workforce of indigenous labourers. Because the cold chain was also taking shape around this time, the bananas started to be sold around the



Banana Vendor, Uganda. Rod Waddington, Kergunyah, Australia, CC BY-SA 2.0, via Wikimedia Commons

world. By the 1940s, tens of millions of hectares of the Gros Michel had been planted across Central and South America. This single variety of banana transformed not only landscapes but also entire economies. In Latin America, the United Fruit Company became so powerful it was known as *el pulpo*, the octopus, because of the long reach of its tentacles. In the 1930s and 40s, under the Guatemalan President Jorge Ubico, the company gained control of the majority of Guatemala's cultivated land, which brought the promise of cheap labour. As well as dominating the country's banana production, it built railways, laid down telegraph lines and constructed sea-ports, all essential to the running of the banana trade. The fruit company effectively functioned as a state within a state.

In the early 1950s, a reformer, Jacobo Arbenz Guzmán, won office and attempted to confiscate unused land from the United Fruit Company and redistribute it to local families. Soon after, he was overthrown in a coup planned by the American CIA and forced into exile. Under the succession of military rulers and three decades of vicious civil war, nearly a quarter of a million people died, many of them peasant farmers. This remains one of the starkest illustrations of how a food commodity, and its control by a corporation, can help shape a nation's fate. Meanwhile, as ever larger monocultures of the Gros Michel

were being planted, the conditions for its downfall were being put in place.

In the centre of origin of the banana, the jungles of South East Asia, wild bananas co-evolved with fungal diseases (including the ancient ancestors of TR4). As these diseases changed over time, so did the plant; an ongoing process in which the host (the banana) and the pathogens (the fungi) keep trying to outmanoeuvre each other. However, a sterile, cloned banana (such as the Gros Michel, and later the Cavendish), having lost the ability to adapt and change, can't take part in this evolutionary process. This means the diseases (which do continue to evolve) eventually win. When bananas were grown on small, isolated farms, the problem was easily contained, but when the first large-scale monocultures were established towards the end of the nineteenth century, these fungal diseases gained the power to devastate. Millions of plants were affected, entire businesses wiped out.

The response of the early plantation owners was to close down infected plantations and start again on virgin (uninfected) land. This is partly why fruit companies found land in Latin America so attractive. The first deadly *Fusarium* species to spread around the world was race I. When infected with this, leaves begin to yellow and become mottled, and the plant starts rotting from within. By the 1950s, race I had spread through so many plantations with monocultures of Gros Michel, the variety had become uneconomical to grow. The industry needed a replacement variety with resistance to this disease, one that could slot into the global supply chain that had been built up around the 'Big Mike'. Enter the Cavendish, which took over where the Gros Michel left off. And for most of the second half of the twentieth century, growing the Cavendish



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and making it the world's banana of choice, worked. But history is now repeating itself. Like race I, TR4 began to spread across the world's banana plantations, a type of disease for which the Cavendish had no resistance. The first significant outbreak was in China in the 1990s, and then it went global. To defend against it, strict biosecurity measures were put in place in Latin America, turning plantations into no-go areas for outsiders. It didn't work. In August 2019, Colombia's agriculture authority, the ICA, confirmed they had discovered TR4 in the country's banana plantations. We're still waiting to find out what the consequences will be.

One solution for the future of global banana production is to stick with the Cavendish and the monoculture model but genetically engineer or edit the plant's DNA to find a fix against the disease. The alternative is to look to genetic diversity, to move away from planting vast monocultures filled with clones and instead make use of the hundreds of varieties of banana that exist. The case of Uganda is helpful here, because in this Central African country both paths are being explored. For Ugandans, the banana is far more than a sweet fruit to be eaten raw; it's a staple food, the main source of carbohydrate for two-thirds of the population. Millions of people's livelihoods depend on the fruit; in rural areas, three-quarters of Ugandan farmers grow bananas, and diversity is key. More than forty different varieties are grown.

Africa is considered to be a secondary centre of domestication for the banana. The fruit arrived on the continent from South East Asia at least 2,000 years ago and, with further adaptation and selection by farmers, a new diverse group, collectively known as East African Highland bananas, emerged. Each cultivated variety has its own culinary uses and a different cultural role. There is the Nakitembe, a black-and-red-coloured banana which is steamed, mashed and served with vegetables or meat. The Ndibwabalangira is a bright green, intensely sweet banana once reserved for chiefs and leaders of Buganda, the largest of Uganda's ancient kingdoms. The Musakala has an ivory-coloured flesh and a slippery texture and smells like a cucumber when

you cut it. The Mbidde has a whitish-grey pulp and bitter taste and is often used to make juice. And there's Namwezi, a medicinal banana; its name means 'lady moon banana' and it is sometimes eaten by women when they are menstruating. The Bogoya is carbohydrate-rich and intensely flavoured and can be eaten raw or cooked into stews (Bogoya, by the way, is the Ugandan name for the Gros Michel). But one of the most versatile bananas is the Kayinja, grown in central Uganda. In traditional marriage ceremonies, the groom presents the bride's family with a beer brewed from the juice of the Kayinja. 'It takes a lot of hard work and effort,' says Edie Mukiibi, an agronomist and banana farmer and the leader of Slow Food Uganda. 'This gift of beer is seen as a sign of commitment to your life partner and shows that you will be a good provider for your future family.'

Food markets in this part of Uganda have entire sections dedicated to bananas. Some are sold at the entrance, a display of every shade of yellow imaginable, bananas at different stages of ripening and suiting all preferences. Walk deeper into the market, and you start to see piles of a variety called Matoke; a staple food cooked throughout the day, an ingredient in most meals. Head even further into the market, and you'll come to areas filled with the aroma of sweet, ripening bananas where people gather to eat, relax and drink. Here, when it gets late, fires are lit, Matoke bananas are roasted, people dance, make music and sip Kayinja banana beer. But this traditional banana culture is changing. In 2014, the Ugandan government, with funding from the Bill and Melinda Gates Foundation, launched a 'banana improvement programme' with the aim of producing new, higher-yielding, more disease-resistant hybrids. Uganda has also been one of the main testing areas for genetically modified and gene-edited bananas.

