CHAPTER 12

Tree Sap:
Nature's Energy Drink

The first year I tried making maple syrup was pretty much a disaster. My father, brother Jeremy, and I tapped several trees on our property in Lake George in an attempt to produce maple syrup. We didn't do nearly enough research beforehand and consequently burned many of my mother's favorite pots. To say that our syrup took on a smoky flavor would certainly be an understatement! The lone bright spot in our adventure was discovering how delicious the sap was—fresh from the tree or partially boiled down into an even sweeter, golden liquid. After several failed attempts at making syrup, we gave up on that aspect altogether and just drank the sap. Whatever sap we didn't drink fresh got boiled down for 20 to 30 minutes on the stove until we had created "Adirondack Sweetwater." While I certainly love pure maple syrup, drinking the sap is what really got me hooked on sugaring.

Maple sap is a natural spring tonic and has been used by people for centuries throughout the world. To understand why, picture the following scenario, which was quite common for the Native Americans and the first settlers to North America . . .

Imagine that you truly live off the land, deriving all your sustenance from what you can grow, forage, hunt, and trade for. The winters are colder, longer, and you have to brave the elements for several months just to survive until the next spring. You may have some maple sugar remaining from the previous spring's efforts and occasionally come across a wild beehive loaded with honey, but you rarely have any sweet foods. Imagine that you don't have a warm, comfortable home to stay in, a car to get around with, or any of the conveniences of modern life. You've been eating a lot of the same, relatively bland food, and supplies are starting to diminish.

By the beginning of March, the nights are still frosty but the days are turning warm and sunny. Sap is now flowing in the maple trees, and you head out to gather the fresh, sweet, nutritious liquid. The trees produce more sap than you can possibly drink, and you boil off the excess water to make sugar for year-round use. The entire community comes together to celebrate the passing of winter and arrival of spring. Almost everyone shares in the work and the rewards. No wonder maple trees and the spring sap flow were so important to our ancestors.

The above scenario would be hard for most people to endure today. These days we have easy access to

FIGURE 12.1. Drinking sap right from the spout is a favorite activity for children (and many adults)!

sugary foods and beverages at any time. A sweet drink in the springtime is no longer a luxury to be waited for after a long winter, but rather a fixture of our everyday diets. In the United States and many other countries, there are more people concerned with dieting and consuming less sugar than there are people just trying to get enough food to sustain themselves. Obesity and its related health problems are now the biggest problem we have related to food, not starvation or scarcity. We have become spoiled by our excesses and largely out of touch with the seasonal nature of food.

Our dysfunctional relationship with food can easily be seen when examining how people first react to the idea of drinking maple sap. Many think of tree sap as the gooey stuff that comes out of pine trees, dropping onto their cars and causing a sticky mess when they park underneath them. To be fair, the thought of eating pine sap also disgusts me, and since we make turpentine out of pine sap—hardly an edible product—this feeling is well justified. However, when people do get a chance to try some maple, birch, or walnut sap, nearly everyone's opinion is drastically altered. They are surprised that it is basically just like water with a hint of sweetness. Indeed, maple sap is usually 98 percent water, 2 percent sugar, and loaded with minerals, nutrients, enzymes, antioxidants, phenolic compounds, and more. Walnut sap has about the same sugar content as maple, whereas birch sap usually contains usually 1 percent sugar or less.

When I first developed the outline for this book, I was just going to include a couple of pages about maple sap in the chapter dealing with value-added products. After all, I think fresh sap is the most valuable product you can get out of a tree. But the more I thought about and researched this subject, the more I realized that an entire chapter should be devoted to tree sap. What really changed my mind was reading through the Proceedings of the 1st, 2nd, and 3rd International Symposiums on Tree Sap Utilization. Researchers from around the world gathered in Japan in 1995, 2000, and 2005 to discuss their latest research and development projects. Although there was some mention of maples, almost all the papers were focused on birch sap—not as a raw material for producing syrup, but as a healthy beverage all by itself.

As the old saying goes, "If life gives you lemons, make lemonade." Although maples are found throughout the world, they are most abundant in eastern North America. Just as we have extensive maple forests, the northern portions of Asia and Europe contain various species of birch, and the people of Eurasia have done an excellent job utilizing the trees they have. It is truly fascinating to read about all the research and development with birch sap throughout the temperate world. Most of the papers were written and presented by scientists in China, Japan, Korea, Russia, and European countries. In other regions of the world, birch sap is used almost exclusively for drinking whereas our utilization of maple sap has been largely relegated to boiling down to syrup. This may be due to the fact that it requires so much more birch sap to make the same amount of syrup, and the flavor of birch syrup is considered by most people to be inferior to maple. Nevertheless, we have a lot to learn about using tree sap as a healthy beverage, not just as the raw material for making syrup.

