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Antioxidant Products



Antioxidant Products: Nutritional Science and Marketplace Opportunities

Antioxidants are gaining prominence in a multitude of products. While most consumers know antioxidants are “good for them,” which ingredients are beneficial and why remain a mystery. New classification systems, further research into antioxidant properties and the ability to make claims will help inform the public.

Amanda Archibald, Contributing Editor

The past two years can be classified as unique regarding a single nutrient classification. Few points in time have had a larger impact on food product development and marketplace momentum. In reality, the market did not suddenly “wake up.” It simply reached a tipping point. In effect, the past two years became a watershed; a time when the first “age wave” of boomers hit 60, and a collision of health consciousness and economic means occurred. Youth and longevity became vogue, and strange ingredient bedfellows such as pomegranate, mangosteen, green tea and chocolate enjoyed notoriety. Their red carpet status was protected by their superstar classification as “antioxidants.”

According to Mintel Global New Products Database (GNPD), 112 new food and beverage products were launched in North America in the past year that touted the presence of antioxidants, many of which promoted an affiliation with health versus formulation functionality. Translating this to the marketplace, more than 35% of all new food and beverage product launches (searching the GNPD between the years 1996-2007) that mentioned antioxidants occurred in the past year in North America. Beyond last year’s new product launches, an additional 155 new varieties, range extensions or products with other revised product features claiming antioxidants were released. Putting this into context, 5.8% of all new products released in North America over the past year mentioned antioxidants. Of these, the majority affiliated themselves with a “good for you” benefit. Simply put, antioxidants have traction among consumers and, given their close tie to health and longevity, are seen as a long-term return on health

investment for the consumer as well as an excellent investment for the processor.

Why the Hype?

Antioxidants find themselves at the intersection of emerging science, aging and a nation of people increasingly aware of the long-term implications of poor food or lifestyle choices. Perhaps the most acknowledged driver behind health awareness and a demand for youthfulness is the growing portion of the population aged 45 and over, with Baby Boomers representing the largest swath.

According to the data, by 2011, persons aged 45 and older will represent more than 39% of the entire population. (See chart “Booming Boomer Growth.”) This translates to a growing population segment facing the aging process with plentiful monetary resources to purchase goods that will prevent its onslaught. Aging is frequently accompanied by an increased risk for cardiovascular incidents, cancer and degenerative diseases, and antioxidants are implicated for their ability to reduce the risk of such diseases and processes; a simple case of supply and demand explains the interest in and demand for products containing antioxidants.

Why Antioxidants?

The MedTerms Medical online dictionary at www.medterms.com defines antioxidants as “any substance that reduces oxidative damage such as that caused by free radicals.” In turn, free radicals are defined as “highly reactive chemicals that attack molecules by capturing electrons and thus modifying chemical structures.”



Nature's Path Foods Inc.'s Optimum Flax Soy Blueberry Waffles notes on the package side that: "They contain heart-healthy fiber, antioxidant isoflavones, and organic flaxseeds, a source of lignans and omega-3 essential fatty acids."

The significance of antioxidants to human health lies in their ability to reduce harmful oxidation reactions at the cellular level. Free radicals, or any molecule that has an unpaired electron in its outermost shell, are closely associated with oxidative damage to cellular structures, resulting in a decline in functionality. Over time, reduction in cellular function causes a decline in organ function and subsequently organism function; this process is otherwise known as "free-radical theory." Preventing oxidative damage at the cellular level is therefore associated with better functionality and subsequently better health outcomes. The goal then of antioxidants and antioxidant systems is to prevent oxidative damage caused by reactive oxygen species (ROS), or free radicals that are generated through normal cellular processes.

Antioxidants are found in varying amounts in natural food sources. These can be broadly classified into the following groups¹: vitamins, vitamin co-factors, minerals, hormones, carotenoid terpenoids, flavonoid polyphenols, phenolic acids and their esters, nonflavonoid phenolics. (See chart "Antioxidant Vitamins.") Synthetic antioxidants do not occur naturally in nature and are used specifically in processing to inhibit the effects of oxygen on food. Examples include BHA, BHT, TBHQ and PG. Naturally occurring antioxidants such as tocopherols and polyphenolics (example: rosemary extract), as well as antioxidant vitamins and nutrients such as vitamins B6, B12, C, E, folate and selenium are also used in food processing. As demand for clean labels increases, the number of new products formulated with natural antioxidants to increase product shelflife will likely increase.