Based at Queensland University of Technology in north-east Australia, James Dale's numerous titles include Banana Biotechnology Program Leader and molecular farmer. As a geneticist, he has spent forty years trying to redesign the banana. So far this has mostly been through transgenics: adding extra DNA from different species. Dale's biggest breakthroughs include

finding TR4-resistant genes in wild bananas sourced from the jungles of Papua New Guinea, the plant's centre of diversity. In a trial carried out in northern Australia, Dale planted GM Cavendish plants in TR4-infected soil along with non-GM plants. The ordinary bananas in the plot became infected and died, but the plants with the inserted wild gene survived. In Uganda, he developed GM bananas supplemented with vitamin A (to tackle nutrient deficiency). More recently, he has turned his attention to genome editing. By switching on a TR4-resistant gene made dormant during the banana's domestication he believes he can save the variety. 'More diseases are on their way. To build resilience, we're going to need this new technology.'

Some Ugandan farmers fear that new science and breeding programmes will result in traditional crops becoming endangered. One such farmer is Edie Mukiibi. 'We'll end up with patented "superbananas" and one or two varieties replacing our rich diversity and thousands of years of history.' He worries about a 'one-size-fits-all' approach. 'The number of banana varieties in Uganda is already getting smaller. We farmers are the custodians of biodiversity, it's our responsibility to protect it,' says Mukiibi.

Dr. Fernando García-Bastidas agrees. Something of a star in the fruit world, his social media followers refer to him as 'Bananaman', sometimes even 'Super-bananaman'. Based in the Netherlands, after years of banana research at Wageningen University, he is a leading expert on TR4, and one of the scientists responsible for tracking the progress of the disease. In his lab, García showed me what a Cavendish plant looks like after it has been infected by TR4. From a high-security cold store, he pulled out a collection of plants that had been inoculated and were now slowly dying, turning into a black mass of decaying stems and leaves. Inside a locked refrigerator were tiny samples of the fungus. Inside one bottle was enough TR4 to wipe out every plantation in Latin America. Because of his research, when he visits banana plantations, he travels with very few possessions—when he arrives in a country, he kits himself out with new clothes and new shoes. 'I have to make sure I'm not the one who introduces the disease to a plan-

tation,' he says. 'I'm supposed to be the scientist trying to stop it.'

At his workplace is a giant glass house which contains a forest of different wild banana plants, some tall, some dwarves, producing different-coloured fruits, some red, others tinged with blue. These have been sourced from the South East Asian jungles, where both the banana and the TR4 fungus originated. García is drawing on millions of years of co-evolution. His plan is to breed some ancient and lost traits back into a new Cavendish-like plant, mixing the best of the past with the best of the present.

This work, known as reconstructive breeding, involves finding ancestors of the Cavendish and evaluating hundreds of wild and cultivated bananas, including varieties from Uganda (some of which have resistance). He thinks it might take him a decade of work, maybe two. 'Hidden away in jungles and on small farms are plants with traits we will need for the future,' he says. 'We can't afford to lose any of these plants.' But even if he helps to save the Cavendish, he believes we will also need to change how we farm. On this, García and James Dale are in agreement. Their scientific approaches might differ but both are convinced saving banana diversity, wild and cultivated, is essential and growing monocultures now looks too risky an option. The Cavendish is the canary in the coal mine, a warning against monocultures and reason enough to increase the pool of genetic diversity in all our crops. We cannot depend on single varieties for the future of our food. The consequences are clear to see in the crisis of the Cavendish as well as the Gros Michel before it. If we fail to acknowledge this, we remain at risk of history repeating itself again and again. There's a reason why monocultures do not exist in nature. 📖

#### ABOUT THE AUTHOR

*Dan Saladino is a renowned food journalist who has worked at the BBC for 25 years. For more than a decade, he has traveled the world, recording stories of foods at risk of extinction—from cheeses made in the foothills of a remote Balkan mountain range to unique varieties of rice grown in southern China. His work has been recognized by the James Beard Foundation, the Guild of Food Writers, and the Fortnum and Mason Food and Drink Awards.*



*In Loving Memory of  
David J. Getoff, CCN, CTN, FAAIM  
1952-2022*

David Getoff left our world as we know it on Sunday morning, October 30, 2022. A naturopath, board-certified clinical nutritionist, and detoxification specialist, he worked tirelessly to help others overcome modern diseases but succumbed to acute myeloid leukemia (AML), a very aggressive form of leukemia, at the age of only seventy.

Throughout his career, David served more than just his patients, friends, and family. For more than 20 years, he was a stalwart contributor to the Price-Pottenger Nutrition Foundation and held the position of vice president. He was also an elected member of the American College of Nutrition, the International Academy of Oral Medicine and Toxicology, the International and American Associations of Clinical Nutritionists, and the New York Academy of Sciences.

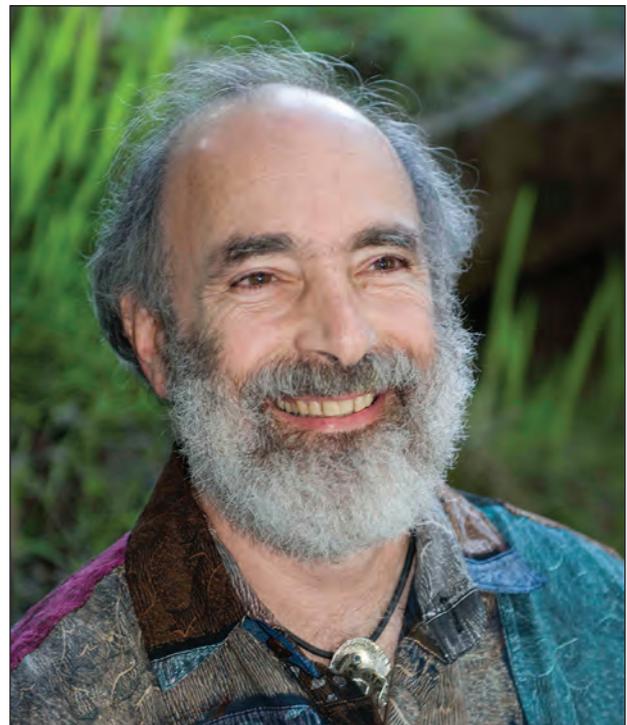
David was an internationally recognized expert in nutrition, diet, and the use of nutritional supplements. He had encyclopedic knowledge and a vast curiosity that propelled him to continually advance his learning and teaching. He lectured at dozens of medical, nutritional, dental, and agricultural conferences across the United States; and his easy-to-understand and very engrossing lecture style, coupled with his entertaining wit, always kept his audiences attentive and motivated.

