



Power in the Peel

AppleBoost Products Inc.

When nearly 1,000 U.S. Olympic athletes and coaches settled in for the long flight to Beijing to compete in the 2008 Summer Olympic Games, each of them was provided with a supply of a new type of “functional food” called AppleBoost™ energy snack tubes. What the Olympians found inside those portable 32-gram tubes was an organic applesauce fortified with the most nutritious part of an apple—the peel. But instead of raw apple peel, AppleBoost snacks are fortified with dried apple peel powder (DAPP™)

that adds fiber, increases antioxidants, and enhances anti-inflammatory properties; the latter is an especially important ingredient for athletes. What the Olympians could not have known was that those DAPP-enhanced AppleBoost snack tubes had their origin in Cornell University’s Department of Food Science, where Rui Hai Liu led the research team that developed the patented process of drying and “powderizing” apple peels without losing their intrinsic nutritional value.

The Perfect Snack

What began in Liu’s laboratory as a journey to extract maximum medicinal value out of fruits, vegetables, and whole grains has ultimately led to the first product of its kind: a low-calorie, high-fiber, highly nutritious apple-based energy snack that athletes enjoy, registered dietitians recommend, and moms love for their children and themselves.

Liu has been on a quest in recent years to show that nature has provided some of the best possible preventive medicines in the form of fresh fruits, vegetables, and grains. He is convinced that if his research team can find new ways to infuse the high-antioxidant properties of apple skin into a wider variety of foods—yogurt, oatmeal, rice cakes, and applesauce, to name a few—he can help people measurably reduce their risk of illness and chronic disease simply by making more informed food choices.

Intrigued and Excited

Liu developed his patented process for drying and milling apple peels in 2003. The first company that held the license to Liu’s patent failed to run with it, opening the door for Dave Copeland, a product developer in upstate New York who says he is constantly searching for greater efficiencies in the food supply. Intrigued and excited by Liu’s research, Copeland spent many sleepless nights imagining the possibilities. That, in turn, led Copeland on many five-hour drives to Ithaca to see Liu at Cornell. By 2006 Liu decided that if anyone could commercialize the application of dried apple peel powder, it would be Copeland, with his long track record of bringing innovative foods to market.

Copeland decided to market dried apple peel powder capsules over the internet, and that’s when the real work began. He auditioned several companies that were able to process a limited supply of the dried apple peel powder, which was a good start. But in order to grow the business, he had to find a large, ongoing supply of organic apple peel, as well as a manufacturer that could dry and mill it at a reasonable cost. It was no easy task.

Keeping It Functional

“The challenges of commercializing the product have been numerous,” Copeland explains. “First, I had to find a steady source of apples. While there are a lot of good food processors who use apples for applesauce, cider, and pies, it was difficult to find a facility that left the apple peel intact. I looked all over North America for a supplier that could meet the criteria.”

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Ironically, after searching from East Coast to West, Copeland found what he was looking for only 75 miles from home, smack dab in the middle of what is regarded in the eastern United States as “apple country” (no offense intended to Washington state).

The supplier was Leahy Orchards of Franklin Centre, Quebec, North America's largest producer of organic applesauce and the fourth largest applesauce producer overall. Leahy Orchards, a family-owned company, was an especially fortunate find for Copeland, not only for its desirable location just north of the New York border, but also for the talents of the company's founder, Jim Leahy. Although Leahy had officially retired, selling his business interests to his sons in early 2007, he was still involved in the company in an advisory capacity. Leahy and Copeland hit it off immediately and teamed up to form AppleBoost Products Inc.

AppleBoost Products now had a steady supply of apple peel from Leahy Orchards. Thanks to Leahy Orchards' commitment to cutting-edge technology, they also had a strategic partner that would be able to dry and mill the peel at a reasonable cost. The concept of using apple peel instead of discarding it was so new that equipment did not exist that would not destroy the peel during the peeling process. Leahy Orchards' top engineers designed custom equipment that would gently separate the peel from the apple so it could be dried and milled without damaging the nutrients. “Functional foods” are, by definition, those that have

health-promoting or disease-preventing properties beyond the basic function of delivering nutrients, so nutrition preservation was imperative to Copeland.

AppleBoost DAPP Caps

Copeland dubbed his apple-peel capsules AppleBoost DAPP caps, and he worked the phones pitching the product to major college and professional sports teams. Copeland's

own history as a college athlete helped him build rapport inside locker rooms and encourage athletes to try the product. Anecdotal reports soon came flooding in, with athletes reporting that DAPP caps were acting like a powerful Cox-2 inhibitor (a nonsteroidal anti-inflammatory drug, or NSAID), without any of the associated side effects.

NSF Certified for Sport

The AppleBoost DAPP caps earned an important distinction early on, when in the summer of 2008, it was awarded the “NSF Certified for Sport™” designation, which ensures that the product is free from banned substances. With athletes, teams, and even organizations like the National Football League more determined than ever to keep foods and dietary supplements clean, the designation is a badge of honor. “NSF International has been in the business of ensuring the safety of food, water, and air for over 60 years,” says Copeland. “It is recognized as the top dietary supplement certification program in the world, and we're proud to be part of the NSF family.”

