

# Creating Beverage Winners

*Ingredient manufacturers are providing food scientists with specialty ingredients and full-on assistance to ensure that resultant beverage formulations will remain stable and flavorful throughout shelf life.*

by Rachel Zemser

While it's the savvy marketing that entices us to buy into a particular brand, no one can deny that beverage companies are taking advantage of all the exciting innovative technology, ingredients and flavors that are emerging. In demand are drinks with more of the "good" stuff, such as nutraceuticals, probiotics or probiotics, etc., and less of the "bad," for example artificial flavors and excess sugar. Consumers want their products fresh tasting, infused with fiber and vitamins and to provide them with "natural" energy. The demands are compounded and get more varied each year, and the food scientist needs

to know how to work with all of the functional ingredients and new technology to meet the demands of the constantly evolving consumer.

## Natural Health

As natural health becomes more mainstream, consumers are seeking out more ways to get trendy and healthful ingredients like probiotics, vitamins, minerals and enzymes into their diet.

But convenience is also a major concern, so consumers need these healthy components to be transportable and have an extended shelf-life.

Many of these components are sensitive to heat, and so it is

difficult to get them in a packaged and processed ready-to-eat form.

The introduction of High Pressure Processing (HPP) has propelled the fresh-pressed, non-heat pasteurized raw juice movement forward, as it can extend the shelf life of fresh juices for up to 30 days by reducing the load of spoilage bacteria in high-acid juice drinks.

There are several companies manufacturing HPP juices, and more are appearing, as manufacturers see that consumers are willing to pay the higher price for these fresh-tasting beverages.

Probiotic beverages are now also available in a shelf-stable form that, when activated by the consumer, provides beneficial levels at the moment of release.

For example, GoLive (goliveprobiotic.com) stores their freeze-dried probiotic culture blend in a foil-sealed, patented bottle cap where the friendly bacteria remain alive until they are released into a liquid. They then begin to grow rapidly, doubling every 30 minutes.

## Vitamin Fortification

Milk and juice have been fortified with vitamin D and calcium for years, but consumer needs are now much more diverse and companies such as DSM, a global leader in vitamins, carotenoids and nutraceuticals, have created premix platforms that manufacturers can use to fortify beverages based on consumer-driven specifications.

Some of these premix platforms include: Energy, Immunity, Beauty from Within,

Meal Replacement and Visual Performance. The company also provides blends designed to meet the separate needs of women, men and children.

Vitamin interaction with food is very dynamic and even experienced food scientists and developers should work closely with vitamin suppliers to ensure the vitamin combination they want will blend in seamlessly with their beverage base.

This allows for particulars of pH, unique ingredients, viscosity, processing conditions, storage temperature and light – all of which can affect the shelf life



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Source: Innova Market Insights

Naked All Natural Fruit + Boosts Juice: Mango Veggie (US)

of viable nutrients. Working with an experienced scientist in the vitamin industry, as well as submitting the final product to shelf-life studies, is crucial to the success of the finished product.

Adding vitamins naturally via fruit-based ingredients has become a desirable and highly marketable path.

It allows for cleaner labels that need only list the specific fruit contributing that vitamin or mineral. For example, acerola cherry has a delicious flavor and can deliver more than 100% DV for vitamin C.

Coconut water can be used as a concentrate to not only sweeten beverages naturally but also increase the potassium in the finished product.

There are dozens of fruits, from the classic (such as tart cherry or blueberry) to the exotic (mangosteen, guava) known for naturally high concentrations of vitamins, minerals and enzymes that can be attractive alternatives to adding vitamin powders (and having to list them separately on the label).

### Fiber and Protein

Americans don't eat enough fiber, and beverages are rapidly becoming a preferred vehicle for both fiber and protein.

However, as with vitamins, careful selection is necessary to ensure proper interaction between the beverage base and added nutrients.

Soluble fibers like corn fiber work well in clear sports and vitamin-enhanced beverages because it is colorless, odorless, dissolves well and does not affect the final viscosity.

Inulin, while not necessarily colorless in clear formulations, actually increases viscosity in a beneficial manner for some applications, improving mouthfeel and texture in dairy and/or meal-replacement beverages.

This allows developers to reduce fat content while maintaining creamy texture. Both fibers are soluble but work differently in application.

Another source of fiber gaining interest in certain beverages is dehydrated vegetables, especially bean powders. These can be labeled as "beans" and may appeal to the health-conscience, clean label-preferring crowd. Higher fiber beans include Navy and black beans, which contain approximately 30% fiber. While they do not provide as much fiber per gram as inulin and corn, they can provide dual service in a beverage by boosting protein. Black-eyed pea powder, for example, adds 30% fiber and 30% protein, all with just a "clean bean" designation on the label.

### Emerging Proteins

Other protein sources, such as soy and whey, are more commonly used in beverages because they are soluble and enable developers to get in a higher amount of protein while maintaining desired product texture, viscosity and color. Archer Daniels Midland has a line of isolated soy proteins (under the brand name "Clariso") designed for transparent and cloudy beverages in both low- and neutral-pH applications. It is heat-stable and requires no stabilizers or homogenization. Whey proteins are also common in beverages because they are both heat- and pH-stable. However, both soy and whey are allergens on the FDA allergen list. Emerging proteins for beverage processing include those derived from low-allergenic vegetables such as peas and potatoes. Pea protein isolate is 88-90% protein, 100% soluble, heat-stable and prized for its natural emulsifying properties. Potato protein recently entered the market, appearing in protein powder formulations and supplements. Manufacturers note that it is highly soluble, suspends well in clear beverages and also is heat and acid stable.