In addition, David wrote a book titled *Abundant Health in a Toxic World*, contributed numerous articles and interviews to our Journal, and produced over a dozen educational DVDs on topics from cancer and diabetes to children's emotional problems and nutritional supplements. He also created a five-part class, "Attaining Optimal Health: Essentials," for

Price-Pottenger, and this 12-hour course is still available at our website. We encourage you to keep David's teachings alive by watching this course and sharing the link with your friends.

While David was a huge proponent of natural and alternative healing practices, he never discounted the value of contemporary medicine, and, during his illness, he received excellent acute care at Scripps Mercy Hospital. He is survived by his beloved wife, Linda, and his much-adored cat, Tomkha.

More information on David's life and work, including some of his writings and recommended resources, is available at his website, [naturopath4you.com](http://naturopath4you.com).



# The Best Foods for Optimizing Your Health

by David J. Getoff, CCN, CTN, FAAIM

*This article was originally published in our Summer 2018 issue, and is reprinted here as a tribute to the late author (see memorial on page 27). David's knowledge and wisdom will never go out of date.*



As we look at our history of food use for guidance about how to eat today, we must decide just how far back we wish to go. Should we look to our preagricultural hunter-gatherer ancestors who ate what the earth provided for them to fish, trap, hunt, dig, or pick? Perhaps we should only go back to the time before we had stores, electricity for refrigeration and freezing, and packaged “foods” that will seemingly remain “fresh” for years.

I have heard many health proponents say that if you wish to remain healthy, you should only eat foods that are located near the outer walls (the perimeter) of the supermarket. While I agree with this in principle, in practice, it is not always so. The perimeter of the supermarket is almost always where you will find eggs, fresh meats, fish, and fresh, raw vegetables and fruit. However, very little of this is organic, some of the vegetables are almost pure starch, and most of the fruit is too high in sugar for even weekly consumption. But at least these foods do not consist mostly of empty calories with added chemicals, like what lines the shelves in most of the other aisles.

Sadly, a great deal of the produce has been picked weeks prior and stored in special ways to make it look freshly picked. The nutrient content was already very low due to hybridization, deficient soils, and the use of incomplete and inadequate chemical fertilizers, and it likely declined further in storage.

In fact, the word “fresh” has become meaningless these days. It used to mean that the animal was killed and butchered very recently, the eggs were collected that day or at least within the week, and the produce was picked within a day or two of appearing on the shelves. Not anymore! The “fresh” produce you just bought in your local market might have been picked two weeks prior and 8,000 miles away in another country. Your “fresh” apples might have been in a low-oxygen storage facility for the previous six months. A great deal of the “fresh” fish may have been frozen for months and is really just freshly thawed. Ask the fish counter salesperson to check which, if any, of their “fresh” fish and seafood has never been frozen and, if they know, when it was caught.

If we returned to eating like our not-so-distant ancestors who grew much of their own food, got milk from their own cows grazing in grassy pastures, and gathered eggs from their own pastured chickens, it would be a gigantic improvement. Dr. Weston A. Price studied many different cultures around the globe whose people were in exceptional health. None of them bought food from stores. None of them had electricity or refrigeration. But they did have exceptional health into old age. It seems that we, in our industrialized societies, have traded our health for what we call convenience. Being sick or in pain, requiring drugs daily to suppress symptoms, losing memory function and reflexes, getting out of breath easily, and generally not feeling like you can enjoy life most days is what I would call inconvenient! I guess I am among the minority of Americans who are willing to sacrifice some of the “modern conveniences” in order to keep a solid hold on our health and all our faculties as we get older.

Thankfully, people are finally becoming interested in the more nutritious foods of our ancestors. Foods that used to be taken for granted, such as eggs from pasture-raised heirloom chickens (older, classic breeds, not hybridized for higher production or larger eggs) or pasture-raised beef and lamb, are finally coming back. The better health food stores carry organic, birth-to-death grassfed beef and lamb—some of which is even from animals that are slaughtered humanely—as well as eggs from chickens raised organically in pastures, with worms and insects a major part of their daily diet.

Today, in our fast-paced society, nutrient-dense and truly healthy foods have been replaced with easier-to-prepare, longer-lasting, chemical-laden, low-nutrient foods. Our bodies must break down and assimilate all the nutrients we can manage to get from our food. Anything that is done to “preserve the freshness” or extend the shelf life of a food is in direct opposition to the healthy functioning of our digestion and absorption processes.

The easiest way to look at it is that we should be eating truly fresh whole foods that, left alone, would rot quickly, loved as they are by bacteria. We just need to eat them even more quickly than the bacteria do. In Southern California, we are blessed to have local farmer’s markets in various counties. I try to get most of my fresh produce at these markets from the actual farmers, whom I can ask whether the cauliflower and broccoli were picked early that morning or the day before.

## FOOD GROUPS

I divide food into many groups, rather than using the meaningless ones specified by the USDA. I use enough different food groups that my students and patients will not get confused. These groups are described below:

**Animal Protein:** Red meat, fish, eggs, and birds (poultry). Good sources of animal protein include 100 percent grassfed beef, lamb, and bison; 100 percent pastured organic eggs and chicken; and wild-caught,

low-mercury fish. I want the animals raised for human consumption to have a diet as close as possible to what they would have been eating in the wild. This makes their fats the healthy ones we need and helps minimize the amount of environmental chemicals in their bodies.

