

BIOBerry

A GRAM A DAY

Natural Intelligent Nutrition



BIOBerry

A GRAM A DAY

We have always heard that we should eat at least five servings of fruits and vegetables a day, preferably of a variety of colors, because each color corresponds to a different group of phytochemicals with a special protective function.

But nowadays, who has the time and opportunity to eat the necessary amount and variety of fruits and vegetables?

Berries, color and functionality

"Edible berry anthocyanins possess a broad spectrum of therapeutic and anti-carcinogenic properties. Berries are rich in anthocyanins, compounds that provide pigmentation to fruits and serve as natural antioxidants... studies highlight the novel anti-angiogenic, antioxidant, and anti-carcinogenic potential of anthocyanin-rich berry extract formulas..."
(Bagchi et al., 2004)

We must supply our bodies with essential nutrients to keep ourselves healthy;

With BioBerry, we have selected the very best of berries especially for you!



The anthocyanins and their effects on health

Epidemiologic studies have suggested many interesting benefits of anthocyanins on human health. Some of them are:

- ▶ Promotion of cardiovascular health (antithrombotic properties).
- ▶ Hypocholesterolemic action, and reduction of LDL oxidation.
- ▶ Anthocyanins keep the integrity of ADN under oxidative stress.
- ▶ Prevention of premature aging effects.
- ▶ Reduction of inflammation and its incidence over certain kinds of cancer.
- ▶ Contribution to nitric oxide synthesis, an important vascular tone regulator.
- ▶ Obesity prevention.





What is the role of Berry polyphenols?

Anthocyanins are phenolic water-soluble compounds, found in nature as glycosides, and thus directly absorbed after their ingestion, through the gastrointestinal tract. This explains its bioavailability and promotes its physiological action over several biological processes. Among other properties, it is recognized for their anti-inflammatory, anti-viral, and anti-diabetic activities and its intervention in tumor suppression.



Reactive oxygen species (ROS) play critical role over the integrity of the cell's molecules. These highly reactive substances, slowly damage tissues, and are responsible for many degenerative diseases. Several studies have demonstrated the antioxidant properties of anthocyanins rich extracts. According to recent results, this antioxidant capacity is higher than the combined action of **vitamin C, vitamin E and beta carotene.**

As potent scavengers of reactive oxygen species (ROS), anthocyanins inhibit the oxidation of lipids and LDL, protect the endothelial wall against oxidative damage, and thus reduces coronary heart disease risk.

› Oxidative stress risk reduction

Oxidative stress is regarded as the main cause of aging and the development of chronic degenerative conditions like cancer, coronary heart disease and neurodegenerative disorders (Alzheimer and Parkinson).



› Vascular tone regulation

Polyphenols found in berries enhance the action of the enzyme nitric oxide synthase, causing an increment in nitric oxide (NO) production. NO is one of the main vascular tone regulators, responsible for dilating blood vessels, reducing hypertension and fighting endothelial dysfunction.





What is BioBerry?

Through advanced technology, we have concentrated the juice from the freshest and most colorful berries available, boosting the antioxidant power to a level way beyond that of raw fruit.

These berries harvested in the south of Chile, have been hand-picked and carefully processed to keep all the properties of their active ingredients.

In **BioBerry**, you will find one of the highest sources of anthocyanins and other polyphenols you can get. The main function of these compounds resides on their antioxidant activity, that prevents, reduces and repairs the oxidative damages in our cells.

At whom is it aimed?

- ▶ Those who want to increase their antioxidants intake, to delay the aging effects.
- ▶ Those who cannot eat the right amount of fruits and vegetables, despite knowing the benefits of their consumption.
- ▶ Those who want to maintain a good cardiovascular health, as preventive or to support pharmacological treatments.

All those people who want HEALTH through diet.



↓ The color of Berries

▶ Berries are everyone's favorite fruits, because of their color and attractive shape. Just imagine the fabulous color you could give your products with **BioBerry**. Consumers are actively seeking functional foods and drinks that are also natural/chemical-free. With BioBerry you can reach the functionality that your customer expects.

▶ The role of color in nutrition

BioBerry contains all the Nature's healthy nutrients and can be formulated in several finished products. Imagine the possibility of getting the equivalent of a portion of fruit in a carbonated drink, with the all-natural color and benefits of real berries.