Although birch sap has a much larger following throughout the world, there are cultures that do consume maple sap on a significant basis. The people of Korea have a long history of drinking tree sap and celebrate it each year with a festival called Namakje. The tradition is especially prevalent in the Kurye Province, which contains the highest mountain in the country, Mount Chiri. Jong Soo Woo from the Mount Chiri Climbers Association described the history of the festival and Koreans' connection to drinking sap at the 1st International Symposium on Sap Utilization in 1995. Many Koreans believe that tree sap is a "mysterious and holy life-water from nature" and they drink it while praying for good health, family prosperity, and enough summer rainfall to ensure adequate harvests in the fall. The tradition goes back more than 1,000 years, to at least to the ninth century. It was abandoned for roughly 40 years in the early 1900s after the fall of the Chosun dynasty but was resurrected when the Republic of Korea was established in 1946. Today over 30,000 people attend the festival each year to drink sap and partake in the many events.

Acer mono is the maple tree most prevalent in Korea, and its Korean name is *gorosoe*, which means "the tree

FIGURE 12.2. A sap-drinking contest at a gorosoe festival in South Korea. The contestant who drinks a liter of sap the fastest wins the prize. PHOTO COURTESY OF KIYOUNG LEE

FIGURE 12.3. People drinking gorosoe sap in a Korean "sugarbush." There has been much more interest in drinking maple sap since an article appeared in the *New York Times* highlighting the Korean sap-drinking industry. PHOTO BY PARK JIN-HEE

that is good for the bones." There is an interesting legend of how this name came to be. In the ninth century, a Buddhist monk named Do-sun spent 35 years helping to build a temple near Baewoon Mountain. One winter he had spent several months sitting cross-legged in meditation. When he eventually achieved the spiritual enlightenment he was searching for and tried to get up, his knees would not bend, so he tried grabbing a tree to help stand up. The tree trunk broke and sap flowed out readily. Do-sun drank all the sap and was soon able to stand up straight; ever since then this tree has been known as gorosoe—"the tree that is good for the bones." With modern science, we now understand that the high mineral levels in the sap, most notably calcium, potassium, and magnesium, are why it is so good for us and our bones. More research still needs to be done, but the medicinal properties of maple sap are becoming more apparent every year.

Today there is a vibrant market for both maple and birch sap in Korea. In fact, the sap from *Acer mono* was highlighted in a *New York Times* article by Sang-Hun Choe in 2009 titled "In South Korea, Drinks Are on the Maple Tree." The article illustrates the weekend retreats people take in the mountains, drinking as much as 5 gallons of sap in a day. People sit on heated floors, in an environment similar to a sauna, so that they can drink as much sap as possible. As one participant described it, "You keep drinking while, let's say, playing cards. Salty snacks like dried fish help because they make you thirsty. The idea is to sweat out all the bad stuff and replace it with sap."[1] Choe also describes how the large amounts of calcium contained in the sap make this treatment especially beneficial for those with osteoporosis.

The market for tree sap in Korea is in full swing during the tapping season of March and April. During the week of Gyonchip (one of the seasonal divisions occurring in early March), maple sap prices are roughly $10 per gallon, about double the price of maple sap at other times of the year.[2] This difference is also seen with the sap of birch trees, as the $8-per-gallon price during the week of Gokwu (mid-April) is two to four times that charged the rest of the season. According to a 2007 government report, that year 1.3 million gallons of sap were harvested from nearly 800,000 taps. Although their production per tap is extremely low, they value the sap at a high price and sell the vast majority of it directly to consumers. Most of the sales are arranged through the Internet, and the sap is delivered directly to customers' homes. Picture the old milk truck in America, but containing maple or birch sap instead. I've even had Korean immigrants who live in New York City come to our sugarhouse in Lake Placid just to purchase maple sap. They were surprised and impressed that I knew what gorosoe was, and they purchased 15 to 20 gallons of raw sap on two separate occasions. I charged them $5 a gallon for the raw sap, which they

FIGURE 12.4. Tapping *Acer mono* in South Korea. Note the small diameter of this tree and the large number of tapholes it already has. In North America, a small tree of this size wouldn't qualify for even one taphole, let alone two. Since maples are not as prevalent in Korea and these small trees only produce a limited amount of sap, the Koreans wouldn't even consider boiling off 40 gallons of this all-natural, healthy beverage just to get 1 gallon of maple syrup. PHOTO COURTESY OF KIYOUNG LEE

FIGURE 12.5. Bottled sap for sale at a gorosoe festival in South Korea in 2013. At the current exchange rate, these prices equate to about $10 per gallon of sap. Since it normally takes 40 gallons of sap to make 1 gallon of syrup, this equates to approximately $400 per gallon of syrup. PHOTO COURTESY OF KIYOUNG LEE

considered a bargain! Considering that it equated to $200 per gallon of syrup, we made out quite well.