**Dairy:** Milk, cream, butter, ghee, yogurt, kefir, and cheese. Milk is the only food (if clean, unprocessed, and raw) that is so nutritionally complete that it can be the sole sustenance of a species for its first weeks, months, or, in some of the healthiest traditional human tribal populations, two or three years of life. I see no reason why people should not continue to consume it as they age, unless they cannot properly digest it or cannot find good quality raw milk from organically raised, pastured cows. In my practice, I find very few individuals who have any reaction to organic, whole raw milk from healthy grassfed cows.

**Nuts and Seeds:** Macadamia nuts, brazil nuts, filberts, pine nuts, pistachios, walnuts, pecans, almonds, and some other nuts, and even peanuts (which are actually legumes and not nuts). Cashews are a high-starch nut, so they are not as healthy as the others, plus many people react to them. Seeds include pumpkin, sunflower, sesame, and hemp seeds (the latter of which I do not eat).

Historically, hemp has never been consumed as a food. Since I do not feel it is wise to play the



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role of a guinea pig, I prefer not to eat things that no population ever ate before me. This includes hemp oil, hemp seeds, hemp “milk,” and hemp protein powder. I prefer the foods that have been consumed for centuries.

**Fats and Oils:** I include here just the ones I consider healthy: butter and ghee from grassfed cows, lard from heirloom pastured pigs, coconut oil, bright orange palm fruit oil that is sustainably harvested, macadamia oil, extra virgin olive oil,\* walnut oil, sesame oil, avocado oil, and peanut oil. These should always be organic and, in the case of oils, pressed at temperatures of 120° F or below.

It is very sad, but here in the US, where corporations have tight control over government regulatory agencies, these agencies are no longer protecting us, even though that was their original purpose. In the fats and oils industry, this means that the term “cold pressed” does not ensure that the oils did not reach high temperatures during their manufacture. It only indicates that a heating device was not used. The process of pressing oils out of nuts, seeds, and grains requires extremely high pressures. A great deal of heat is produced during this process unless it is done very slowly and with adequate temperature control. Most of the best-known brands of cold-pressed oils allow their products to reach temperatures that I feel are too high (above 120° F) during the pressing process, but they are still completely within their legal rights to label these oils as “cold pressed.”

Sadly, few Americans have ever tasted high-quality nut or seed oils. If you were to taste supermarket brands of corn oil, canola oil, cottonseed oil, and “vegetable” oil, all would taste quite similar, since their original flavors have been pretty much destroyed during their high-temperature deodorizing process. You and your taste buds may have been deceived for decades into believing that salad and cooking oils don’t really have distinct flavors, just slightly different textures or viscosities. One of the extra

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\* Most inexpensive extra virgin olive oils are, in fact, *not* extra virgin olive oil. Read the book *Extra Virginity: The Sublime and Scandalous World of Olive Oil* by Tom Mueller ([www.extravirginity.com](http://www.extravirginity.com)).

benefits of exploring truly healthy foods is the more distinct flavors you get to experience.

**Whole Grains:** All grain and grain-like seeds, including but not limited to rice, barley, wheat, rye, quinoa, amaranth, teff, and millet. All of these are approximately 75 percent starch, which your body converts into sugar and, sometimes, triglycerides. The faster they are converted into sugar and the less nutrition they contain, the more unhealthy I consider them to be. The less starch, sugar, and alcohol you consume, the better your body can regulate your blood sugar level, and the lower your current and future risk for cancer, diabetes, heart disease, and weight gain will be.

Foods in this group are not required for long-term health, since there are no essential nutrients in any of them that we cannot get from nonstarchy foods. Moreover, I don’t consider whole grain bread, pasta, muffins, or crackers to actually be whole grain anything. Once you grind the grain or seed into millions of tiny particles that we refer to as flour, you have massively increased the speed with which the body converts it to sugar. It is also worth mentioning that oxygen can damage flour easily, as its protection has been ground away. It is a powder and *not* a whole grain.

**Beans (Legumes):** Mung beans, kidney beans, Anasazi beans, lentils, etc. These are yet another group of food that is about 75 percent starch, but since they convert into sugar much more slowly than other starches, they are less harmful. Only whole grain barley converts as slowly as beans. Mexican refried beans that are traditionally cooked with a good amount of lard convert even slower, since fats slow down the conversion process.

If you have had a blood test called hemoglobin A1c (HbA1c) and your number from a US lab is 5.3 or below, you can probably handle a small portion of beans or whole grains once a week without it slowly pushing you toward diabetes (although if your number is 5.4 or above, I wouldn’t recommend it). Of course, this is only if you are not also eating other starches. I will occasionally put a small amount of green,

red/orange, or black lentils or some heirloom barley in my stews.

**Soybeans:** Since soy is often a harmful food, I do not lump it in with the other beans.<sup>†</sup> Soy can be far more problematic than just being difficult to digest and causing gas production, which are the problems associated with other beans. Unless it has been adequately fermented, soy can disrupt and unbalance human hormone levels, causing various possible health problems. In addition, the vast majority of soybeans are genetically modified. Many people react to soy without knowing it.

Adequately fermented organic soy products from reputable companies, although not required in any way for long-term health, do not appear to cause problems in most individuals. These would include tempeh, miso, natto, and the really good fermented and gluten- or wheat-free tamari sauces, which are higher quality versions of soy sauce.

Regular refrigerated health food store tofu is *not* fermented. If you want the original Chinese fermented tofu, also known as fermented bean curd, you will usually find it in glass jars on Asian grocery store shelves (not refrigerated).

It is the US, not Asia, that has massively promoted soy products. Soy milk, soy ice cream, soy cheeses, and soy protein powders are American products and did not originate in Asia—the Asian cultures knew better, their people having eaten soy for thousands of years in its *fermented* forms. The only soy foods that have good research supporting their benefits are the fermented soy products miso and natto.

