

Superior or Superfluous?

By Sandy Almendarez, Editor

With hype come haters. Just ask the açai berry. There it was; this little noble fruit growing for centuries in the Amazon and fueling Brazilian breakfasts with little interest from the rest of the world. It hit the Western world, and then Dr. Mehmet Oz called it “a very great powerful antioxidant” on the Oprah Winfrey Show in 2008. The açai berry was a hit, with marketers touting its weight-loss benefits specifically. Internet pop-ups abound, and many companies named dropped Oprah in their ads.

Then, on Aug. 19, 2009, Harpo Inc., producers of The Oprah Winfrey Show and The Dr. Oz Show, along with Dr. Oz, filed a trademark infringement complaint against 40 Internet marketers of dietary supplements, including açai berry products among others. In a press release, Dr. Oz said, “The companies that are using my name to hawk these products are duping the public. I do not endorse any of these products. By falsely presenting products as ‘scientifically proven’ and endorsed by well-known figures, these companies do a gross disservice to the public health and could even pose a danger to those who believe their false and unproven claims. I am taking this step in the interest of public safety. I feel compelled to stand up against these companies and their deceitful practices.”

Harsh words, and just like the hype she created, many followed Oprah’s recommendation to the extreme, turning against all açai products, and even the entire superfruit category. That backlash hurt the industry for sure, but maybe the excitement and the counterattack helped level sales to what they would have been without the rollercoaster ride. Now, health-conscious consumers are smart enough to separate the hype from the science, and they realize açai and other superfruits offer unique health benefits, and can bring variety into a healthy lifestyle.

“Certainly all the attention to superfruits has opened up the consumer taste to a broader range of varieties, creating new agricultural opportunities around the globe,” said Chris DiLorenzo, Pocantico Resources. “However, the term superfruit may have become overused—originally the buzz came with pomegranate, acerola, açai and goji—not so much because they were better, but rather ‘novel.’”

Angela Dorsey-Kockler, RD, product manager, BI Nutraceuticals, noted consumers are willing to pay for superfruit ingredients because of the perception that they offer more nutrition and health advantages. “However,” she said, “this interest is tempered by consumer skepticism and fraudulent activities of some large online direct marketing companies proffering superfruit products and promising too-good-to-be-true benefits (i.e., açai for weight loss). It is important for manufacturers to be responsible in how they present the benefits of their superfruit products so as not to discredit the company’s or the superfruits’ reputations.”

Defying Definition

Gina Valentino, sales executive, HP Ingredients, said she defines a superfruit simply as “a fruit that combines exceptional antioxidant qualities with appealing taste that supports healthy lifestyles.”

Dorsey-Kockler added BI defines superfruits as, “those fruits, both traditional and exotic, that offer a higher-than-average dose of health-promoting properties,” but qualified, “the definition is largely

subjective and superfruits gain their status more through marketing efforts, than through clear, well-defined standards.”

Yes, like “natural,” it seems everyone has his own definition of superfruit. Most agree superfruits at least must be a fruit and possess some high-quality nutrients and antioxidants. But, isn’t that covered in the definition of “fruit”?

“Superfruits should be defined by measurable standards,” said David Bell, president, Bell Advisory Services LLC. “It would not please or serve many of the companies that use the term to market products, but it would help make the term more meaningful.”

Paul Gross, Ph.D., industry consultant and author of “Superfruits,” took on the task of defining the obscure category using five criteria: 1) popularity and sensory appeal of the whole fruit, 2) nutrient diversity and density, 3) phytochemical diversity and density, 4) medical research, and 5) clinical applications. He uses a five-point scale for each criteria; each fruit’s score is compared to a 25 maximum, a height he said no fruit has met.

“The criteria lead to accepting only a few fruits actually having exceptional qualities—eight in total, eliminating most others as nutritionally deficient or scientifically undeveloped to warrant calling them true superfruits,” Gross wrote in a July 2009 *INSIDER* article. Fruit that shouldn’t be including in the superfruit category included baobab, maqui, amla, noni and even the berry that seemed to start it all, açai. However, those that are officially “super” per Gross’ book are mango (*Mangifera indica*), fig (*Ficus carica*), orange (*Citrus sinensis*), strawberry (*Fragaria ananassa*), goji (*Lycium barbarum*), red grape (*Vitis vinifera*), cranberry (*Vaccinium macrocarpon*), Kiwi (*Actinidia deliciosa*) and papaya (*Carica papaya*).