Conservative Recommendations from Associations

Given their role in preventing oxidation and the subsequent related decline of cellular function, antioxidants have been the subject of extensive research over time. While their roles and applications continue to expand, health (or disease-based) research can generally be classified into

the following areas: cancer, cardiovascular, neurodegeneration (to include cognitive degeneration), ocular science and aging. The challenge is, and always will be, finding conclusive and consistent evidence to use as a basis for sound recommendations. This would best describe the plight of researchers striving to make specific antioxidant recommendations, particularly in the fields of cardiovascular and cancer science.

In a 2004 article published in the scientific journal *Circulation*,

the American Heart Association (AHA) reported on a review of several controlled clinical studies in which the effects of antioxidant vitamin and mineral supplements on cardiovascular disease (CVD) risk were studied. According to AHA, "Collectively, for the most part, clinical trials have failed to demonstrate a beneficial effect of antioxidant supplements on CVD morbidity and mortality." This being the case, the AHA position is to recommend the following, rather than support antioxidant vitamin supplementation: "Consumption of a diet high in food sources of antioxidants and other cardioprotective nutrients, such as fruits, vegetables, whole grains and nuts, instead of antioxidant supplements to reduce risk of CVD." In other words, they acknowledge the benefits of antioxidants in the diet, but do not support overt supplementation to reduce cardiovascular risk.

At the AHA 2006 Scientific Sessions gathering, researchers in the Women's Antioxidant and Folic Acid Cardiovascular Study (WAFACS) reported "no cardiovascular benefits from three antioxidants—vitamin C, vitamin E or beta-carotene—on the primary end point of CVD during a 9.4-year study. On the other hand, researchers were able to show a possible reduced risk of stroke among smokers or women who had three or more risk factors when supplemented with vitamin C. Similarly, women with a prior history of CVD who took vitamin E also had a significant reduction in cardiovascular events, according to an AHA news release. Researchers critical of the AHA and aforementioned research suggest that the focus of antioxidant roles in disease management undermine their value in general wellness or risk prevention.

According to the National Cancer Institute (NCI), "Considerable laboratory evidence from chemical, cell culture and animal studies indicates that antioxidants may slow or possibly prevent the development of cancer. However, information from recent clinical trials is less clear.



In recent years, large-scale, randomized clinical trials reached inconsistent conclusions. "The etiology of cancer is further complicated by the simple fact that humans are dynamic organisms, and what may be a cause of cancer in one person may not be the same for another. Additionally, what might be deemed an effective treatment for one type of cancer may not be for another, making concrete recommendations difficult.

Review of results from a number of trials published in the 1990s illustrates this point, since taken together, they revealed inconsistent results. The China Cancer Prevention Trial published in 1993 showed that a combination of beta-carotene, vitamin E and selenium significantly reduced the incidence of both gastric cancer and overall cancer. In contrast, the famous 1994 Beta-Carotene and Retinol Efficiency Trial (CARET) demonstrated a possible increase in lung cancer in the presence of antioxidant supplementation. However, results of a multi-center study conducted in Italy and published in the *International Journal of Cancer* reported an inverse association between intake of vitamin E and/or vitamin C and renal cell cancer among the population studied². Alternatively, this study found no statistically significant relationship between other micronutrients analyzed, including alpha and beta-carotene, lutein and lycopene. Researchers examining the role of supplemental and dietary vitamin E, beta-carotene and vitamin C in prostate cancer risk reported that their findings did not suggest a role for high-dose antioxidant supplementation in preventing prostate cancer, but that among male smokers and among men with low beta-carotene intake, supplementing with vitamin E and beta-carotene respectively "were associated with reduced risk of this disease"³.

As mentioned earlier, when it comes to the advice about antioxidant supplementation and cancer, the answer is "it depends." This would also lend credence to NCI advice that mirrors the AHA in terms of making broad rather than narrow dietary antioxidant recommendations.