We have hurt many children by feeding them a food-like product called soy milk. In reality, milk is a complete, animal-based protein with animal fats and some sugar that comes out of the nipple of a mammal and is intended to feed its young. Since soybeans, almonds, and rice kernels do not either give birth or nurse their young,

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<sup>†</sup> I recommend people read Kaayla Daniels' book *The Whole Soy Story*.

it is a bastardization of the English language and should be a violation of good food regulations to call the white liquids made from them soy milk, almond milk, and rice milk. None of these liquids will ever have the nutrients required to be the sole source of food for a healthy youngster of any species.

**Vegetables, Starchy:** I consider vegetables to fall into two very different food groups. The first is the high-starch vegetables, and most of us would benefit from eating less of these. People with cancer, diabetes, or hypoglycemia and those who are overweight would be better off cutting them out almost completely. Starchy vegetables include all colors and varieties of potatoes, yams, corn, pumpkin, parsnips, and rutabaga, and all hard-skinned winter squash, such as spaghetti, butternut, Tahitian, kabocha, and acorn.

**Vegetables, Nonstarchy:** These are perfectly fine to eat unless you have a difficult time digesting their fiber or you have a reaction to any of them. These “good” vegetables include lettuces of many varieties, tomatoes (which, botanically speaking, are a fruit), cabbage, Brussels sprouts, broccoli, cauliflower, mushrooms, Jerusalem artichokes, regular artichokes, and many different peppers (another fruit). Peppers are a great deal healthier if you eat them when they are ripe and, by that, I mean vine ripened. There is no such thing as a ripe green pepper. A green pepper is one that was picked too soon, since more time on



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the plant means less money for the grower. It is for this reason that many people say that green peppers do not agree with them but that every other color is fine.

**Fruit:** Sadly, some believe that fruit with its “natural” sugar content is somehow a healthy sweet. Trust me, your body does not agree with that idea. Fruit is loaded with sugar (fructose), and unless you run or bike a few miles after eating it, this sugar will not be used for energy. It will instead travel into your blood, where it may be converted into triglycerides and raise your risk for heart disease, diabetes, cancer, and obesity. It will definitely raise your blood’s fructose level, and fructose causes insulin resistance, which, when severe enough, is referred to as type 2 diabetes.

People continually say, “But we have been eating fresh fruit throughout our history. How can it now be bad for us?” The answer is exceedingly simple and straightforward. First, the fruit available to our distant ancestors did not contain anywhere close to the amount of sugar found in our modern hybridized varieties. Second, before agriculture—which means for most of human history—the vines, bushes, and trees that produced the only available and not-so-sweet fruit were few and far between. Third, the fruit-bearing trees and plants that did exist only had ripe fruit for about four to twelve weeks

each year. No one could go to their nonexistent stores, fruit stands, refrigerators, or freezers to get more. So, the amount of fruit consumed, with its low sugar content, did not cause health problems. Our ancestors were also a great deal more active than we are today, and so they burned a great deal more calories.

It is my belief that the healthiest fruits are those berries that are the same color inside and outside, since the pigments have antioxidant and other health-promoting properties. Which berries or other fruit, if you slice them in half, will be the same color throughout? Raspberries, blackberries, loganberries, cranberries, boysenberries, wild (not cultivated) blueberries, elderberries, and cherries. For those who don’t have diabetes or cancer, a healthy dessert a couple of days a week might be a small bowl of wild, organic blueberries bathed in organic heavy cream, unless you are lucky enough to have access to grassfed, raw heavy cream.

**Sweeteners:** I divide sweeteners into natural and artificial sweeteners, and we will cover the natural ones first. To begin with, the vast majority of natural sweeteners are simply composed of different combinations of various types of sugar. By this, we could mean sucrose, which is our granulated white table sugar, or fructose, maltose, or lactose, which are other natural sugars. We might mean substances that are processed

from natural sources and that contain an assortment of sugars along with a trace of nutrients—for example, corn syrup, rice syrup, honey, maple syrup, agave nectar, molasses, palm sugar, coconut sugar, and barley malt. As far as your body is concerned, they are all sugar. If you ask a type 1 diabetic about sweeteners, they are likely to tell you that the only seemingly different one is fructose, which is the sugar in corn syrup and agave nectar and is one of the many sugars contained in fruit.

Why might a diabetic tell you that fructose-containing sweeteners are different? Because although fructose is an extremely damaging sugar and causes both type 2 diabetes and fatty liver disease,



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it does not all get rapidly converted by the body into glucose. This means that, while it is raising your risk for those two conditions, it is not doing much to raise your blood glucose level (the one your doctor measures), and so you might call it a more hidden killer. Of all the fructose-containing sweeteners, the one highest in fructose and therefore the most harmful in my view is agave nectar. Agave nectar has even more fructose than high-fructose corn syrup!

Although fruit can be harmful, fruit juice is far worse for two reasons. First, it contains none of fruit's natural fiber, which slows down the absorption of sugar into the bloodstream. Second, no one would eat four or more apples in 60 seconds, but they might very well, in that period of time, drink a glass of apple juice that contains all the sugar from four or five apples and rapidly spikes their blood fructose. A 12-ounce glass of apple or grape juice has just as much health-damaging sugar as a 12-ounce can of soda pop, and these days a 12-ounce can or glass is considered small, even though it contains 10 to 14 teaspoons of sugar!

There are a handful of natural sweeteners that do not have any effect on our blood sugar nor do they feed cancer cells or cause diabetes. These sweeteners fall into two groups. The first are called sugar alcohols, the name having to do with their chemical structure, as they are not alcohols. The older sugar alcohols are sorbitol and maltitol, both of which have been used in dietetic and diabetic candies and chocolates since I was a child. Both cause diarrhea if more than a couple of candies are consumed. The newer ones, which have found their way into packaged foods in the last twenty or so years, are erythritol and xylitol. These are less likely to cause loose stools when eaten in small amounts, so they are being used more in "sugar free" chocolates and protein bars. Xylitol made from organic birch seems to be the best type. The xylitol made from GMO corn is more likely to cause gastrointestinal issues. I consider both erythritol and xylitol to be acceptable (although not my favorites), as long as they are consumed in quantities that cause no gastrointestinal effects.