The tree sap industry is certainly not restricted to Korea. Russians drink a lot of birch sap, and several Russian scientists have devoted tremendous time and energy to exploring the effects of birch sap on human and animal health. The majority of this research took place from the 1960s to '80s, though it has been revived in recent years. In 2005 a group of Russian researchers published a synthesis of the literature dealing with the most important species of birch throughout Russia.[3] There are 15 different species of birch in Russia, but only 4 are primarily used for sap production. The authors touted the health benefits and cultural traditions involved with drinking birch sap. They cited over 150 references in their article, a testament to the importance of birch trees and birch sap to the Russian culture. In fact, Russians have such a strong affection for their birch trees that people often compliment women by comparing their beauty to that of birch trees.

In a paper presented at the first symposium in 1995, another researcher[4] highlighted the traditional medicinal uses of birch sap in five countries (Table 12.1). Although many of these medicinal benefits have not yet been confirmed by modern science, it is highly likely that at least some of these purported benefits are legitimate. The fact that many cultures spanning diverse regions of the globe utilize birch sap for the same ailments lends additional credibility to the claims. It's just a matter of time before modern science proves how and why birch sap is so good for us.

Reading about the medicinal properties of birch sap convinced me even further that there must be more to maple sap that we just don't know about at this point. While there are unique compounds in birch sap that are responsible for some its health benefits, the sap of other trees—including maples and walnuts—is also likely to have its own beneficial compounds. Since there is an abundant supply of birches and Norway maples (*Acer platanoides*) in Europe, some scientists in Latvia recently conducted experiments to determine the chemical composition of their birch and maple trees. Both species exhibited favorable results, though nearly 50 percent more phenolic compounds and roughly twice as many antioxidants were found in the maple sap as in the birch sap.[5] There is clearly much more to tree sap that we have not yet discovered; further research is warranted to determine all of the multiple health benefits.

There has been some scientific research concerning maple sap in recent years in Korea. Scientists there have

TABLE 12.1: Traditional Curative Properties of Birch Sap in 5 Countries*

	Japan	Korea	China	Finland	Russia
HYPERTENSION	X	X		X	
URINARY PROBLEMS	X	X	X	X	
GOUT	X		X	X	X
DECREASED WORK CAPACITY		X	X	X	X
GASTRITIS		X	X	X	X
KIDNEY PROBLEMS		X	X	X	
SCURVY			X	X	X

* Adapted from M. Terazawa, 1995.

been performing various experiments using mice and rats to determine the impact of consuming maple sap on a number of health issues. One of their first experiments involved feeding different amounts of maple sap to mice that exhibited osteoporosis-like symptoms due to a low-calcium diet.[6] For seven weeks, different groups of mice were given a variety of beverages as part of their diet, including springwater, 25, 50, or 100 percent maple sap, and a special beverage with high levels of calcium. At the end of the study, researchers examined their bones for size and density. The high-calcium solution yielded the greatest benefits, whereas the 50 and 100 percent maple sap diet also produced very favorable results. Mice that only had 25 percent sap or springwater suffered the greatest negative effects on bone density and size. To understand why this could be the case, the authors examined the mineral contents of the pure springwater and maple sap. The maple sap had 37 times as much calcium, 16 times as much potassium, and 3.7 times as much magnesium as the springwater. In an obvious conclusion, the authors "propose that the sap of *A. mono* may improve low-calcium diet induced osteoporosis-like symptoms by augmenting mineral levels in the body."

The same scientists conducted additional studies to assess the medicinal benefits of *Acer mono* and *A. okamotoanum,* another species of maple found only in Korea. Maple sap is known among Koreans as a hangover cure, so they set out to see if maple sap decreased the serum alcohol and acetaldehyde levels after acute ethanol treatment in rats.[7] In simple terms, they got a bunch of rats drunk, gave some of them maple sap and others water, and then determined how the rats recovered. Those that consumed maple sap fared much better, and researchers attributed this to the abundance of minerals found in the sap. Another study examined whether maple sap would have beneficial effects on hypertension in rats. The rats that had 50 or 100 percent maple sap experienced lower blood pressure levels (among other benefits), and the authors attributed this effect to the additional potassium in the sap.[8] Finally, they noticed that the sap of *A. okamotoanum* smelled very much like ginseng, so they collected some roots of this maple and did chemical analyses. They discovered that it contains two of the same pyrazines (aromatic organic compounds) found in ginseng root, which helps explain the similarities in odor. According to Professor Eui-Bae Jeung, they have only discovered these pyrazines in *A. okamotoanum* and not in any other species of maple. Given the Koreans' affection for ginseng, it is not surprising that they also prefer the sap from this tree.