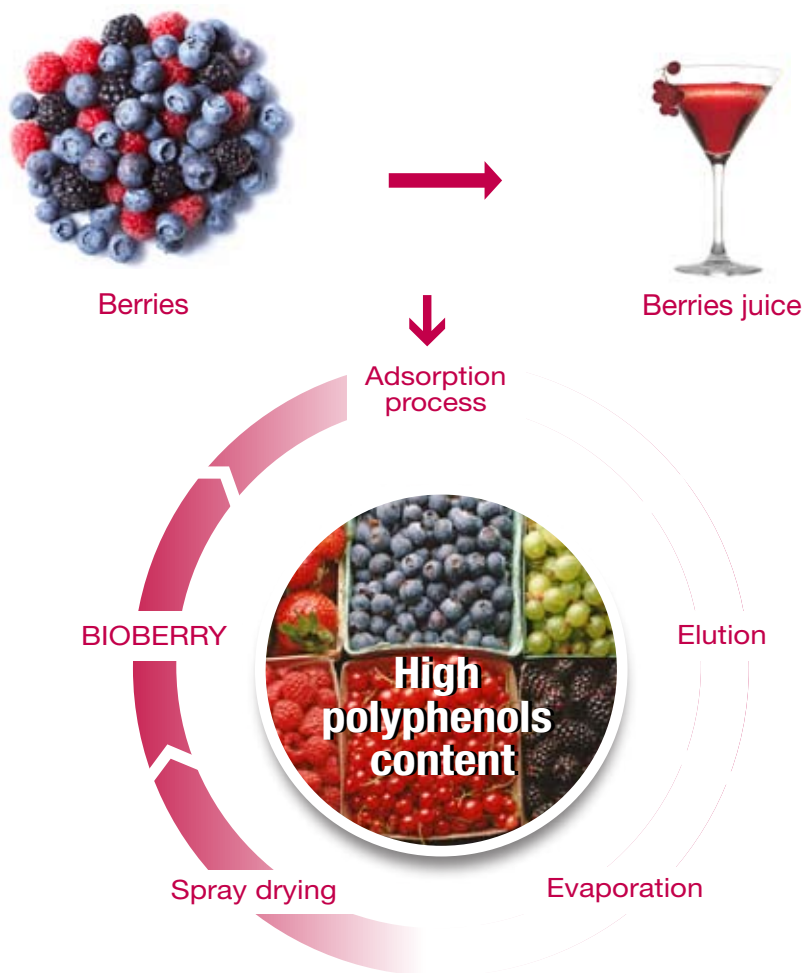




BIOBerry

A GRAM A DAY

How is BioBerry obtained?



> Manufacturing Process



- ▶ The manufacturing process of **BioBerry** guarantees the integrity of all the protective components of berries.





How can the **antioxidant capacity** of a substance be assessed?

- ▶ **ORAC** (Oxygen Radical Absorbance Capacity) is a widely recognized methodology to determine the total antioxidant capacity of a substance. The results are expressed as micromoles of Trolox Equivalent per gram of dry substance. Trolox is a water-soluble synthetic analogue of vitamin E.
- ▶ It is hard to measure the antioxidant capacity of isolated compounds; **ORAC** expresses the antioxidant power of all the constituents of a complex mixture (like food).
- ▶ Although there is no reference value of ORAC daily intake, the experts (Prior, R. and Cao, G., researchers of the Jean Mayer USDA Human Nutrition Research Center on Aging at Tufts University HNRCA) recommend the ingestion of 3000 to 5000 **ORAC** per day. This amount would be necessary to obtain a significant antioxidant effect on plasma and tissues. On the other hand, USDA points that 1750 ORAC/day would equal **five servings of fruits and vegetables**