What’s wrong with açai (*Euterpe oleracea Mart.*), according to Gross? He said, “1) it cannot be obtained as a whole food in the United States, Asia or Europe (large markets), and probably would not be popular for general consumer use due to its sour, oily taste, and both storage and product formulation difficulties; and 2) it has only minimal science published to date, mostly on its properties in vitro and early-stage human pilot studies, and seems not to be attracting wide scientific interest. In other words, it remains mainly in the bottom half of the health claims research pyramid shown in the book and my *INSIDER* article, and would be regarded by impartial scientists as a fledgling research topic, not earning true ‘super’ status.”

Lab Results

Still, açai is unusual because it contains omega-3 essential fatty acids (EFAs), and science hasn’t ignored it completely. In fact, a USDA-ARS study is currently underway. In Phase I of the study, researchers from Tufts University, Boston, are assessing various açai preparations and comparing them with concord grape juice, pomegranate juice and white grape juice. If the açai berry preparations show efficacy for reducing calcium clearance (following depolarization), oxidant stress (amyloid beta, A(beta)42 induced) or inflammation, then two more phases will be carried out to determine the mechanisms. In a progress report, the researchers said they found components of açai berries were effective against inflammatory and oxidative stress in the brain cells similar to the other berries they tested. Completed research has found it is a good source of vitamin C and antioxidants,¹

has anti-inflammatory properties,² has a high phenolic and phytochemical content,³ and has a high ORAC value.⁴

Mangosteen (*Garcinia mangostana*), which comes our way from Indonesia, scored highly on popularity and sensory appeal in Gross' definition, but only reached a total score of nine due to sparse nutrient content, and lack of medical research and clinical applications. "It does have high levels of certain anthocyanins, xanthenes and tannins, but only in the inedible rind; some companies have extracted those compounds to add to consumer products," Gross noted.

Mangosteen research has shown periodontal (gum) disease prevention⁵ and positive effects on cancer.⁶ A 2009 study reviewed the ability of a proprietary, whole-fruit mangosteen puree (XANGO® Juice) to reduce inflammation and increase antioxidant levels in 40 obese patients with elevated C-reactive protein (CRP) levels. The eight-week study revealed 18 oz. of the beverage significantly helped to reduce high-sensitivity CRP measurements compared to placebo.⁷ Subjects that drank XANGO also reduced their body mass indexes (BMIs).

"Research indicates that naturally occurring xanthenes found in the mangosteen may help maintain intestinal health, support the immune system, neutralize free radicals, help support cartilage and joint function, and promote a healthy seasonal respiratory system," added Jeff Chandler, senior manager, corporate communications, XANGO LLC.

Surely a major trend in the superfruit category—and even part of the definition for many—are they come from exotic origin. **Baobab** (*Adansonia*) fruit, from Madagascar, certainly fits that condition. While there is a dearth of research, in 2009, researchers evaluated published material about baobab food products and reported its pulp is particularly rich in vitamin C, the leaves are particularly rich in calcium, and they contain good-quality proteins.⁸ In 2002, Italian researchers compared the Integral Antioxidant Capacity (IAC) of baobab, and reported it had more antioxidants than strawberry, kiwi, orange and apple.⁹

"A new [superfruit] now entering the United States is baobab fruit, which is already becoming popular in Asia and Europe," Dorsey-Kockler said, adding baobab is BI's newest offering. "It is sourced from Africa and is very high in calcium, vitamin C and potassium compared to other fruits. It is also reported to contain an ORAC value of 240 u mol TE/g, double that found even in pomegranates. Finally, it has also demonstrated prebiotic effects in in-vitro testing."

Nutraceutical International's newly patented Baozene® is a purified powdered extract containing 70-percent fiber content, made from the baobab fruit, according to David Romeo, managing director. "It has an immense amount of nutritional benefits including high amounts of fiber, vitamin C, calcium, potassium, iron and more," he reported.

Adding to the list of beneficial components, Hugh Lamond, president, Herbal Teas International, said baobab also contains phosphorus and vitamins B2 and B3. "What sets baobab aside from other superfruits of its caliber is the exceptionally high fiber content and its high levels of pectin (23 percent)—which make it useful as binding and thickening agent," he said.