Although these studies are useful, they were all conducted in a laboratory setting with animals. What is truly needed are clinical trials with human subjects.

The Federation of Quebec Maple Syrup Producers has been sponsoring research looking at the health benefits of maple sap and syrup. Although most of the studies have focused on syrup, they found that the sap contains nearly 50 vitamins and minerals, amino and organic acids, polyphenols, and phytohormones. In particular, the abscisic acid present in the sap may have tremendous health benefits; more research is currently being conducted in this field. Once there is applied research examining the effects of consuming maple (and birch) sap on human health, it is likely that many more people will want to drink these all-natural beverages.

FIGURE 12.6. Many people enjoy drinking sap right out of the bucket. If you do this, just be careful that your buckets meet the highest standards for safety and cleanliness. PHOTO BY NANCIE BATTAGLIA

Drinking Sap: Fresh or Pasteurized

Some people enjoy drinking sap fresh from the tree, while others prefer to boil it for a brief period to kill any bacteria or yeast. Since it is certainly possible for harmful bacteria to be found in sap, the cautious solution is to pasteurize it before drinking. However, this will kill all the bacteria, both good and bad, thereby precluding possible consumption of probiotics that are important for human health.

According to the current definition put forth by the World Health Organization, probiotics are "live microorganisms which when administered in adequate amounts confer a health benefit on the host." Most probiotics are a strain of *Lactobacillus*, a microorganism found in yogurt and other dairy products. However, for people who are lactose-intolerant, are allergic to dairy, or choose to follow a vegan diet, getting probiotics into the system can be challenging. Researchers in Canada have been exploring the feasibility of sterilizing sap and then reintroducing probiotics to create a healthy beverage capable of delivering probiotics to people who cannot consume dairy products.[9] A private company has received a patent on this method, so you may see it in a grocery store near you at some point in the near future.

It is worth noting that maple sap is basically sterile inside the tree; it is not until it is exposed to the atmosphere or comes in contact with collection equipment

FIGURE 12.7. If you are planning on drinking sap without first pasteurizing it, a clean 1-gallon jug with a small hole cut out to let it hang on the spout works great. Simply take it off the spout, stick it in the fridge, and replace it with a new jug. The best jugs to use for this purpose are ones that previously contained water, although other food-grade containers can be used after cleaning and rinsing. PHOTO COURTESY OF JEREMY FARRELL

that it picks up various strains of bacteria. Luc Lagace, a maple researcher with Centre ACER in Quebec, has spent considerable time and resources along with his colleagues identifying the bacterial communities commonly found in maple sap. They recently used advanced technology to identify a wide array of bacterial communities found at the taphole, with *Pseudomonas* and *Rahnella* the most commonly occurring genera.[10] Although it is possible that probiotics could become introduced into the sap, it is also possible that harmful bacteria could make their way in. For this reason, I always recommend filtering and pasteurizing the sap before drinking—just to be safe. In the same way that municipalities implement a "boil water" policy whenever there is a water main break, I also always recommend sterilizing the sap before drinking. I would feel terrible if someone wound up with contaminated sap (based solely on their collection practices) and then became ill themselves or made other people sick by serving contaminated sap to them. While there is a good chance you could drink raw sap your entire life and never get sick from it, when you are serving sap to other people (or recommending them to try it), it is always best to err on the side of caution.

All that being said, my favorite way to drink sap is right out of the bucket or while dripping out of the spout. There is something special about being outside on a warm, late-winter day, feeling the sunshine on your skin and drinking the sap straight from the tree. When you've been working hard tapping trees and gathering sap, there is no better way to quench your thirst than drinking fresh sap. Once you have done this, it is easy to see why it was such a sacred tradition for our ancestors in so many countries. The mind is a powerful thing, and I think the experience of getting outside to tap trees and gather sap is one of the main reasons why it is so good for us. The experience may do as much good for your body as the actual vitamins and minerals that the sap contains. This is especially true for people who generally eat a healthy diet anyway. After all, many of us aren't lacking in vitamins or minerals, but rather those authentic experiences that help tie us to the natural world. Just as eating a tomato that you grew yourself is a lot different from buying one at the grocery store, drinking the sap from your own trees can be a compelling experience that helps to deepen your connection to the land. Food scientists have created sap-like beverages full of vitamins and minerals, but buying one of these "energy drinks" is not nearly the same as drinking fresh sap from trees you have tapped.

