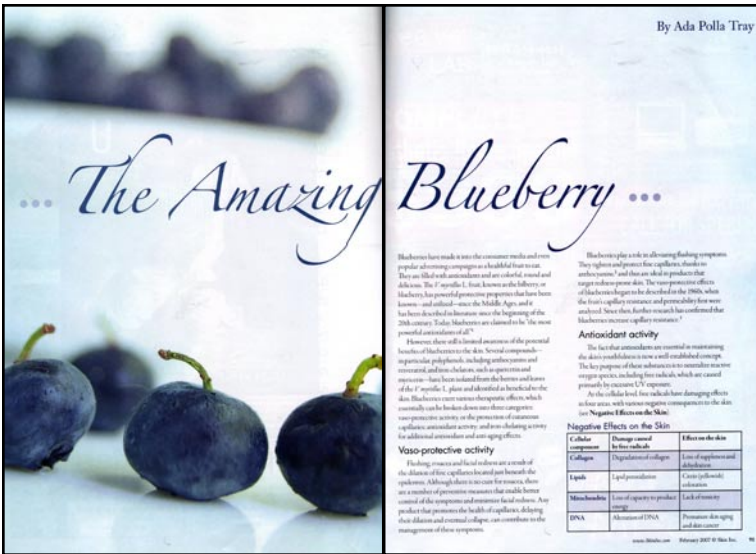


By Ada Polla Tray



*... The Amazing Blueberry ...*

Blueberries have made it into the consumer media and even popular advertising campaigns as a healthful fruit to eat. They are filled with antioxidants and are colorful, round and delicious. The *V. myrtillus* L. fruit, known as the bilberry, or blueberry, has powerful protective properties that have been known—and utilized—since the Middle Ages, and it has been described in literature since the beginning of the 20th century. Today, blueberries are claimed to be “the most powerful antioxidants of all.”<sup>1</sup>

However, there still is limited awareness of the potential benefits of blueberries to the skin. Several compounds—in particular, polyphenols, including anthocyanins and resveratrol, and iron chelators, such as quercetin and myricetin—have been isolated from the berries and leaves of the *V. myrtillus* L. plant and identified as beneficial to the skin. Blueberries exert various therapeutic effects, which essentially can be broken down into three categories: vaso-protective activity, or the protection of cutaneous capillaries; antioxidant activity; and iron-chelating activity for additional antioxidant and anti-aging effects.

**Vaso-protective activity**

Flushing, rosacea and facial redness are a result of the dilation of fine capillaries located just beneath the epidermis. Although there is no cure for rosacea, there are a number of preventive measures that enable better control of the symptoms and minimize facial redness. Any product that promotes the health of capillaries, delaying their dilation and eventual collapse, can contribute to the management of these symptoms.

Blueberries play a role in alleviating flushing symptoms. They tighten and protect fine capillaries, thanks to anthocyanins,<sup>2</sup> and thus are ideal in products that target redness-prone skin. The vaso-protective effects of blueberries began to be described in the 1960s, when the fruit’s capillary resistance and permeability first were analyzed. Since then, further research has confirmed that blueberries increase capillary resistance.<sup>3</sup>

**Antioxidant activity**

The fact that antioxidants are essential in maintaining the skin’s youthfulness is now a well-established concept. The key purpose of these substances is to neutralize reactive oxygen species, including free radicals, which are caused primarily by excessive UV exposure.

At the cellular level, free radicals have damaging effects in four areas, with various negative consequences to the skin (see **Negative Effects on the Skin**).

Cellular component	Damage caused by free radicals	Effect on the skin
Collagen	Degradation of collagen	Loss of suppleness and dehydration
Lipids	Lipid peroxidation	Citrin (yellowish) coloration
Mitochondria	Loss of capacity to produce energy	Lack of tonicity
DNA	Alteration of DNA	Premature skin aging and skin cancer

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# Blueberry ...

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## Vaso-protective activity

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## Antioxidant activity

The fact that antioxidants are essential in maintaining the skin’s youthfulness is now a well-established concept. The key purpose of these substances is to neutralize reactive oxygen species, including free radicals, which are caused primarily by excessive UV exposure.