Neurodegenerative Applications

A number of recent studies have continued to find neuroprotective applications for green tea/green tea extract. Recent research published in the September, 2006 edition of *Human Molecular Genetics* suggested that green tea extract, polyphenol epigallocatechin-3 gallate (EGCG), may play a role in preventing the misfolding and subsequent mutation of the huntingtin protein⁴. Since the body cannot dispose of these mutant proteins, they accumulate in the brain (polyglutamine-mediated toxicity) and eventually become toxic to the brain's nerve cells.

In a related way, a study published in the September 21, 2005 issue of the *Journal of Neuroscience* demonstrated that green tea decreased production of beta-amyloid, an Alzheimer-related protein, in the brains of mice that were genetically programmed to develop the neurodegenerative disease process⁵. Researchers suggested a that dietary supplementation of EGCG might be effective in preventing or treating Alzheimer's in

(Right) While consumers are advised to consume more whole fruits, vegetables, nuts and grains, they also are presented with more detailed information on antioxidants from a broad media array. As such, their interest in such components and what it means for their diets will grow.

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humans, if indeed the beta-amyloid pathology in mice is the same in humans.

Research published in 2006 in the *American Journal of Clinical Nutrition* analyzed the association between consumption of six different drinks (green, black and oolong tea, coffee, cola or juice, and 100% vegetable juice) on cognitive

function for 1,003 Japanese subjects with an average age of 74⁶. Cognitive function was tested using the Mini-Mental State Examination (MMSE). Statistical analysis indicated that participants who drank more than two cups of green tea per day had a 50% lower chance of showing cognitive impairment than those who drank less than three cups a week. In

Examples of Functional Components*

Class/Components	Source*	Potential Benefit
Carotenoids		
Beta-carotene	Carrots, various fruits	Neutralizes free radicals which may damage cells; bolsters cellular antioxidant defenses
Lutein, Zeaxanthin	Kale, collards, spinach, corn, eggs, citrus	May contribute to maintenance of healthy vision
Lycopene	Tomatoes and processed tomato products	May contribute to maintenance of prostate health
Flavonoids		
Anthocyanidins	Berries, cherries, red grapes	Bolster cellular antioxidant defenses; may contribute to maintenance of brain function
Flavanols—Catechins, Epicatechins, Procyanidins	Tea, cocoa, chocolate, apples, grapes	May contribute to maintenance of heart health
Flavanones	Citrus foods	Neutralize free radicals which may damage cells; bolster cellular antioxidant defenses
Flavonols	Onions, apples, tea, broccoli	Neutralize free radicals which may damage cells; bolster cellular antioxidant defenses
Proanthocyanidins	Cranberries, cocoa, apples, strawberries, grapes, wine, peanuts, cinnamon	May contribute to maintenance of urinary tract health and heart health
Isothiocyanates		
Sulforaphane	Cauliflower, broccoli, broccoli sprouts, cabbage, kale, horseradish	May enhance detoxification of undesirable compounds and bolster cellular antioxidant defenses
Phenols		
Caffeic acid, Ferulic acid	Apples, pears, citrus fruits, some vegetables	May bolster cellular antioxidant defenses; may contribute to maintenance of healthy vision and heart health
Sulfides/Thiols		
Diallyl sulfide, Allyl methyl trisulfide	Garlic, onions, leeks, scallions	May enhance detoxification of undesirable compounds; may contribute to maintenance of heart health and healthy immune function
Dithiols	Cruciferous vegetables—broccoli, cabbage, bok choy, collards	Contribute to maintenance of healthy immune function
Whole Grains		
Whole grains	Cereal grains	May reduce risk of coronary heart disease and cancer; may contribute to reduced risk of diabetes

*Not a representation of all sources

Source: <http://ific.org/publications/factsheets/antioxidantfs.cfm#>—Chart adapted from *International Food Information Council Foundation: Media Guide on Food Safety and Nutrition: 2004-2006*

Sheer Bliss Ice Cream's gourmet novelty bar takes advantage of pomegranate's antioxidant reputation. 100% pomegranates' juice falls right after dairy ingredients and cane sugar on its ingredient legend.



that study, the same observations were weak or non-existent for black or oolong tea or coffee. Researchers felt that the higher level of catechins (of which EGCG is one) in green tea (67.5mg/100mL) versus black tea (15.5mg/mL) may explain the results. Results from recent in vitro research conducted on fruit flies showed that vitamin E was effective in reversing neurodegeneration, caused by genetic manipulation of antioxidant proteins, superoxide dimutase and thioredoxin in the brains of fruit flies. This succession of research with promising results in the area of neurodegenerative disease prevention suggests that products targeting the brain and cognitive function will be a growth market for the future.