The healthiest natural sweeteners are stevia, yacon syrup, and luo han. Stevia, from the leaf

of the *Stevia rebaudiana* plant, is a green herb that contains many steviosides and rebaudiosides. These complex natural compounds, named after the plant, are 200 to 300 times sweeter than sugar when they have been extracted and purified. They do not promote diabetes, cancer, or obesity and have been approved and used in Japan for far longer than in the US. Many years ago, the sugar and artificial sweetener industries pressured the FDA into banning stevia in the US to protect their markets. Eventually, since it is a safe natural herb used in many countries, the FDA was forced to end the ban. Depending on which steviosides or rebaudiosides are extracted, or if the whole plant extract is used, chlorophyll included, the taste can vary greatly from brand to brand.

Because it is so much sweeter than sugar, pure stevia powder must be diluted or cut with some other substance in order to make it easier to use. Some companies use organic erythritol for their diluting powder, which I feel is a good choice.

I'll give you three hints about using stevia. First, try different brands to see which one you like the taste of best. The second is to start off with a very small amount and then increase the amount in tiny increments, tasting it after each increase, since if you put in too much, it will be bitter. The third is that stevia's slight herbal taste goes away completely when it is used in a sour food. Therefore, if you use stevia to sweeten either yogurt or fresh lemonade, most people will not realize it was not sweetened with sugar.

The next great natural sweetener does not come from a leaf but rather from the underground tuber of the yacon plant. Yacon syrup has the flavor and color of a mild molasses, and most people like it. The yacon tuber looks like a potato but contains no starch. It gets its sweetness from a nondigestible fiber called fructooligosaccharide (FOS), and so has basically no calories and no effect on your blood sugar level.

The last natural healthy sweetener is luo han from the Chinese luo han guo fruit. Like stevia, the concentrated powdered extract can be over 200 times sweeter than table sugar.

There is one more product that many of my patients like. It is called Lakanto® Monkfruit Sweetener. You can use it to replace sugar in

your recipes at a one-to-one ratio. It is non-GMO erythritol with Luo Han added to make the sweetness level equal to that of sugar. Without this boost, erythritol is only about 70 percent as sweet as sugar. I use the other three, as I try to avoid the sugar alcohols for gastrointestinal reasons, but many have no issues with it and really love the Lakanto.

This brings us to the plethora of artificial sweeteners. What is the purpose of consuming a chemical that, prior to being manufactured in a laboratory, had never before existed on our planet or in the human body? The best answer I can come up with is that—due to misleading marketing, untrue advertising, and ignorance on the part of both the consumer and most medical professionals—millions of people think it would be better for their health and waistlines to use an artificial sweetener rather than a natural sugar-based sweetener. However, the results of two well-designed research studies clearly proved that the artificial sweeteners used did not produce any weight loss when compared to natural sugars. As my mentor and nutrition expert Jonathan V. Wright, MD, would say, putting into your body an alien molecule that does not even aid in weight loss and is loaded with published side effects is not a good idea.

## WHY EVERY DINNER IS A BREAKFAST

All you need to do in order to make a healthy meal is to put together a protein source with adequate fats, and, if you wish, add in one or more nonstarchy vegetables seasoned so that you will enjoy their flavor. What? You mean like eating steak or chicken or fish and vegetables for breakfast? Why not? It brings in what your body is asking for, even if you can't hear it.

How about hard boiling four or five eggs, shelling them, and adding some healthy mayonnaise (I make my own) and a few tablespoons or more of a low- or no-sugar organic pasta sauce with whatever additional spices you enjoy? Cut the eggs into small pieces, mix it all up, and you will have a delicious bowl of inside-out deviled eggs. All I am trying to get across is that companies advertising breakfast cereals have programmed us to believe that sugar-laden, starchy foods are “breakfast foods,” when, in fact, they should never be thought of as healthy foods at all. If you eat a healthy meal, it should hold you, without hunger returning, for five to seven hours or sometimes even longer.

For most people, a wholesome and complete meal would be five to eight ounces of really high-quality, not overcooked animal protein with all the fat that should be there, and some



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nonstarchy vegetables. Please leave the yolks in your eggs and the fat on the grassfed beef, lamb, or bison. Adding some additional healthy flavor by putting grassfed butter or ghee, extra virgin olive oil, or maybe organic, raw, grassfed cheese on your vegetables is a great idea. Then season it all with the organic herbs and spices you like best.

## HEALTHY FOOD CHOICES

Strive for good food in as many categories as possible. Remember that no designation ever means the same thing as a second designation. For example, “organic” does not mean that the food is pastured or grassfed, nor does “grassfed” or “pastured” mean that is organic. You need to see every word you are looking for, or you need to phone the manufacturer or the ranch and ask questions—not the store!

Here is a list of some of the good foods to include in your diet. Please note that all of the fish must be wild caught, and everything except the fish should be organic. Organic designations are not used with fish.

- Meats: grassfed and grass-finished beef, lamb, and bison
  - Fish: salmon, canned sardines, flounder, haddock, mahi mahi, Pacific mackerel, scallops, and shrimp
  - Poultry: pastured (*not* free range, a meaningless designation), organic, and, if available, heirloom varieties (with the skin, please)
  - Eggs: pastured and organic (see the egg scorecard at [cornucopia.org](http://cornucopia.org))
  - Cheeses: any from organic, raw, grassfed milk that are made below 110° F
  - Other dairy: organic, *not* ultra-pasteurized, preferably grassfed milk and heavy cream, and plain, full-fat organic yogurt. Raw, grassfed dairy is best, if it is available in your state.
  - Nuts: raw, organic walnuts, macadamias, pine nuts, almonds, pecans, pistachios, etc. Cashews have too much starch.
  - Sweeteners: stevia, yacon, and luo han; also acceptable if you have no reaction to them are non-GMO erythritol and birch xylitol
- Seasonings: miso (make sure it was actually fermented), garlic, unrefined sea salt, products containing organic herbs that are individually listed on the label, which does not contain the word “spices.” In the US, manufacturers can add MSG, wheat, and other adulterants if they use the general term “spices” on the label.
  - Vegetables: all nonstarchy vegetables you have no reaction to (locally grown, organic, and picked ripe, if possible)
  - Fruit: *wild* organic blueberries, or raspberries or blackberries (not strawberries). No more than one apple a day as a dessert.
  - Frying oils and fats: coconut oil, grassfed ghee, palm oil, lard
  - Lower temperature oils and fats: extra virgin olive, walnut, macadamia, and avocado oils, and grassfed butter (always try for organic). All of these are great for making salad dressings and mayonnaise.