At the cellular level, free radicals have damaging effects in four areas, with various negative consequences to the skin (see **Negative Effects on the Skin**).

## Negative Effects on the Skin

Cellular component	Damage caused by free radicals	Effect on the skin
Collagen	Degradation of collagen	Loss of suppleness and dehydration
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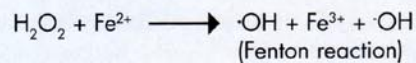
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“the most powerful antioxidants of all.”

Antioxidants prevent or stop the various reactions caused by free radicals and repair the resulting damage. Specifically, the polyphenols found in blueberries—more specifically, the anthocyanosidic extract—are powerful scavengers of free radicals,<sup>4</sup> helping at various levels of the cell. They inhibit lipid peroxidation,<sup>5</sup> or citrin coloration, and prevent the production of elastase, which is involved in the degradation of collagen, or loss of suppleness and dehydration.<sup>6</sup>

### Iron-chelating activity

Iron has been featured often in the health and consumer press in the context of anemia. Although many articles have discussed the various ways of ensuring appropriate iron intake—whether through a diet that includes red meat and plenty of fruits and vegetables, or through the daily use of supplements—few people realize that unusually high levels of iron can pose serious health risks.

Excess iron is involved in a number of ailments that all have an oxidative component—such as cardiovascular, brain and muscle diseases—as well as in premature skin aging. Indeed, free iron is involved in the Fenton<sup>®</sup> chemical reaction that leads to the production of the hydroxyl radical, one of the most harmful free radicals.<sup>7</sup>



The management and prevention of excess iron through the use of topical iron chelators to combat photodamage and premature skin aging is a novel approach in skin care. Neutralizing free iron helps to minimize its involvement in the production of free radicals, thus promoting the skin's youthfulness.

Once again, blueberries play a key protective role. Indeed, research has shown that quercetin and myricetin—two types of polyphenols found in blueberries—have iron-chelating

properties, meaning that they inhibit the formation of free radicals stimulated by excess free iron and UV light.<sup>8</sup>

### Positive Effects on the Skin

Activity	Molecule Effects	Action on the skin
Vaso-protective	Anthocyanins	<ul style="list-style-type: none"> <li>• Protect fine capillaries</li> <li>• Minimize facial redness</li> </ul>
Antioxidant	Anthocyanins	<ul style="list-style-type: none"> <li>• Scavenge free radicals</li> <li>• Prevent premature skin aging</li> <li>• Inhibit lipid peroxidation</li> <li>• Rehydrate, increase suppleness</li> <li>• Prevent the production of elastase</li> </ul>
Iron-chelating	Quercetin, Myricetin	<ul style="list-style-type: none"> <li>• Neutralize free iron</li> <li>• Prevent premature skin aging</li> </ul>

### Positive effects

Blueberries exert three key effects on the skin, as illustrated in **Positive Effects on the Skin**. So it's important to remember not only to eat your blueberries, but to put them on your face, as well! ✂

#### FOOTNOTES

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- 2 D Bagchi, CK Sen, M Bagchi, M Atalay, Anti-angiogenic, antioxidant, and anticarcinogenic properties of a novel anthocyanin-rich berry extract formula. *Biochemistry (Mosc)* 69(1) 75-80 (2004)
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- 4 R Lichtenhaler, F Marx, Total oxidant scavenging capacities of common European fruit and vegetable juices. *J Agric Food Chem* 53(1) 103-110 (2005)
- 5 H Sakagami, K Asano, K Takahashi, S Terakubo, Y Shoji, H Nakashima, W Nakamura, Anti-stress activity of mulberry juice in mice. *In Vivo* 20(4):499-504 (2006)
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- 7 AS Polla, IL Polla, BS Polla, Iron as the malignant spirit in successful ageing. *Ageing Res Rev* 2(1) 25-37 (2003)
- 8 A Svobodová, J Psotová, D Walterová, Natural phenolics in the prevention of UV-induced skin damage. *Biomed Papers* 147 137-145 (2003)