Chocolate and Analytical Considerations

A review of new product launches in 2006 showed a flurry of activity around chocolate. Depending on the cocoa content, chocolate may be a rich source of flavanols, a sub-class of antioxidant-rich polyphenols. Since the value of antioxidants can be interpreted by their ability to neutralize the impact of free radicals, or their Oxygen Radical Absorbance Capacity (ORAC), it follows that foods with high ORAC scores may have more value than lower scoring foods. According to data published by Hershey, dark chocolate has a higher ORAC score (9,080 units per serving) than blueberries (8,708 units per serving), and natural cocoa (8,260 units) has a higher score than raspberries, cranberries, cherries and walnuts⁷. (See also USDA data in the chart "ORAC Scores.") Preliminary research suggests there may be a link between cocoa and cocoa compounds and cardiovascular health. However, definitive outcomes and recommendations have not been made to date. ORAC scores may also underlie other observations in the marketplace centering on new fruits emerging from Latin America.

As interest in the role of antioxidants in health and disease prevention grew, it became increasingly clear that a standardized method(s) of determining the antioxidant capacity in foods and dietary supplements needed to be developed. This would provide regulatory agencies with a consistent means of evaluating an increasing number of antioxidant-based health claims. Evaluation of data presented at the First International Congress on Antioxidant Methods in 2004, in which scientists gathered to review measurement methodologies, resulted in three proposed methods to be considered for standardization: The Oxygen Radical Absorbance Capacity (ORAC), the Folin Cioalteau method and the Trolox Equivalent Antioxidant Capacity (TEAC). While each method has its virtues, authors of an article appearing in a 2005 *Journal of Agricultural and Food Chemistry* evaluating these methodologies noted, "The ORAC method has been extensively used by research and industry groups and utilizes a reaction mechanism which is highly relevant to human biology." The ORAC methodology can measure both lipo- and hydrophilic compounds⁸.

While the ORAC method is currently the most commonly referenced measurement standard, scientists also recognize that it is not without shortcomings. As Ron



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Wells' Dairy's recently introduced Blue Bunny FrozFruit Superfruit in Pomegranate Cherry and Raspberry Acai Berry varieties. The company notes they contain real fruit and are a natural source of antioxidants.

Pegg, Ph.D., University of Georgia, noted in his Worldnutra 2006 presentation, "Levels of vitamins, minerals and high-potency antioxidants can vary enormously within a particular commodity." Also not known is the impact of processing on the potency of these compounds. These issues prompted the Scientific Certifications Systems (SCS) to launch "Certified Nutrient Rich" and "Certified Antioxidant Rich" programs as a means of verifying "actual levels of essential vitamins, minerals and high-potency antioxidants in foods." SCS offers third-party certification for actual nutrient levels in fresh fruits and vegetables.

Translating the Science to the Street

While science continues to validate and acknowledge that antioxidant nutrients are beneficial to health, translating these benefits into concise and precise dietary advice has proven difficult. Indeed, as mentioned previously, much of the language from leading health organizations continues to acknowledge the "goodness" and benefits of antioxidants but cannot directly relate that to precise dietary advice. Case in point is the Functional Foods Fact Sheet on antioxidants, released in March 2006 by the International Food Information Council (IFIC). It indicates, "Current recommendations by the U.S. government and health organizations are to consume a varied diet with at least five servings of fruit and vegetables per day and six-11 servings of grains per day, with at least three of those being whole grains."