For my health, I am willing to spend the additional money for organic food, grassfed and grass-finished beef and lamb, pastured organic eggs and chicken, and wild-caught low-mercury fish. I do this to increase the number of years I will live and the good health I will have while living them. Eating this way can greatly improve the chances that you will keep your memory function as you age, and can help ensure that you retain good muscle tone, skin tone, and reflexes. Is organic food really more expensive than conventional food, as some say? That depends on how much value you put on feeling great and having lots of energy, a good memory, and a body that is truly healthy. 📖

**Adapted from *Abundant Health in a Toxic World* by David J. Getoff, CCN, CTN, FAAIM (AuthorHouse, 2018).**

### ABOUT THE AUTHOR

David J. Getoff was a board-certified clinical nutritionist, traditional naturopath, and fellow of the American Association of Integrative Medicine. He was vice president of the Price-Pottenger Nutrition Foundation for over 20 years. David maintained a private practice in San Diego, CA, and contributed numerous articles in the Price-Pottenger Journal. His website remains available at [naturopath4you.com](http://naturopath4you.com).



### SHORT SLEEP DURATION LINKED TO MULTIMORBIDITY

Older adults who get less than five hours of sleep per night are at increased risk of multimorbidity—the development of two or more chronic diseases, such as diabetes, cancer, and cardiovascular disease—according to a new study published in *PLoS Medicine*.

The researchers analyzed data on over 7,000 people who participated in the Whitehall II cohort study, established in 1985 to investigate social and occupational influences on health among employees in the London offices of the British civil service. Using data that spanned a 25-year period, they examined the relationship of sleep duration at the ages of 50, 60, and 70 with the onset of one or more chronic diseases.

Participants with short sleep duration (five hours or less) at age 50 were found to have 20% greater risk of diagnosis with a first chronic disease over the next 25 years, compared with those who slept for seven hours. Risk of multimorbidity was 30-40% greater for those with short sleep duration at any of the three ages.

**SOURCES:** Five hours' sleep a night linked to higher risk of multiple diseases. UCL News, October 19, 2022. [ucl.ac.uk/news/2022/oct/five-hours-sleep-night-linked-higher-risk-multiple-diseases](https://ucl.ac.uk/news/2022/oct/five-hours-sleep-night-linked-higher-risk-multiple-diseases).

Sabia S, Dugravot A, Léger D, et al. Association of sleep duration at age 50, 60, and 70 years with risk of multimorbidity in the UK: 25-year follow-up of the Whitehall II cohort study. *PLoS Med*, 2022; 19(10):e1004109. doi.org/10.1371/journal.pmed.1004109.

### DIETARY FLAVONOIDS MAY BOOST CARDIOVASCULAR HEALTH

New research from Edith Cowan University suggests that regular consumption of flavonoid-containing foods may protect against extensive abdominal aortic calcification (AAC), which is a predictor of cardiovascular disease events and late-life dementia.

Using data from 881 participants (mean age of 80) in the Perth Longitudinal Study of Ageing Women, the researchers found that those women with higher intake of total flavonoids, flavan-3-ols, and flavonols had a 36-39% lower risk of extensive AAC. Flavonoid intake was calculated based on food frequency questionnaires.

Flavonoids are phytochemicals found in many common foods and drinks, including black and green tea, berries, citrus fruit, red wine, apples, and dark chocolate. Among the study participants, black tea was the main source of flavonoids, and those woman who drank two to six cups per day had 16-42% lower risk of extensive AAC, compared with those who did not drink tea.

However, even among the non-tea drinkers, higher total flavonoid intake appeared to protect against extensive arterial calcification. Some individual sources of flavonoids—fruit juice, red wine, and chocolate—were not shown to provide significant protection.

**SOURCES:** Put the kettle on! How black tea (and other favourites) may help your health later in life. Edith Cowan University, November 22, 2022. [ecu.edu.au/newsroom/articles/research/put-the-kettle-on-how-black-tea-and-other-favourites-may-help-your-health-later-in-life](https://ecu.edu.au/newsroom/articles/research/put-the-kettle-on-how-black-tea-and-other-favourites-may-help-your-health-later-in-life).

Parmenter BH, Bondonno CP, Murray K, et al. Higher habitual dietary flavonoid intake associates with less extensive abdominal aortic calcification in a cohort of older women. *Arteriosclerosis, Thrombosis, and Vascular Biology*, 2022; 42(12):1482. DOI: 10.1161/ATVBAHA.122.31840.

### EARLY HUMANS MAY HAVE COOKED FOOD 780,000 YEARS AGO

Evidence found at the Geshar Benot Ya'aqov archaeological site in Israel suggests that *Homo erectus*, an ancestor of modern humans, was cooking fish approximately 780,000 years in the past. Previously, the earliest evidence of cooking—by *Homo sapiens* and Neanderthals—dated back only 170,000 years.

Researchers at the Israeli site analyzed fish teeth found in an area that appears to have once contained hearths. Using X-ray powder diffraction, which measures the size of crystals in tooth enamel, they concluded that the fish were exposed to controlled temperatures below 930° F. This suggests that the fish were not prepared directly over flames but rather may have been cooked in an earthen oven. Evidence also indicates that the fish may have been consumed on site.

