



Washington Red Raspberry Research Monograph

Market for Healthy Juice Drinks Shows no Sign of Cooling Off

Manufacturers are racing to keep up with consumer demand for healthy beverages, particularly those that offer functional ingredients such as botanicals, minerals, and antioxidants. New product introductions in the health drink and fruit juice categories are on target to reach over 700 new offerings this year, up 40 percent over 2002.¹

Health concerns continue to drive consumer interest in healthy beverages. Whereas shoppers are having difficulty fighting obesity and keeping track of calories, healthy juice drinks offer consumers a quick, simple way to help them feel good about what's going in.

Healthy Juice Drinks

Healthy drinks are perceived as a great way to deliver nutrients. Health-conscious consumers read a vast amount of information about botanicals, extracts, vitamins, minerals, and foods that supposedly are good for them, but taking all those ingredients in pill form is nearly impossible and prohibitively expensive.

As a result, numerous food manufacturers and even healthcare companies are trying to meet the demand with fresh, shelf-stable and dry-mix beverages. Companies such as Baxter Healthcare launched a line of fortified waters under the PULSE brand name. Baxter was able to leverage its pharmaceutical expertise and help aging boomers find nutritional beverages that didn't cramp their style.²

Consumers consistently indicate on market surveys that they would like to



improve their dietary habits, but they feel they either do not have the time, or existing products on the market are inconvenient.

Healthy beverages, however, are considered easy-to-use products that provide nutritional support in an easy, flavorful way.

Red Raspberry Juice

Ingredients are being selected not just for flavor and color, but for their nutritional, functional profile as well. Consumers are much more knowledgeable about the antioxidant levels of blueberries, for instance, or the natural pain-fighting anthocyanins found in cherries and red raspberries. New

Red Raspberries in Functional Juice Beverages

product introductions are taking advantage of the health concerns of consumers, and are offering them what they need in a glass, rather than a pill bottle.

Functional Fruit Beverages

Red raspberries are becoming a key ingredient in a variety of functional fruit drinks for their wide range of phytochemicals and anthocyanins. Red raspberries are particularly high in a variety of antioxidants, including ellagic acid, catechins and quercetin. Antioxidants destroy free radicals — highly reactive and chemically unstable compounds that cause cell damage. Free radicals occur naturally in the body, but they are also produced in response to things in the environment, such as smoke and pollution. They've been linked to cancer, heart disease and they are a prime factor in aging. Antioxidant-rich diets are good for immune strength and can reduce the visible signs of age.

Anthocyanins, which act as pigments to give berries their deep color, are a major component of the phenolic/flavonoid class. This class of compounds is highly correlated with antioxidant activity. It may be one reason why people like colored foods: they may instinctively know they are good for the body. Recent research shows that two anthocyanins present in red raspberries have the ability to block pain messages in the body. Red raspberries contain 24 mg/100g of anthocyanins 1 and 2, with an activity comparable to those of ibuprofen and naproxen at 10 μ M concentrations.³

Catechins are flavonols that support the antioxidant defense system. Catechins found in red raspberries may contribute to cancer prevention. The catechins

content found in red raspberries is 0.83 milligrams per 100 g.

Ellagic Acid

The most promising benefit that red raspberries hold for consumers is their substantial quantity of ellagic acid, at 4.3 μ g/gram dry weight. Ellagic acid is a phenolic compound that has become known as a potent anti-carcinogenic/anti-mutagenic compound. Clinical tests conducted at the Hollings Cancer Institute at the Medical University of South Carolina (MUSC)⁴ show that ellagic acid, a naturally occurring plant phenol may be the most potent way to prevent cancer, inhibit the growth of cancer cells, and arrest the growth of cancer in subjects with a genetic predisposition for the disease.

Ellagic acid acts as a scavenger to "bind" cancer-causing chemicals, making them inactive. It inhibits the ability of other chemicals to cause mutations in bacteria. In addition, ellagic acid from red raspberries prevents binding of carcinogens to DNA, and reduces the incidence of cancer in cultured human cells exposed to carcinogens.

Quercetin is a flavonol that works as an anti-carcinogen and an antioxidant. Quercetin has also been shown to reduce the release of histamine and may be effective against allergies. The quercetin content of red raspberries is 12 milligrams per 100 grams of juice.

Salicylic acid is found in red raspberries and is suspected of having the same protective effect against heart disease as aspirin. Aspirin is a closely related compound known to pharmacists as salicylic acid acetate. The therapeutic successes of small daily doses of aspirin to inhibit arteriosclerosis suggest the possibility that salicylic acid consumed in foods may provide a similar benefit. A 100-gram serving of red raspberries contains around 5 milligrams of salicylic acid.