While dietary guidance from major health organizations remains general, antioxidant food group classifications are readily available and often form part of the literature dispensed with dietary advice. IFIC's fact sheet presents an extensive cross-mapping of food sources to antioxidant classes and subclasses, listing potential benefits as well. The publication explains, for example, that flavanols are a sub-class of the flavonoid antioxidant class, and cocoa, tea, chocolate, apples and grapes are sources of flavanol-antioxidants. (See chart "Examples of Functional Components.") While top-down advice remains general, the consumer is presented with extensive information



about the deeper roots of antioxidants and will, therefore, continue to seek out ways to interpret these into their diets.

The result of an atmosphere of general guidance coupled with "good for you" benefits is a communication challenge and a knowledge gap. Recognizing this, Paul Gross, Ph.D., notes in his article, "A Nomenclature for Classifying Antioxidants," with such potential significance to public health, the consumer education process should begin now (and) in a way that the non-scientific public...can readily understand antioxidants at a glance as we do now with calories, carbohydrates, fat percentage and vitamin C." Gross suggests a classification system using letters that would help consumers to group

antioxidants together in a more logical way, according to their functionality. These classifications would then follow: enzymes, vitamins, phenolics (to include the flavonoid class and its subdivisions), carotenoids, hormones, minerals, glutathione, lipid effectors (such as lipoic acid, tocopherols, phytosterols), saponins, steroids and silberines (one class) and finally, sulfur-containing chemicals. In this system, for example, carotenoids would be labeled as Antioxidant C and hormones as Antioxidant H. Gross also suggests a color-coding system could accompany these revised antioxidant classes. He notes that his nomenclature and classifications are suggested and do not represent a complete list or a scientifically validated description of classes. Additionally "classification of antioxidants must undergo scrutiny, revision and adoption by scientists, industry and government to be acceptable for food label use in the public."

The goal of simplifying antioxidant classification is to move the consumer away from a vast array of complex names and terms to simpler means of identification. A second goal is to provide a more practical way of identifying preferred foods which may confer specific benefits according to their antioxidant content and classification.

ORAC Scores

Fruit	ORAC units/100g	Vegetable	ORAC units/100g
Prunes	5,770	Kale	1,770
Raisins	2,830	Spinach	1,260
Blueberries	2,400	Brussels sprouts	980
Blackberries	2,036	Alfalfa sprouts	930
Raspberries	1,220	Broccoli flowers	890

Source: USDA Agricultural Research Service, 1999

ORAC scores can vary greatly, even within a particular plant species, making recommendations and claims more difficult.

RDI for vitamin A must be present as beta-carotene per reference amount customarily consumed." If a product contains several antioxidants and only certain nutrients/ antioxidants meet the criteria for the claim, the regulations require that those antioxidant nutrients be identified by their common name, such as "high in antioxidant vitamins A and E."

Over the past years, government-sponsored research has focused on the antioxidant properties of foods. Companies also are researching ways to

incorporate foods with measurable amounts of antioxidants into products. FDA has authorized a qualified health claim linking antioxidant vitamins to a reduced risk of cancer. Since the FDA has determined that evidence is still "limited and not conclusive," Brown reminds manufacturers that they must include one of three accompanying disclaimers with a claim that "Consumption of antioxidant vitamins may reduce the risk of certain kinds of cancer." Suggested disclaimers include:

- Some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer. However, FDA has determined that this evidence is limited and not conclusive.
- Some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer. However, FDA does not endorse this claim because this evidence is limited and not conclusive.

Antioxidants can be found in a wide array of food sources. Antioxidant vitamins are also a popular way to nutritionally enhance foods and beverages.

Antioxidants and the Regulatory Environment

Diana Brown, who consults with food manufacturers for Blackwell Sanders Peper Martin in St. Louis, notes that there is significant momentum in the marketplace for products containing antioxidant nutrients and marketing language, but the claims are limited: "Currently, the FDA allows the term 'antioxidant' in nutrient content claims only for nutrients with demonstrated scientifically recognized antioxidant activity and that have an established Reference Daily Intake (RDI)."

