

# USANA Technical Bulletin

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## Bioflavonoid Complex

### Technical Background

- Bioflavonoids comprise a diverse class of polyphenolic compounds with antioxidant activity. They are found naturally in the leaves, bark, roots, flowers, and seeds of plants.<sup>1</sup>
- There are thousands of naturally-occurring bioflavonoids. To aid in classification, they have been divided into eight major groups: flavonols, flavones, flavonones, catechins, anthocyanidins, isoflavones, dihydroflavonols, and chalcones.<sup>1</sup>
- Therapeutic effects of bioflavonoids on human health are reported abundantly in scientific literature, and include anti-bacterial, anti-viral, anti-inflammatory, anti-allergic, and vasodilatory activities.<sup>2,3,4</sup> Considerable work has been done to establish a negative relationship between bioflavonoid intake and heart disease.<sup>1,5,6</sup>
- Evidence also suggests that bioflavonoids (along with other vitamins in the fruits and vegetables that contain them) could prevent many types of cancer.<sup>7,8</sup> Bioflavonoids in particular have demonstrated the potential to fight leukemia cells.<sup>9</sup> One study found that the flavonoid *myricetin* may modulate anticancer drug resistance, making it a possible companion to chemotherapy when fighting cancer.<sup>10</sup> Recent studies have found that some flavonoids may even help control diabetes.<sup>11</sup>
- It is believed that many of the therapeutic effects of bioflavonoids result from their potent antioxidant and free radical scavenging properties.<sup>12</sup> The antioxidant activities of bioflavonoids complement, extend, and sometimes synergize the antioxidant activities of vitamin C, vitamin E, and carotenoids, making them an important nutritional component in the body's defenses against free radical damage.<sup>7</sup>
- Additional technical information on the bioflavonoids in green tea extract and grape seed extract can be found in USANA technical bulletins specific to those materials.

### Sources and Recommended Intake

- Bioflavonoids are present in most of the foods we eat, but particularly in fruits and vegetables, nuts, seeds, teas, and wine. Some specific bioflavonoid-containing foods that have received recent attention for their role in nutrition are grape seeds, citrus, onions, green tea, bilberry, and soybean.
- No Recommended Dietary Allowance (RDA) has been established for bioflavonoids. Eating the recommended five servings of fruits and vegetables a day would provide a beneficial daily intake of approximately 100mg of bioflavonoids. Unfortunately, few Americans (about 20%) follow this advice,<sup>13,14</sup> and the best calculations (from work in the Netherlands) estimate an intake of only 23 mg per person per day.<sup>15</sup>

## Abstracts

**Kris-Etherton PM, Keen CL. Evidence that the antioxidant flavonoids in tea and cocoa are beneficial for cardiovascular health. *Curr Opin Lipidol.* 2002 Feb;13(1):41-9.** Epidemiologic studies suggest an inverse association of tea consumption with cardiovascular disease. The antioxidant effects of flavonoids in tea (including preventing oxidative damage to LDL) are among the potential mechanisms that could underlie the protective effects. Other possible mechanisms include attenuating the inflammatory process in atherosclerosis, reducing thrombosis, promoting normal endothelial function, and blocking expression of cellular adhesion molecules. Cocoa and chocolate can also be rich sources of flavonoids. Flavanols and procyanidins isolated from cocoa exhibit strong antioxidant properties in-vitro. In acute feeding studies, flavanol-rich cocoa and chocolate increased plasma antioxidant capacity and reduced platelet reactivity. Based on limited data, approximately 150 mg of flavonoids is needed to trigger a rapid antioxidant effect and changes in prostacyclin. Some dose-response evidence demonstrates an antioxidant effect with approximately 500 mg flavonoids. Brewed tea typically contains approximately 172 mg total flavonoids per 235 ml (brewed for 2 min); hence, consumption of 1 and 3.5 cups of tea would be expected to elicit acute and chronic physiologic effects, respectively. Chocolate is more variable with some products containing essentially no flavonoids (0.09 mg procyanidin/g), whereas others are high in flavonoids (4 mg procyanidin/g). Thus, approximate estimates of flavonoid rich chocolate needed to exert acute and chronic effects are 38 and 125 g, respectively. Collectively, the antioxidant effects of flavonoid-rich foods may reduce cardiovascular disease risk.

## References

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