Formulating Juice Drinks

When developing new functional fruit beverages, some manufacturers are turning to antioxidants that are derived from GRAS fruits. The products are so concentrated, that less than 0.5 ml of liquid blends or 85 to 300 mg of powdered blends deliver the ORAC units equivalent to a single serving of vegetables.⁵ In concentrated juices, however, the level of antioxidants seems to increase with processing. Recent research identified how the heat processing used to make juices and jams had a positive impact on raspberry phenolics.⁶ The ellagic acid derivatives remained quite stable with processing and during 6 months of storage. The content of free ellagic acid increased 3-fold during the storage period. The initial content (10 mg/kg of fresh weight of raspberries) increased 2-fold with processing, and it continued increasing up to 35 mg/kg after 1 month of storage. The increase observed in ellagic acid could be explained by a release of ellagic acid from ellagitannins with the thermal treatment.

In many functional fruit drinks, stability is a key concern. Packaging becomes a primary consideration to protect antioxidant levels. With plastic packaging there is the potential to have degradation over time.

Formulating with Fiber

Because consumers often find it hard to consume the five recommended servings of fruits and vegetables in their daily diet, they also likely fail to meet the recommended levels of fiber. Adequate fiber intake can decrease cholesterol, and reduce the risk of cancer, diabetes, heart disease and obesity. Product designers can find a number of ways to incorporate fiber into beverages.

Red raspberry -based beverages benefit from the natural addition of fiber. Red raspberries provide the greatest amount of fiber per calorie than any other fruit. Raspberries are the lowest common food item in "Calories

High Protein Red Raspberry Drink Mix



Ingredients	Usage Level (%)
· Skim milk powder	23.00
· Whey protein concentrate 80%	22.00
· Fructose and sucrose	25.00
· Creamer	12.00
· Vegetable Oil	6.00
· Red raspberry powder	4.20
· Cocoa powder	3.00
· Gum blend (stabilizer)	1.50
· Natural flavor	1.40
· Milk minerals (calcium source)	1.30
· Vitamins/mineral premix	0.80
	100.00

per Gram of Dietary Fiber” at just 7.7 calories/gram dietary fiber. Fiber is a crucial component in a healthy diet, but so too is caloric intake. Consumers want health, great taste and low calorie all in one convenient package. Red raspberries are an inexpensive source of dietary fiber.

Red Raspberry Fruit Juices on the Rise

As the demand for healthy, great-tasting beverages continues to rise, the variety of red-raspberry beverages continues to grow right with it. Each juice manufacturer has been successful in developing their own unique taste or healthy component, as these following products attest.



Ocean Spray

(Lakeville-Middleboro, Mass.) has been successful by blending red raspberries with its traditionally known fruit, the cranberry. Sold in both *Light* and *Regular* varieties, the products are certified by the American Heart Association.

Welch's

Welch Food's (Concord, Mass.) Wild Raspberry Fruit Juice Cocktail

has been a successful addition to the company's line of seven juice drinks. Capitalizing on a wealth of health research about the benefits of red wine and grape juice, Welch's juices are all "Heart Healthy."



Tropicana

Tropicana's (Bradenton, Fla.) line of fruit smoothies have taken full advantage of the healthy attributes of red raspberries in their Mixed Berry variety. The product boasts high levels of fiber, calcium and antioxidants C and E. The products are targeted at active adults and people who have difficulty finding time to eat right.

References

- ¹ Anon. 2003 *Product Alert*. New Products Magazine. June. p. 18.
- ² Arici, Ilke. 2002. *Baxter Launches Pulse*. Media Release. May 28.
- ³ Seeram NP, Momin RA, Nair MG, Bourquin LD. 2001. *Cyclooxygenase inhibitory and antioxidant cyanidin glycosides in cherries and berries*. *Phytomedicine*. Sep;8(5):362-9.
- ⁴ Narayanan BA, Geoffroy O, Willingham MC, Re GG, Nixon DW. 1999. *p53/p21(WAF1/CIP1) expression and its possible role in G1 arrest and apoptosis in ellagic acid treated cancer cells*. *Cancer Lett*; 136(2):215-21 1999.
- ⁵ Hazen, Cindy. 2003. *Formulating Function into Beverages*. *Food Product Design*. January. p. 37-70.
- ⁶ Zafrilla P. *Effect of processing and storage on the ellagic acid red raspberry jams*. *J Agric Food Chem*. 2001 Aug;49(8):3651-5.



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