Brown explains that nutrient content claims regulations require that products contain 20% or more of the RDI for any given antioxidant nutrient to use the word "high" and 10% or more to equate to "good." Manufacturers also must specify the name of the antioxidant that comprises the claim. Referring to the regulations of nutrient content claims, "Beta-carotene may be a subject of the claim when the level of vitamin A present as beta-carotene in the food that bears the claim is sufficient to qualify for the claim. For example, for the claim 'good source of antioxidant beta-carotene,' 10% or more of the

Antioxidant Vitamins

(Examples of Antioxidant Vitamins and Minerals)

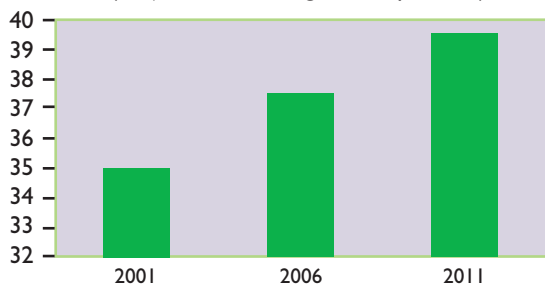
Vitamins	Daily Reference Intakes (DRI)*	Antioxidant Activity	Sources
Vitamin A	300-900µg/d	Protects cells from free radicals	Liver, dairy products, fish
Vitamin C	15-90mg/d	Protects cells from free radicals	Bell peppers, citrus fruits
Vitamin E	6-15mg/d	Protects cells from free radicals, helps with immune function and DNA repair	Oils, fortified cereals, sunflower seeds, mixed nuts
Selenium	20-55µg/d	Helps prevent cellular damage from free radicals	Brazil nuts, meats, tuna, plant foods

*DRIs provided are a range for Americans ages 2-70

Source: <http://ific.org/publications/factsheets/antioxidantnfs.cfm#> — chart adapted from Food and Nutrition Board Institute of Medicine DRI reports and National Institutes of Health Office of Dietary Supplements

Booming Boomer Growth

(Projected Percentage of People > 45)



Source: Mintel/U.S. Census Bureau (adapted)

■ FDA has determined that although some scientific evidence suggests that consumption of antioxidant vitamins may reduce the risk of certain forms of cancer, this evidence is limited and not conclusive.

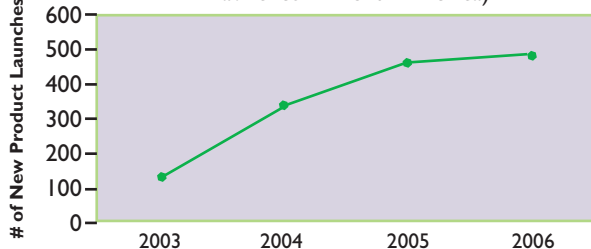
Brown observed that while "FDA has not supported guidelines on how many and what kind of antioxidants to consume in a daily diet, it has supported antioxidant intake at the whole foods level. Clearly the FDA recognizes the role of diets rich in fruits and vegetables for risk reduction in certain cancers and other chronic diseases. Fiber-rich fruits, vegetables and fiber-containing grain products have been shown to have a role in reducing cardiovascular risk. And since fruits, vegetables and grains can also be excellent sources of antioxidants, approved health claims are indirectly acknowledging that these nutrients are part of the risk reduction equation."

Product Trends

A review of new product launches between January 2006 and January 2007 containing antioxidants (for both functional and nutrition claims) showed these 12 months to be dominated by tea, green tea, tea blends, exotic berry beverages and chocolate. While these ingredients may fit into specific sub-classes of polyphenols, marketers chose to

Fortified Growth

(Vitamin/Mineral Fortified New Product Launches in North America)



Source: Mintel GNPD

According to estimations, persons aged 45 and older will represent more than 39% of the U.S. population by 2011.

focus on "antioxidants" as the terminology expressing "goodness." Use of flavanol, polyphenol or even EGCG was minimal, indicating that processors are not convinced that enough consumers have sufficient understanding of antioxidant sub-classifications to drill down beneath the antioxidant "surface." (See chart "Growth in Products Mentioning Antioxidants.")

While not all products launched noting the presence of antioxidants targeted health benefits, the majority did. Growth in popularity of antioxidants mirrors a growth trend in specific ingredient categories. That is, growth trends in pomegranate and green tea are significant compared to the years immediately preceding 2004. However, it should be noted that the popularity of chocolate as a flavor is independent from its use in formulations for its flavanol properties.