While I am certainly a strong proponent of drinking sap, I only drink it in the beginning and middle of the season under the most sanitary conditions. I stop drinking sap once it gets warm and the sap takes on a yellow tinge. At this point in the season, the spouts and collection equipment have been contaminated by bacteria and yeast, and the sap begins to take on a sour flavor. This sap would certainly have to be boiled before you drink it. I usually don't drink sap out of our tubing system, but rather always out of buckets or bags. Even if the tubing weren't contaminated with bacteria and yeast (which I know it is), by the time the sap gets to the collection tank it may have a bit of a plastic flavor to it. Pasteurizing the sap would kill any bacteria and yeast, but I rarely pasteurize sap before drinking it myself.

If and how you decide to drink sap is a personal choice. If you are willing to take the risk of consuming something that could have harmful bacteria in it, then you may consider drinking fresh sap. However, if you are concerned about possibly consuming harmful bacteria yourself or serving bacteria-laden sap to others, then boiling the sap beforehand is a must. Finally, unless you want to drink a sap-based tea or coffee, I would cool the sap down before drinking after you have pasteurized it. Just as most people prefer cold water to warm water, cold sap is an especially refreshing drink. I personally don't enjoy drinking warm sap (nor do I like warm water), but there is nothing more refreshing and rejuvenating than cold sap on a warm spring day.

Carbonated Sap

If you are a fan of carbonated beverages, you can make a fresh maple seltzer simply by using maple sap instead of water in a home carbonation machine. There are plenty of different models on the market that are relatively inexpensive and easy to use. Simply substitute maple sap

FIGURE 12.8. The maple seltzer currently being produced by the Vermont Maple Sweetwater Bottling Company. I don't normally like the taste of seltzer, but this maple sap seltzer is phenomenal. PHOTO BY NANCIE BATTAGLIA

(or birch or walnut sap) for water and use the carbonation machine as directed. With your own carbonator, you can control the level of fizziness in your seltzer and make it fresh whenever you want. I highly recommend this to anyone who likes carbonated beverages. As an added bonus, you'll also be able to make your own maple soda (as described in detail in chapter 11).

There is a company in Vermont that has been instrumental in commercializing the concepts discussed above. Brothers Bob and Rich Munch applied for and received a patent in 1995 to create the products that they market through Vermont Sweetwater Bottling Company. Their patent covers the methods of pasteurization, filtration, concentration, and bottling of carbonated maple sap. A 2009 article in *The Atlantic* featured their successful business, which now sells roughly 10,000 cases each year.[11] In addition to carbonated maple sap, they also make a pure maple soda and several other flavored soft drinks. Although not all of their beverages utilize maple sap and syrup, these two products provided the impetus to develop their thriving company.

Cooking with Sap

The sap from maple, birch, and walnut trees can be used in place of water in nearly all recipes. We use maple sap to make beef stew, and the carrots, onions, potatoes, beef, and broth all taste just a little bit sweeter. We also steam vegetables with sap and then use the boiling sap to make rice. The nutrients that leach from the veggies wind up in the sap and are absorbed by the rice, making it even more delicious and nutritious. Sap can also be used in place of water when making coffee and tea, eliminating the need to add processed sugar. Oatmeal is another food that greatly benefits from using sap in lieu of water. The uses for tree sap are only bound by your culinary instincts and curiosity.

Betsy Folwell at *Adirondack Life* magazine recently wrote an article about maple sap and its culinary uses.[12] She provided several recipes using sap, including Drunken Beans, Fau Phox, and Sugarbush Bagels. This article prompted a couple of restaurants in Lake Placid to utilize maple sap in their specials featured in March over the course of Maple Weekend in 2012. The fresh sap certainly added a unique flavor to the normal winter specials and was greatly appreciated by all who tried it. I have since come across several restaurants that are cooking with maple sap and getting good press coverage as a result.

Koreans have experimented with making a soy sauce using sap from their maple trees instead of regular water in the recipe.[13] They found that maple-sap-based soy sauce had roughly twice the amount of minerals as ordinary soy sauce, and it was especially high in calcium, potassium, and magnesium. Glucose and galactose were the only sugars found in ordinary soy sauce, whereas the maple sap soy sauce also had fructose and sucrose. Of the 14 amino acids found in regular soy

sauce, 3 of them appeared in lower abundance in the maple sap soy sauce whereas 11 were found in greater abundance. Overall the authors concluded that using maple sap instead of water when making soy sauce results in a healthier and more nutritious product.