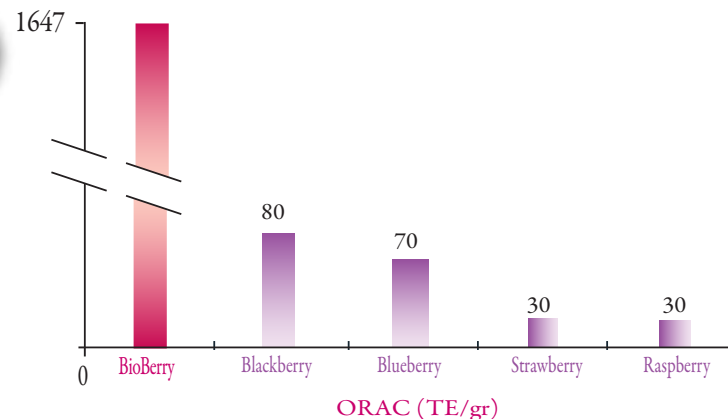
*Source: USDA National Nutrient Database for Standard Reference. 2007.
<http://www.ars.usda.gov/Services/docs.htm?docid=15866>



BIOBerry
A GRAM A DAY

› What amount of **BioBerry QF 01** should be consumed?

- ▶ **BIOBERRY IS MINIMUM 1500 ORAC:** as a reference, with 1.17 g of **BioBerry** you will get the benefit of the antioxidant power equivalent to five servings of fruits and vegetables.



What is the polyphenols content of **BioBerry QF 01**?

- ▶ It contains a minimum of 10% polyphenols (as percentage of gallic acid, determined through a modified Folin-Ciocalteu method of analysis).



- › We also have a less concentrated version:
BIOBERRY QF 11: minimum 250 ORAC and 4.5% polyphenols.



BIOBerry

A GRAM A DAY

How could it be used?



- ▶ It is water soluble and easy-to-apply into several kinds of foods.
- ▶ It is stable at acidic pH values (pH<4)
- ▶ It is a color ingredient and also a functional ingredient.
- ▶ You can add the whole recommended daily intake of antioxidants or just a fraction of it.

What makes BioBerry so attractive?



- ▶ You can highlight the polyphenol content on the labels of your products, like this:
 - Berry polyphenols concentrate
 - High level of antioxidants.
- ▶ It has an attractive ruby red color.
- ▶ Can be labeled as berry juice.
- ▶ **No sensory impact:** it does not contribute to flavor or aroma at the doses of application.



Technical Data Sheet:

BERRIES POLYPHENOLS POWDER

Good stability	✓ Light	✓ T°
Shelf life	24 months at room T°	
Flavor and aroma	Imperceptible at the typical usage levels	
Appearance	Reddish red powder	
Certification	GMO Free	



BIOBerry

A GRAM A DAY

› Some examples of end-use applications

Mostly composed of Anthocyanins, **BioBerry** is suitable for low pH products.

Doses (% daily intake BioBerry QF 01)	g/ serving
100% (1750 ORAC)	1.17
50% (875 ORAC)	0.58
25% (438 ORAC)	0.29
5% (88 ORAC)	0.05

BioBerry QF 01 (ORAC/g= 1500), we assume 1750 ORAC as daily recommended intake.

You can decide the dose to include in your products. Depending on the kind of application, with a dose representing 25% of daily ORAC intake, the resultant color is very attractive.



In addition to all its advantages, BioBerry is very easy-to-use.