As noted, green tea, as well as tea in general, has been a popular delivery medium for antioxidants, but products have expanded beyond the liquid category to other interesting mediums. For example, Tyger Hill launched White Tea Candy onto the market in 2006. The product is also available in mint, lemon, green and red varieties. Gumlink Vejle introduced a green tea formula chewing gum to the U.S. market, with each piece of gum "comparable to two cups of green tea." Creating a powerful nutrition delivery system with a double brand punch, The Republic of Tea teamed with Pom Wonderful to introduce a Pomegranate Green Tea. In the indulgent category, Pom Wonderful teamed with Sheer Bliss Ice Cream in a new product concept, the Pomegranate Bar. This product promotes the antioxidant properties of pomegranate, but likely plays on consumer knowledge about the potential health properties of the dark chocolate that coats the ice cream, without overt mention.

Overt mention of the antioxidant properties in chocolate is not overlooked by Navitas Naturals' Cacao Powder Raw Chocolate Nibs. The company shamelessly flaunts the cocoa's superior antioxidant properties over green tea, wine and blueberry counterparts. Dynamic Chocolate's Choco-Omega claims a cardiovascular "slam dunk" with its antioxidant cocktail of cocoa, vitamin C, co-enzyme Q10 and lycopene. Its Choco-Mind product contains choline, tocopherol and is "rich in antioxidants which support healthy memory and brain functions."

There has been a general increase in the number of new foods and beverages fortified with vitamins and/or minerals in the North American market in the last few years.

Looking specifically at the growth trend in emerging exotic fruit ingredients, there is an upward trend in the use of açai berry, mangosteen and goji berries, with açai berry being the more prominent of these exotic fruits. Beverages are the most popular delivery medium, with the formulation usually reflecting a combination of fruits naturally high in antioxidants. Bolthouse Farms' Bom Dia beverage comprises a mix of açai berry and pomegranate juice. Lakewood Fruit Products also plays on the exotic with its Super Antioxidant Energy Juice featuring açai berry, banana and mango flavors, enriched with green tea, rosehips and acerola cherry. Nutiva's Organic Hemp Shake Drink Mix comes in Amazon Açai, Berry Pomegranate and chocolate flavors and is positioned as a "superfood drink mix" with "antioxidant boost." The Berry Pomegranate variety also contains goji berries. Many if not all of these "exotic" fruits and berries have been in use for a long time by other cultures and have been subject to quite extensive research. Generally, U.S.-based human clinical trials are yet to be conducted.


Understanding the Future

A review of leading non-food claims accompanying new product launches noted in the Mintel GNPD provides a glimpse of consumers' current state of mind. Claims of "all natural," "organic," "no additives/preservatives," "kosher" and "microwavable" have all been increasing in frequency since at least the year 2003. Clearly, this is an era that cross-maps a desire for convenience (microwaveable) with traceability (organic/kosher) and natural versus synthetic. If a similar search is conducted for new menu items introduced over the past year, according to Mintel Menu Insights, organic is the leading nutritional claim. Collectively, these two data sources are suggesting what is resonating in general with today's consumer. Product formats that speak to these values are therefore well-placed for the near future.

With regard to fortified products, which may or may not directly imply antioxidants in the ingredient statement or marketing language, new product launch data indicates that these formats also resonate well with today's consumer, and that there is good momentum. (See the chart "Fortified Growth.")

Clearly, fortified products are nothing new, but the significant increase in new product momentum suggests that consumers are responding to products that deliver more than the basics of calories, flavor and standard nutrients. As noted earlier, this momentum will continue as Boomers demand "youthsizing" products (food and non-food). Pressure

Most new products mentioning antioxidants were health-oriented.

from the health and medical fields to maintain or improve health based on current and future costs, as well as the excessive health risks America faces as an obese nation, will also underwrite the value of "better for you" multifunctional products. While this does not tie in specifically with antioxidants as a lone class, antioxidants are the rising ingredient stars in a "good for you" market showing upward momentum. 

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