### Fruit & Veg Blends

In 2006, the Japanese company Kagome launched its line of fruit and vegetable blends in the US. Fruit and vegetable



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blends had been on the market for a long time in Japan, but at that time Americans were not yet ready for fruit and vegetable blends. Although successful in taste tests, Kagome's products did not do well on the market.

Fast-forward to 2013 and fruit/vegetable blended drinks are showing up as "pressed raw juices" and also in mainstream pasteurized blends. These include Campbell Co.'s V8 Fusion, PepsiCo.'s Naked Juice and Coca Cola Co.'s Odwalla drinks. Orange-carrot juice is one of the more accepted fruit and vegetable combinations, but other options with beets and pumpkin are also popping up on the shelves.

Developing fruit- and vegetable-based pasteurized refrigerated drinks requires that the product be classified as naturally acid or acidified. In the US (or products being exported to the US), a process description must be filed with the FDA to determine the exact shelf life time and temperature needed, based on the finished product pH. All products must be acidified to well below 4.6 or else go through a retort process.

### Whole Food Nutrition

Verging on the meal-replacement category are beverages

formulated with whole grains like brown rice flour, quinoa and chia seeds. Mama Chia is one of the leading chia drinks in the US, providing a distinct textural experience – the consumer can almost chew on the beverage instead of drinking it.

Working with grains and seeds can be challenging from a manufacturing perspective. Manufacturing equipment might not be able to handle thicker, more particulated blends and it could result in a "burned" product if the slurry flows too slowly through the pasteurization system.

Unless the product is retorted, an updated thermal process will have to be evaluated to ensure thicker formulations receive sufficient time and temperature in heat treatment. Typically, the incorporation of grains and grain flours does not contribute much nutritionally but is more of a marketing tactic used to lead consumers into believing the product provides wholesome grains in significant amounts.

### Energy Drinks

According to new research from the 2012 Packaged Facts report "Energy Drinks and Shots: US Market Trends," the energy drinks and shots mar-

ket has grown 60% from 2008 to 2012. The primary energy source in these drinks is caffeine, and there also are alternative ingredients available for a natural energy boost, specifically vitamins, green tea extracts and other botanicals, such as yerba maté, ginseng and guarana.

One company, Avitae, uses natural caffeine extracted from coffee instead of lab-derived caffeine. These beverages are being marketed as "natural energy" and some are being sold in the supermarket juice aisles to give them a healthier image.

There is always a push to reduce sugar in energy drinks, and formulators are increasingly turning to natural sweeteners like stevia and monk fruit (luo han guo).

Monk fruit was given GRAS status in 2010 and its sweetness comes from glycosides, a bound sugar molecule that does not provide energy. The monk fruit glycosides, called "mogrosides," also have shown strong antioxidant capacity. Monk fruit is 150-300 times sweeter than sugar and is sold as a food ingredient by Tate and Lyle under the trade name Purefruit.

Tea also is seen as a healthier energy drink alternative and consumers have an interest in regional teas, organic teas, fair-

trade tea and non-GMO. Developers can take advantage of this "specialized tea" trend and infuse ingredients like vitamins and antioxidants into specialty tea-based drinks.

### Cocktails and Mixology

Creative cocktails have gone mainstream and the market for fresh-tasting, culinary inspired ready-to-drink cocktails and non-alcoholic mixers has been growing in both the food service and retail markets.

Sensient Flavors is keeping a close eye on alcoholic beverage trends; they note mixologists are making heavy use of abstract seasonal fruits and vegetables.

They also report increased use of purées, e.g. pomegranate purée instead of juice, as well as herbaceous bitters and flavor-infused syrups.

One thing is certain: there are no more authenticity "rules" as new retail spirit products are entering the market with flavors like marshmallow, maple, glazed donuts, bubble gum – even bacon and smoke.

Restaurant chains serving signature cocktails are seeking unique blends they can serve with consistency in all their units. And retail purchasers want to be able to serve specialized culinary cocktails they can make with their own with fruit and vegetable garnishes.

Manufacturers can develop simple, flavor-infused or "gum" syrups (syrups with added gum arabic) to give the final drink a unique texture, mouthfeel and viscosity.

These syrups have great shelf stability due to their high sugar content. Typically, only citric acid and spoilage inhibitors need be added to ensure quality throughout shelf life.

Ready-to-drink cocktails will involve partnerships with both flavor and stabilizer suppliers to ensure the flavors and hydrocolloid stabilizers are compatible with the alcohol system and won't result in flavor or texture degradation. ♦

## Doehler Files Patent for Carotenoid-Based "Crystal Clear Colors"



Stability, taste neutrality and bright colors – that's what Doehler's "Crystal Clear Colours" are claimed to stand for. With its new range of brilliant, crystal clear "warm orange" and "shining yellow" hues, Doehler is opening up innovative potential for the beverage industry. For the first time, "Crystal Clear Colors" allow the use of colors with neutral taste profile in clear beverages, without adding any artificial colors.

In addition "Crystal Clear Colors" are characterized by outstanding stability under the influence of light, heat and various pH values. With this system, Doehler has achieved a breakthrough in the

development of carotenoid-based colors for clear beverages. Their outstanding properties make the "Crystal Clear Colors" ideal for a wide range of beverage applications. They offer an excellent opportunity to distinguish beverages from other products in the beverage aisle, especially in the still drink and water plus segment. Crystal Clear Colors allow clear beverages to shine with a color spectrum ranging from strong, warm orange hues to bright, sunny yellows.