With purple power, the **maqui** berry (*Aristotelia chilensis*) was traditionally used by the Mapuche Indians for strength and stamina in the Patagonia region. This superfruit has a relative high

anthocyanin content,¹⁰ and more antioxidants than carrot, red pepper, cucumber, strawberry and wild blackberry, according to the FRAP (ferric reducing activity power) test.¹¹ Its juice inhibited copper-induced low-density lipoprotein (LDL) oxidation, and in human cell cultures, it protected against hydrogen peroxide-induced oxidative stress.¹²

While a taste of the exotic is a trait of superfruits, some familiar favorites have also hit this super status. “It’s important to recognize that homegrown superfruits like cranberry and blueberry are yielding research that is every bit as exciting as some of the more exotic varieties of fruits,” said Marina Linsley, marketing director, NP Nutra.

And, Vladimir Badmaev, director medical and scientific affairs, P.L. Thomas & Co. Inc., reminded, “Wild **blueberry** (*Vaccinium angustifolium*), due to its outstanding antioxidant properties researched in 2004 by the USDA, was historically the first fruit referred to as a superfruit.”

Unfamiliar fruit may not always be a selling point, according to Thomas Payne, industry specialist for the U.S. Highbush Blueberry Council, who said, “Food safety is also a big issue, and consumers have been given reason for concern about the origins of their foods, especially with the exotic and unfamiliar. That’s where blueberries come in. People already identify blueberries with the healthiest possible eating.”

The blueberry genus *Vaccinium* includes more than 450 plants, but three varieties are most abundant. The northern highbush (*V. corymbosum*) grows wild in North American forests, the lowbush (*V. angustifolium*), known as “wild blueberries,” grows in Arctic North America, and rabbiteye (*V. ashei*) thrives in the southern United States. This native berry also has a ton of western hemisphere research. In 2010, a study from Oklahoma State University reported blueberries may improve selected features of metabolic syndrome and related cardiovascular risk factors at dietary achievable doses,¹³ and a study from the National Institutes of Health (NIH) found blueberry extract supplementation may have protected rats against neurodegeneration and cognitive impairment caused by oxidative stress.¹⁴ It’s not just American researchers who are interested in this anthocyanin-rich berry; Canadian researchers found blueberries decreased total, LDL- and high-density lipoprotein (HDL) cholesterol in pigs.¹⁵ And blueberry anthocyanins demonstrated anti-cancer properties by inhibiting cancer cell proliferation and by acting as cell anti-invasive factors and chemoinhibitors, according to Portuguese researchers in 2010.¹⁶

So much a part of the American life that it’s a staple at Thanksgiving, **cranberries** (*Vaccinium macrocarpon*) are among Gross’ shortlist of true superfruits. It’s tasty as a whole berry (albeit with the addition of a sweetener), and it has an extensive list of research credit. Cranberries are high in antioxidants,¹⁷ have a high amount of vitamin C,¹⁸ are full of anthocyanins¹⁹ and also fight oral bacterium.²⁰ Of course, they are best known for treating urinary tract infections (UTIs).²¹

While the average American may not be carrying **pomegranate** (*Punica granatum*) in her lunch box, the flavor has certainly become familiar, at least in beverages. And the whole fruit has been studied in several clinical trials. “Some fruits are supported by mainly hype and in vitro data, while others are supported by clinical research, human pharmacokinetics, method validation and other types of substantiation,” noted Blake Ebersole, technical director, Verdure Sciences. “With this perspective, we see pomegranate as more of a ‘super-duper fruit.’”

Most recent research has shown ellagitannins from pomegranate may support recovery from exercise, attenuating muscle soreness and damage,²² and both in vitro and in vivo studies have demonstrated how it acts as an antioxidant, an anti-diabetic and a hypolipidemic remedy, and shown anti-bacterial, anti-inflammatory, anti-viral and anti-carcinogenic activities, according to a Spanish review.²³ Researchers also noted, “The fruit also improves cardiovascular and oral health.” Previous research has found pomegranates are high in fiber, vitamin C and vitamin K and have potent antioxidant activity,²⁴ can modify heart disease risk,²⁵ help reduce coronary heart disease (CHD)²⁶ and may reduce type 2 diabetes.²⁷