Commercializing Tree Sap

To date there has been much more commercial activity with bottling and selling birch sap than there has been with maple sap. A quick Internet search for "birch sap" reveals a wide variety of purveyors throughout Europe, Russia, and Asia. There are many websites where you can buy pure birch sap or other beverages that utilize birch sap as the main ingredient. Most of the products use citric acid to preserve the sap, and many come with added sugars. The main obstacle that most companies encounter is preserving tree sap for year-round consumption while still maintaining the flavor and health benefits of fresh sap. The other challenge is trying to supply a market for 52 weeks when the sap is only running for less than a month. This requires a lot of warehousing and strategic planning to ensure a steady supply at an affordable price. It also requires a great deal of marketing and outreach to teach the public about maple and/or birch sap. Most people are originally skeptical of drinking tree sap, so you need to offer samples and do whatever outreach is needed to get people to understand why maple and birch sap are incredible, all-natural beverages. Once people taste the sap and discover that it is just like pure water with a hint of natural sweetness, they will gladly buy it. However, if you just put it on a shelf somewhere and hope somebody will try it, chances are you won't sell much.

Maple Sap

The last few years have seen a surge in activity with bottling maple sap. In 2009 Keith Harris retired from his corporate job and started Troll Bridge Creek Inc. with his wife, Lorraine, in Ontario, Canada. Keith decided to use his science and business background to start an entirely new venture in bringing maple sap

FIGURE 12.9. Pure maple sap and three fruit-flavored varieties offered by Troll Bridge Creek Inc. in Ontario. COURTESY OF KEITH HARNS

FIGURE 12.10. Keith and Lorraine Harris of Troll Bridge Creek Inc. offering samples of their KiKi Maple Sweet Water at a health food store in Ontario. PHOTO COURTESY OF TASHA JEFFRIES

to the marketplace as an all-natural, healthy beverage. Within a year Troll Bridge Creek Inc. developed the KiKi Maple Sweet Water brand and bottled thousands of gallons of maple sap in 12-ounce glass bottles. They have since greatly expanded production and branched out to include blueberry-, strawberry-, and cranberry-flavored versions that have pure fruit juice added to the maple sap. For a couple of years they also had lemon-ginger and lemon-mint flavors, but these were not as popular so are no longer offered. The response from health food stores has been remarkable; over 150 outlets across Canada now carry their products. Keith is also in conversations with a number of Asian businesses to export their maple sap to Korea, China, and Japan. Over the past year he has been working with

FIGURE 12.11. Sweet Run is one of the new "maple waters" being launched in 2013. PHOTO COURTESY OF GABRIEL VRISHAKETU PELLETIER

FIGURE 12.12. We're all used to seeing these types of tankers hauling milk away from a dairy farm, but as the maple water business continues to develop, we'll see a lot more such trucks hauling fresh, clear sap away from large sugarhouses like this one. PHOTO COURTESY OF GABRIEL VRISHAKETU PELLETIER

researchers at Conestoga College in Ontario to develop additional processing techniques to preserve maple sap for year-round consumption. The idea is to then license this technology to others so that sugarmakers throughout the United States and Canada could also bottle and sell pure maple sap as a healthy beverage. Stay tuned for further developments in coming years.

With the financial support of Agriculture and Agri-Food Canada, the Quebec Department of Agriculture, Fisheries and Food, and the Conseil pour le développement de l'agriculture du Québec, the Federation of Quebec Maple Syrup Producers spent the last seven years developing a method to preserve the sap such that it can be stored for 18 months at room temperature and still maintain its original quality. They are now licensing the technology to three companies that are certifying the maple water under the NAPSI process (NAPSI is an acronym for "Natural Authentic Pure Sterile Integral"). Seva, Oviva, and Maple3 are the different brands that you may already be seeing on grocery store shelves in Canada. The sap is being bottled aseptically using the same type of Tetra Pak containers that can keep milk from spoiling without refrigeration for several months. In February 2013 the federation put out a press release announcing the launch of maple water. It appears that the sap sourcing and sales will be limited to Canada for the time being, but we may be seeing it in the United States in coming years.

Although the federation claims that the maple water will be "a worldwide first," this fails to acknowledge the efforts of Troll Bridge Creek in Ontario, all the gorosoe harvesters in Korea, or another Canadian entrepreneur who had also been working on a similar process. In 2011 Gabriel Vrishaketu Pelletier started a company to preserve and bottle maple water for year-round sales. I recently tasted some of the sap that Gabriel had bottled in 2012 and was impressed with how good it tasted, even though it had been nearly a year since it was packaged. We all know how quickly sap can spoil and turn sour if left untreated, yet the process he used was able to maintain the freshness as if the sap had just flowed fresh out of the tree. Gabriel is also using aseptic processing technology with Tetra Pak containers, but since he developed this idea separately, he doesn't have to license the federation's technologies and certification process.

In 2013, Gabriel moved beyond the R&D phase into commercial production and sales under the brand name Sweet Run. One of Gabriel's marketing strategies is to provide bottled sap (that can be stored at room temperature) to other sugarmakers to sell along with their syrup and other maple products. You can learn more at www.sweet-run.com.