Dose of application: 50% ORAC 25% ORAC 5% ORAC

JELLIES



25% ORAC

BEVERAGES



50% ORAC





BIOBerry

A GRAM A DAY



Scientific background



1. **Andriambelason E, Magnier C, Haan-Archipoff G, Lobstein A, Anton R, Beretz A, Stoclet JC, Andriantsitohaina R.** Natural Dietary Polyphenolic Compounds Cause Endothelium-Dependent Vasorelaxation in Rat Thoracic Aorta. *Jn.nutrition.org*. March. 2008.
2. **Bagchi D, Sen CK, Bagchi M, Atalay M,** Anti-angiogenic, antioxidant and anti-carcinogenic properties of a novel anthocyanin-rich berry extract formula. *Biochemistry (Mosc)*. 2004 Jan;69(1):75-80, 1 p preceding 75.
3. **Bell DR, Gochenaur K.** Direct vasoactive and vasoprotective properties of anthocyanin-rich extracts. *J Appl Physiol* 100: 1164-1170, 2006.
4. **Benito S, López D, Sáiz MP, Buxaderas S, Sánchez J, Puig-Parellada P, Mitjavila MT.** A flavonoid-rich diet increases nitric oxide production in rat aorta. *British Journal of Pharmacology* (2002) 135, 910 - 916.
5. **Chen PN, Chu SC, Chiou HL, Kuo WH, Chiang CL, Hsieh YS.** Mulberry anthocyanins, cyanidin 3-rutinoside and cyanidin 3-glucoside, exhibited an inhibitory effect on the migration and invasion of a human lung cancer cell line. *Cancer Lett*. 2005 Jun 21.
6. **Cooke D, Steward WP, Gescher AJ, Marczylo T.** Anthocyanins from fruits and vegetables- does bright colour signal cancer chemopreventive activity? *Eur J Cancer*. 2005 Sep; 41(13):1931-40.
7. **Fimognari C, Berti F, Nusse M, Cantelli Forti G, Hrelia P.** In vitro antitumor activity of cyanidin-3-O-beta-glucopyranoside Chemotherapy. 2005 Oct; 51(6):332-5. Epub 2005 Oct 13.
8. **Galvano F, La Fauci L, Lazzarino G, Fogliano V, Ritieni A, Ciappellano S, Battistino NC, Tavazzi B, Galvano G.** Cyanidins: metabolism and biological properties. *J Nutr Biochem*. 2004 Jan; 15(1):2-11.
9. **Hou DX, Tong X, Terahara N, Luo D, Fujii M.** Delphinidin 3-sambubioside, a Hibiscus anthocyanin, induces apoptosis in human leukemia cells through reactive oxygen species-mediated mitochondrial pathway. *Arch Biochem Biophys*. 2005 Aug 1;440(1):101-9.
10. **Kang SY, Seeram NP, Nair MG, Bourquin LD,** Tart cherry anthocyanins inhibit tumor development in Apc(Min) mice and reduce proliferation of human colon cancer cells. *Cancer Lett*. 2003 May 8;194(1):13-9.
11. **Lazze MC, Savio M, Pizzala R, Cazzalini O, Perucca P, Scovassi AI, Stivala La, Bianchi L.** Anthocyanins induce cell cycle perturbations and apoptosis via nitric oxide pathway and regulation of calcium homeostasis. *Br J Pharmacol*. 2003 Jul; 139(6):1095-102.
12. **Nakamura,Y, Matsumoto H, Todoki K.** Endothelium-Dependent Vasorelaxation Induced by Black Currant Concentrate in Rat Thoracic Aorta. *Jpn. J. Pharmacol*. 89, 29-35 (2002).
13. **Pechanona, O., Simko, F.** The Role of Nitric Oxide in the Maintenance of Vasoactive Balance. *Physiol. Res*. 56 (Suppl. 2): S7-S16, 2007.
14. **Rechner AR, Kroner C.** Anthocyanins and colonic metabolites of dietary polyphenols inhibit platelet function. *Thromb Res*. 2005; 116(4):327-34. Epub 2005 Feb 8.
15. **Seeram NP, Adams LS, Hardy ML, Heber D.** Total cranberry extract versus its phytochemical constituents: antiproliferative and synergistic effects against human tumor cell lines. *J Agric Food Chem*. 2004 May 5;52(9):2512-7.
16. **Shih PH, Yeh CT, Yen GC.** Effects of anthocyanidin on the inhibition of proliferation and induction of apoptosis in human gastric adenocarcinoma cells. *Food Chem Toxicol*. 2005 Oct;43(10):1557-66.
17. **Xu JW, Ikeda K, Yamori Y.** Upregulation of Endothelial Nitric Oxide Synthase by Cyanidin-3-Glucoside, a Typical Anthocyanin Pigment. *Hypertension*. 2004; 44:217.
18. **Yeh Ct, Yen GC.** Induction of apoptosis by the Anthocyanidins through regulation of Bcl-2 gene and activation of o-Jun N-terminal kinase cascade in hepatoma cells. *J Agric Food Chem*. 2005 Mar 9;53(5):1740-9.
19. **Yi W, Fischer J, Krewer G, Akoh CC.** Phenolic compounds from blueberries can inhibit colon cancer cell proliferation and induce apoptosis. *J Agric Food Chem*. 2005 Sep 7;53(18):7320-9.
20. **Zhang Y, Vareed SK, Nair MG.** Human tumor cell growth inhibition by nontoxic anthocyanidins, the pigments in fruits and vegetables. *Life Sci*. 2005 Feb 11; 76(13):1465-72. Epub 2004 Dec 13.