Verdure’s patented POMELLA® pomegranate extract is standardized to the punicalagins in the fruit, some of the most active and abundant phytonutrients unique to the fruit. Studies on POMELLA® found it is a proven and safe dietary supplement, and has promise as a treatment against breast cancer by preventing proliferation of cancer stem cells,²⁸ and has an antiplaque effect when used in vitro in a mouthrinse.²⁹

A propriety blend of prune extract, pomegranate fruit extract, apple extract (phloridzin), white cherry extract and grape leaves extract (dihydroquercitin), as FruitOx® from P.L. Thomas, with the addition of raspberry and strawberry extracts, was evaluated in a four-week, double blind, randomized, placebo-controlled, clinical study on a healthy population of young men with high cholesterol (average 280 mg/dl).³⁰ The fruit mix resulted in statistically significant reduction of total plasma cholesterol, average plasma LDL cholesterol and pro-inflammatory markers, and an increase of plasma HDL cholesterol with no changes in cholesterol in the placebo group. Additionally, Badmaev noted a nutritional analysis of FruitOx showed a low content of fructose, glucose, sucrose, maltose, lactose, fats and sodium. The ORAC value for FruitOx was established at values ranging from 8,000 to 10,000 µmoleTE/g, he said.

Adding a cherry on top to the category, **tart cherries** (*Prunus cerasus*) are also considered a superfruit based on science, according to Jeff Manning, chief marketing officer, Cherry Marketing Institute. “Tart cherries have a very high level of disease-fighting antioxidants compared with most fruits,” he said, noting research has linked the unique anti-inflammatory qualities of tart cherries. “Tart cherries are rich in anthocyanins, powerful antioxidants that provide many of the fruit’s health benefits and also give cherries their bright red color. Specifically, tart cherries are known for their powerful anti-inflammatory profile, linked to reduced risk factors for heart disease, and also reducing pain associated with arthritis and exercise recovery.”

An early 2011 study confirmed athletes who drank the juice of tart cherries after a vigorous workout reduced muscle damage and recovered faster thanks to anthocyanins that reduce inflammation.³¹ The findings also suggested the cherries could affect inflammation related to heart disease and arthritis. Another study, published just a few months earlier, found drinking a glass of unsweetened cherry juice at bedtime was associated with statistically significant pre- to post-treatment reductions in insomnia severity (minutes awake after sleep onset).³²

Market Movement

This is by no means an extensive list of fruits marketed as super, as numerous others, including noni, gogi, sea buckthorn, saw palmetto, acerola, papaya, black currants, mango, grape and strawberry are all contenders in this heavy marketplace. In fact, “Sea buckthorn is shaping up to be the next big

superfruit,” according to the editors of FoodSpring.com who identified the “holy fruit of the Himalayas” as one of the most influential food trends of 2010. *New Nutrition Business* named fruits and superfruits number five out of its top 10 trends for 2010, and the food channel noted superfruits, specifically, acai, pomegranate and blueberry, in its top 10 trends of the past 10 years.

Expect more trendy superfruits in the near future, said Steve Siegel, vice president, Ecuadorian Rainforest LLC. “The superfruit category is still quite young,” he said. “A trend we’ve noticed is that as soon as one ingredient comes out, another is waiting to take its place. For example, pomegranate was followed by acai which was followed by maqui. Consumers are always looking for the next big thing.”

And that next big thing is likely to come in whole form, according to Bell. “There is a growing consensus and sense of urgency that complex whole foods, eaten as close to their natural state as possible, are essential to optimal health. Even if this still poses considerable logistical challenges to the average shopper on a daily basis, it represents a massive shift in both thinking and behavior from the peak of the processed-food era.” This shift will bring big guns to the superfruit category, added Bell, who said the market will see more consolidation and bigger corporate investment.

Money will bring more research, and the “tier one superfruits” on Gross’ list will expand. He said he expects more studies on kiwi, blueberry, seaberry and tart cherry in the near future.

While superfruits will continue to spread their seeds in all delivery forms, Jeff Hilton, partner and co-founder, Integrated Marketing Group (IMG), said he believes superfruit-centered products “are going to be around for a long time,” during his SupplySide West 2010 presentation on the top trends in functional foods.

Those foods will often tout cognitive health, Badmaev predicted. “In essence, brain foods and foods that may have positive effect on mood maybe natural target for superfruits, especially in a handy form of delivery.”