Not all of the maple sap commercialization is happening in Canada. Here in the United States, I have come across several restaurants and health food stores selling maple sap in various forms over the past several years. Most notably, in 2012, Feronia Forests, LLC, a sustainable forestry company and certified B-corporation with timberland holdings in Massachusetts and New York State, started researching various processes to extend the shelf life of maple sap. After positive developments in their first year, Feronia bottled enough maple water in a shelf-stable manner to run a regional test market in the summer of 2013. They are planning a commercial launch of maple water in the spring of 2014 under the label *Vertical Water*. Feronia's *Vertical Water* will soon provide added growth to the subsegment of all-natural functional waters category, much in the way coconut waters have done over the past few years.

Birch Sap

Rather than being processed into syrup, the majority of birch sap collected in the world is used as a beverage. Most of it is converted into what's known as a "Forest Drink" (or a similar translation) that involves adding sugar to the sap and preserving with citric acid and/or heat treatment for year-round consumption. Although there is a good market for this type of beverage, a company in Finland is taking a different approach. Susanna and Arto Maaranen have developed a unique method of preserving birch sap without having to heat, freeze, or refrigerate the sap. Their company, Nordic Koivu, is able to keep the birch sap in a natural state and therefore maintain all the health benefits of fresh birch sap for everyday use throughout the year. They have not yet patented their technology, because doing so would reveal the trade secrets that they have spent years of research and development to discover.

They first got the idea of bottling birch sap in 1995 and came out with their first non-heat-treated product in 2001. The Maaranens did a tremendous amount of research in starting this company and published a book in 2003 based on their acquired knowledge and experiences. They named it *Koivunmahla: malja luonnolle ja terveydelle*, which means "birch sap: a toast to nature and health." Their business has steadily grown over the years—they now ship birch sap to 22 countries throughout the world. Their products are mostly found in health food and specialty stores, and are advertised as gifts for business purposes. The largest markets are in Europe and Asia, and the Maaranens have just begun working with companies to export their products into North America.

FIGURE 12.13. The glass bottle from Nordic Koivu is so decorative, simple, and elegant that it has been featured in art displays in Finland and France. This company clearly understands the market potential and demand for a natural health drink and is capitalizing on its unique ability to preserve birch sap in its natural state. PHOTO COURTESY OF NORDIC KOIVU, LTD.

Can Drinking Birch Sap Prevent Birch Pollen Allergies?

Just as many people believe that consuming local honey can ease the symptoms of local pollen allergies, some people also believe that consuming birch sap could help people who suffer from birch pollen allergies. In fact, many people with birch pollen allergies have contacted Nordic Koivu to get some pure birch sap. They consumed the birch sap before and during the time of the year when birch pollen is plentiful. The results were promising, so Nordic Koivu decided to do more internal testing on this subject. They gathered a small, unofficial test group consisting of people who are allergic to birch pollen and had them drink birch sap for three years when birch pollen counts were high. According to their website, "Each member of the test group felt that regular consumption of birch sap had a dramatic effect in alleviating their allergy symptoms." Because internal testing by a company selling a product is not scientifically valid, Nordic Koivu is now partnering with university professors to conduct more scientific studies. By the time you are reading this, there may be peer-reviewed literature evaluating this theory—stay tuned.

Nordic Koivu notes that there is strong and rising interest among the cosmetic, food, and beverage industries for using birch sap as an ingredient. Many companies are working on new product development utilizing natural ingredients—and of course tree sap fits the bill. The Maaranens are now producing birch sap in large containers for several industrial clients according to their individual, specific requirements. Because they are able to collect and preserve high-quality birch sap in its natural form, without any heat treatment or preservatives, there are a multitude of uses for their product.

The temperatures are usually much warmer when birch sap is flowing as compared with maple. Therefore the sap is more likely to spoil and needs to be collected and processed carefully and quickly. Nordic Koivu has developed a custom-made sap collection system, utilizing stainless steel and a special type of plastic that allows the company to maintain the highest-quality sap for as long as possible. They are also working on a project to have subcontractors collect birch sap, which they would then deliver to the plant for processing and bottling. They originally experimented with having another company collect sap for them; once that proved successful, they have expanded to include another four or five sap collectors. This allows them to focus on processing, bottling, and marketing the sap without having to worry about gathering it. By having trained people gather the sap with customized and specific materials, they can also ensure a high-quality product.