From DAPP Caps to Energy Snacks

Once they had blazed a business pathway for DAPP caps, Copeland and Leahy came up with an even more intriguing idea: DAPP-fortified organic applesauce in durable, portable tubes that can be served at room temperature, chilled, or frozen. Their plan for 2008 was to pitch the DAPP caps to athletes and the AppleBoost energy snack tubes to large institutional customers, notably schools, hospitals, and major



(l. to r.) Dave Copeland, Jim Leahy, and Mike Leahy

Patent No. 11/018,833



Throughout his career, Rui Hai Liu, Food Science, has focused his research on dietary phytochemicals and disease prevention, and his research on apple peel has been some of his most exciting work so far. In 2003 Liu patented a process for drying and grinding apple skins to create dried apple peel powder (DAPP). Gram for gram, the powder is more nutrient-dense than fresh apple peel, and the powder form makes it more bioavailable than fresh peel. While Liu's patent was written with cancer treatment in mind, the applications have proven to be much more wide-ranging.

college and professional sports teams. Both men firmly believe that a successful introduction of DAPP caps and energy snacks will lead to wider commercial success, most likely when larger food companies choose DAPP as a nutrient-rich ingredient for fortifying cereals, energy bars, baked goods, and other types of food products.

By mid-2008, it was clear to Leahy and Copeland that DAPP had huge potential as a food ingredient. The endeavor was not without its challenges, however. Many of the big food companies learned of the dried apple peel powder before they were ready to properly present it, much less produce it on a large scale. The partners did not want to miss an obvious opportunity, but neither did they want to move forward unprepared. One year later, having nurtured relationships with the large food companies, AppleBoost Products is now in a much better position to go after that market aggressively.

Endowed by Nature

At first glance, according to Liu, DAPP may look unsophisticated to the untrained eye. It is, after all, merely pure dried-and-milled organic apple peel. But in reality, he says, DAPP supplies hundreds of bioactive compounds that act both additively and synergistically with other whole foods to provide countless health benefits. These benefits come from the abundant natural antioxidant and anti-inflammatory compounds found in DAPP, along with the peel’s soluble and insoluble fiber.

“Consumers are reminded to eat a wide variety of fruits, vegetables, and whole grains to capitalize on the multiplicity of enzymes contained in whole foods,” Liu says. “The health benefits provided by nature are virtually impossible to replicate with multiple vitamins.”

Liu’s early research suggests that dried apple peel powder will have a wide range of applications, starting with antioxidant protection, but also promoting digestive and cardiovascular health, Cox-2 inhibition, and even inhibiting the growth of cancer cells. As impressed as Copeland is with Liu’s groundbreaking research, he is careful to point out that creating a product in a lab is light years away from producing it commercially.

“The research is very compelling,” says Copeland, “but it’s only the beginning. We’ve barely scratched the surface of what DAPP can do and how it can be used. We’re dedicating significant resources to more research so that we can make even more persuasive claims.”

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Even with compelling scientific evidence that supports the health advantages of DAPP and a patent license, AppleBoost Products, like any other food company, must meet the demands and expectations of health regulatory agencies. “The FDA has determined that DAPP is a GRAS (generally recognized as safe) substance,” explains Copeland. “It’s considered a physically altered whole food, not a chemical extract, which is a very important distinction in our favor.”

The company is currently proceeding with more studies, such as a double-blind in vivo study on arthritis patients. Researchers will look at the participants’ blood markers for inflammation before and after consuming DAPP and evaluate typical arthritis symptoms, such as range of motion. Copeland has no reason to believe the results will be anything less than spectacular. Anecdotal evidence already demonstrates that DAPP helps athletes withstand the rigors of training and competing, which can contribute to joint inflammation.

You Can Have It Chilled To Go

When frozen, the AppleBoost energy snack tubes are already gaining traction in sports for providing “cool down” refreshment, not to mention good texture and great taste. Food service companies that supply schools and hospitals are eyeing the AppleBoost energy tubes as a healthy alternative to traditional salty and sugar-based snacks. And registered dietitians, with whom AppleBoost founders hope to form an alliance, may be the heroes in the end. Dietitians are trusted sources, and the handful of them who have had the opportunity to experience AppleBoost

energy snacks to date have liked what they have tasted. Add an American population that typically consumes only half of the daily recommended fruits, vegetables, and fiber, and one could reasonably conclude that there is a place in the American food supply for AppleBoost Products.

AppleBoost on the Go

As AppleBoost Products evolve from idea to incubation, from locker rooms and the summer Olympics to lunch boxes, school cafeterias, and beyond, Liu continues to play an advisory role. “Semi-retired” Jim Leahy presides over the administration and quality control, while his son Mike, president of Leahy Orchards, ramps up manufacturing capabilities to accommodate growth. Dave Copeland, meanwhile, continues to tinker around his home near Lake Placid, New York, working on new flavors, new packaging, and entirely new AppleBoost products.

*Eileen Coale
Coale Communications for AppleBoost Products Inc.*

For more information:

Dave Copeland
AppleBoost Products Inc.
PO Box 85
Churubusco, NY 12923
(518) 593-0278
E-mail: dave@appleboost.com
Website: www.appleboost.com



DAPP Caps and Tubes

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