Linsley agreed, adding, “With an aging population, there’s a special focus on healthy aging with particular attention being paid to brain and memory function. We’re also seeing an unprecedented rise in ‘lifestyle’ diseases so blood sugar and weight management will continue to be important. We can expect to see a range of sugar substitutes become popular including lo han guo and others. Omega-3s are also an interesting, developing trend with interest from the U.S. military for troop mood and stress benefits showing how mainstream the category is becoming. One last trend to note is that as we become increasingly time poor, superfruit-enriched products offer a convenient way to shore up nutritional deficiencies.”

Taste will also be a factor, as consumers want more of the real thing. “As more consumers become aware of the taste profiles of various fruits and use the raw fruits, I think the flavor profiles of such will become more authentic in mass-produced products,” said Jamie Goodner, Ph.D., senior scientist, WILD Flavors. “Now, superfruit flavors are often combined with more recognizable fruits for consumer appeal; that will change to be more of an authentic message.”

Increasingly important to all aspects of the natural product industry will continue to be sustainability, and manufacturers that show green efforts should bode well. “There is increasing demand for

transparency and sustainability of products, and probably more so for exotic fruits that may be coming from the developing world as consumers want to make sure that the products they consume are raised, harvested and traded in fair ways,” Dorsey-Kockler said.

It’s important for both suppliers and manufacturers to toot their own green horn, so shoppers know which companies to support. However, the story shouldn’t stop there. “The key to marketing superfruit products is telling their whole story,” Siegel said. “Telling the whole story involves discussing the science, the folklore and the cultivation, and describing the fruit itself in order to give consumers a complete—and juicier—picture of these exceptional fruits.” He suggested describing the flavor, color and history of the fruit as it relates to indigenous populations. “Not only do these stories fill in some of the gaps left by inadequate scientific research, they bring intrigue and entertainment, marketing elements that can only help you hold onto consumers’ attention.”

Making the Grade

Consumers are getting more familiar with antioxidant tests, such as ORAC, as well as their pitfalls. “Solid preclinical and clinical science, rather than ORAC value alone, is increasingly required to substantiate the health supporting use of superfruits,” Badmaev said. He explained new derivations of the ORAC test have been developed such as Hydroxyl ORAC measuring prevention of formation of hydroxyl, Peroxynitrite ORAC measuring peroxynitrite, Superoxide ORAC measuring superoxide and SOAC singlet oxygen absorbance capacity. Also, he noted the original ORAC now involves ORAC-hydro for water soluble antioxidant capacity, ORAC-Lipo for lipid soluble antioxidant capacity and the sum of two.

Marie Spano, M.S., R.D., CSCS, CSSD, food industry consultant, noted using different tests on one piece of fruit may result in different measured outcomes of total antioxidant capacity (TAC), which highlights a glaring shortcoming of these tests, in an article for *Food Product Design* published in November 2010. “TAC, regardless of the test used, shouldn’t influence a consumer’s choice of fruit, since TAC tests do not take into account the absorption and utilization of various antioxidants in the human body,” she wrote.

Indeed, in a 2007 study, volunteers ate varying amounts of cherries, dried plums, kiwifruit, red grapes, strawberries and wild blueberries, and scientists measured their postprandial spike in antioxidant capacity as measured by ORAC.³³ Kiwifruit outperformed the other fruits for increasing blood antioxidant levels, likely due to their high vitamin C content (vitamin C is well-absorbed by the body), despite the fact that other fruits had higher levels of specific antioxidant compounds, including anthocyanins, proanthocyanidins and flavonols. Consumption of blueberries and cherries resulted in an increase in the subject’s fat-soluble antioxidant capacity, even though these berries do not contain large quantities of fat-soluble antioxidants.

To help sort out the confusing ranking of antioxidants, Bell said Brunswick Labs is presently designing a trust mark certification program that establishes superfruits in verifiable quartiles of nutritional performance in different categories based on recommended daily ORAC intake.

As the category matures, superfruit antioxidant tests are sure to be solidified and improved, which will help establish a clearer definition. This in turn should mean more consumer trust and spending. No matter how they’re tested or defined currently, superfruits are still popular to consumers in foods,

beverages, personal care products and supplements, even if Oprah discredits some of their marketers. As the category grows, the unscrupulous companies fade and studies bring substantiation, even some of the current haters will learn to love the superness of these tiny avengers.

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