Final Thoughts

Whereas commercializing tree sap for year-round consumption is a difficult venture, you may have better luck marketing sap as a seasonal product with a limited shelf life. Our relationship with seasonal beverages in America is highly varied. Some beverages are seasonal even though they don't have to be; others should be seasonal but are now produced year-round. For example, Americans are used to having eggnog available only during the holidays, though it can easily be made at any time of the year. Many breweries feature seasonal beers, but the ingredients can be sourced at any time from local or distant places. Milk used to be a seasonal product in the Northeast since farmers dried their cows off during the winter when pasture was no longer available. The flavor of the milk was also seasonal, as it changed throughout the year depending on what the cows were eating. Now milk is available in the same homogenized form with the same basic flavor year-round. Apple cider used to be produced only in the fall, but we can now store apples in controlled environments and press them into cider at any time.

As our food system has evolved over the past century, many of us have lost touch with the seasonal

nature of food. However, since tree sap only flows during a limited time of the year and is difficult and expensive to preserve, it may work best as a seasonal product. With the rise of CSAs, year-round farmers' markets, and other venues for local food distribution, getting fresh, minimally processed maple sap to the market is much easier than it used to be. There are many people who would love to drink sap as a seasonal "spring tonic." If you can find a way to supply fresh, properly processed and packaged sap to them in an economical manner, then you can certainly develop a successful business.

We first started selling sap to our local health food store (Green Goddess) in Lake Placid in 2011. The store provided us with quart- and pint-sized ball jars that we filled with filtered sap that had been heated to at least 160°F for several minutes. We were able to use our canning unit and the filtering system that we normally bottle syrup with, so there weren't any additional equipment expenses. We got paid $2 for filling the jugs; Green Goddess charged $3 with an additional $1 deposit on the glass jar. Since there are 4 quarts in a gallon and it normally takes 40 gallons of sap to make 1 gallon of syrup, we were paid an equivalent price of $320 per gallon (of syrup) for our sap. There was certainly extra time involved in filtering, heating, and bottling the sap, but the price we received more than paid for the extra time involved. Over 90 percent of the quart bottles that we delivered sold within three or four days, and we took the few bottles that didn't sell within that time period back to the sugarhouse to be processed into syrup with the rest of our sap. This type of sales and distribution system has worked well for us; if you can figure out a way to make it work in your community, your customers will be happy and your bottom line may also significantly improve.

It is important to realize that the market for beverages is *much* greater than the market for sugary syrups. Whereas we need water to survive, most of us should cut back on our sugar consumption. Furthermore, people rarely consume pancakes and waffles, and if they do have them for breakfast, the vast majority use the fake stuff as their topping of choice. Even if they did choose pure maple, the amount of syrup consumed would still pale in comparison with the overall beverage consumption. The sap of maple and birch trees provides a natural tonic consisting mostly of pure water with small amounts of sugar, minerals, and other beneficial compounds. Removing almost all the water to produce sugary syrups may not be the best use for these all-natural, delicious, and nutritious beverages.

To envision the possible market demand for tree sap, consider the growth of coconut water in recent years. Coconut water is the liquid inside a young coconut.

FIGURE 12.14. Quart and pint containers of maple sap have been a big hit at the local health food store in Lake Placid with just a simple tag affixed to a glass jar. PHOTO BY NANCIE BATTAGLIA

FIGURE 12.15. The display of coconut waters at a popular grocery store in New York City. Soon enough I expect these shelves to also be filled with maple and birch water. PHOTO COURTESY OF DANIEL GRATTAN

People have been drinking it for centuries in the tropics—and it is indeed a healthy, refreshing beverage. However, it wasn't until some savvy marketers started bottling it and selling it to health-conscious consumers in North America that it started to really take off. Coconut water can now be found in stores throughout the world and has developed into a huge industry with overall sales much greater than pure maple. The health benefits of coconut water are nearly identical to those of maple and birch sap; it is described as a super-hydrating beverage containing significant amounts of electrolytes with only a limited amount of natural sugars. The claim to fame for coconut water is that one serving contains more potassium than a banana. To be fair, coconut water does have more potassium than maple or birch sap, but it also has a lot more sugar and doesn't taste nearly as good. It also comes from tropical plantations and must be transported long distances for us to enjoy it in the United States.

On the contrary, harvesting sap from maple and birch trees can be carried out with minimal environmental impact and helps to retain ecologically important forests throughout the world. It is truly the local, seasonal spring tonic for temperate regions. By drinking the sap from maple and birch trees, we can get nearly the same health benefits as coconut water at a fraction of the cost, and without the associated environmental impact of clearing tropical forests to plant coconut trees and shipping the final product halfway around the world. People should be drinking coconut water in tropical countries, but wherever maple and birch trees thrive, the sap that flows through them in the spring should be our first choice. With the right marketing and business development planning, I believe the market for maple sap as a beverage will eventually outperform the sales of pure maple syrup. Likewise, rather than boiling our birch sap down into syrup, it is likely that most of the birch sap will continue to be used primarily as the pure, all-natural beverage that it is.