Learning to cook is recognized as one of the most important evolutionary milestones of our species, impacting both biological and social development. Cooking food makes it easier to digest and allows for more efficient growth of the body and brain. That this ability may have developed so much earlier than previously believed has major implications for the understanding of human evolution and history.

**SOURCES:** Schwaller F. Evidence of cooking 780,000 years ago rewrites human history. DW, November 18, 2022. [dw.com/en/evidence-of-cooking-780000-years-ago-rewrites-human-history/a-63812031](https://www.dw.com/en/evidence-of-cooking-780000-years-ago-rewrites-human-history/a-63812031).

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### LARGEST DAM REMOVAL PROJECT IN US HISTORY WILL RESTORE TRADITIONAL SALMON HABITAT

On November 17, 2022, the United States Federal Energy Regulatory Commission voted unanimously to approve a plan demolishing four dams on the lower Klamath River in a remote, wild area spanning the California and Oregon border. The massive dam removal and river restoration project will return the lower half of the river to a free-flowing state and

open up hundreds of miles of historical salmon habitat.

Native tribes that have traditionally relied on the Klamath River and its salmon fought for the demolition project for years. Craig Tucker, natural resources policy advocate for the Karuk Tribe, says: “The tribes here—this includes the Yurok, the Karuk, the Hoopa, the Shasta, the Klamath tribes—they were salmon people. Salmon were part of their subsistence, part of their culture, part of their spiritual life, and so losing those fish has a lot of consequences. Some of it is just nutrition and health, but some of it is really a loss of cultural identity. Removing these dams will reverse those trends and make sure that salmon survive into the future, and that these tribal cultures continue to survive into the future.”

The smallest of the dams may be demolished as early as this summer, with the remaining ones to be drained slowly next year. The plan calls for restoring the river to its natural state by the end of 2024.

**SOURCES:** Flaccus G. ‘Momentous’ US advances largest dam demolition in history. The Associated Press, AP News, November 17, 2022. [apnews.com/article/business-california-native-americans-dams-salmon-311ea96fda0fe1b0052ab8cef9ae36a9](https://apnews.com/article/business-california-native-americans-dams-salmon-311ea96fda0fe1b0052ab8cef9ae36a9).

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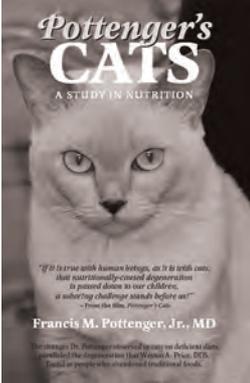

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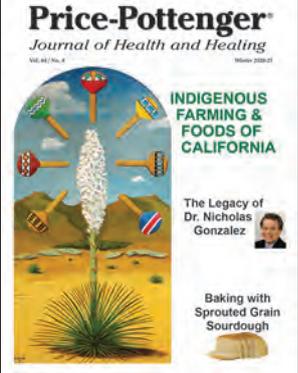
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# CALENDAR OF EVENTS

## CONFERENCES AND SYMPOSIUMS

- JAN. 13-15**      **SYMPOSIUM FOR METABOLIC HEALTH—BOCA 2023**  
Boca Raton Marriott Hotel, Boca Raton, FL  
[lowcarbusera.org/smhp-symposiums/boca-2023](http://lowcarbusera.org/smhp-symposiums/boca-2023)
- JAN. 27-29**      **SCRIPPS 18<sup>TH</sup> ANNUAL NATURAL SUPPLEMENTS CONFERENCE**  
**An Evidence-Based Update**  
Hyatt Regency La Jolla at Aventine, San Diego, CA, and online  
[scripps.org/events/18th-annual-natural-supplements-january-26-2023](http://scripps.org/events/18th-annual-natural-supplements-january-26-2023)
- FEB. 23-25**      **INTEGRATIVE HEALTHCARE SYMPOSIUM**  
Hilton Midtown, New York, NY  
[ihsymposium.com](http://ihsymposium.com)
- FEB. 23-26**      **LOW CARB DENVER 2023**  
**Where Is Nutrition Headed?**  
Gaylord Rockies Resort, Denver, CO  
[lowcarbconferences.com](http://lowcarbconferences.com)
- FEB. 28-  
MAR. 2**          **INTEGRATIVE MEDICINE & HEALTH SYMPOSIUM**  
**Advancing Together: Meaningful Connection and Strategic Collaboration**  
Hilton Chicago, Chicago, Illinois  
[consortiummeeting.org/#home](http://consortiummeeting.org/#home)
- MAR. 3-5**        **THE FORUM FOR INTEGRATIVE MEDICINE**  
**Exploring Complex, Chronic Illness Through the Lens of True Healing**  
Virtual event  
[forumforintegrativemedicine.org](http://forumforintegrativemedicine.org)
- MAR. 24-26**     **JOINT AMERICAN HOMEOPATHIC CONFERENCE**  
Holiday Inn Riverwalk, San Antonio, Texas  
[jahc.info](http://jahc.info)
- MAR. 24-26**     **SOUTHWEST CONFERENCE ON BOTANICAL MEDICINE**  
Virtual event  
[botanicalmedicine.org/southwest-conference-on-botanical-medicine-2023](http://botanicalmedicine.org/southwest-conference-on-botanical-medicine-2023)
- APR. 21-23**     **KETOCON AUSTIN 2023**  
**The Science and Stories of Keto**  
The Palmer Center, Austin, TX  
[ketocon.org/ketocon-2023](http://ketocon.org/ketocon-2023)
- MAY 4-7**        **HEALCON 2023**  
**National Association of Nutrition Professionals (NANP) Annual Conference**  
Hyatt Regency Bellevue, Bellevue, WA  
[healcon.org](http://healcon.org)
- MAY 18-21**     **FOOD AS MEDICINE GLOBAL 1<sup>ST</sup> ANNUAL CONFERENCE**  
Virtual event  
[foodasmedicine.global/2023-Conference](http://foodasmedicine.global/2023-Conference)

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in the repeated refrains of nature – the assurance that dawn  
comes after night, and spring after winter.”

Rachel Carson, *Silent Spring*, 1962

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