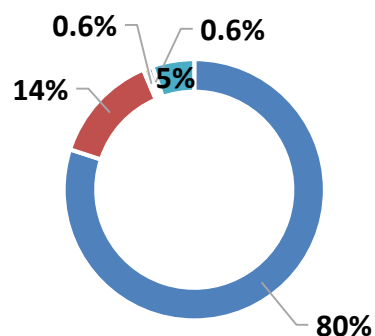


# Nutritional Attributes of Elderberry Varieties (*Sambucus nigra* ssp.)

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Elderberries are composed of water, sugars, organic acids, small amounts of proteins and lipids, and phenolic compounds, including the red-purple pigments called anthocyanins. Genetics and growing conditions affect the levels of these compounds. The balance of these components influence the taste, color, and functional properties of the elderberries.

Elderberry Components



■ Water ■ Sugar ■ Organic acids  
■ Phenolics ■ Other

## European elderberry: *S. nigra* ssp. *nigra*

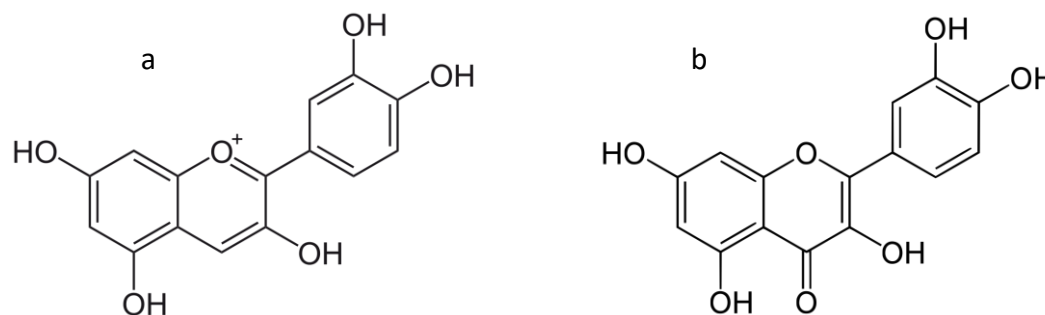
The most extensively studied elderberry variety, the European elderberry has been used and cultivated for years. It's known for its health-promoting properties due to the high levels of phenolic compounds

## American elderberry: *S. nigra* ssp. *canadensis*

Cultivation of the American elderberry is on the rise, as the demand for elderberry increases in supplements, foods, and beverages. This variety has similar phenolic compounds to the European variety, but with a unique composition of anthocyanins.

## California blue elderberry: *S. nigra* ssp. *cerulea*

The research is just beginning for this variety native to California! The data shows promising signs that the blue elderberry has similar nutritional attributes to the European and American elderberries (see Table 1 on back). Like other varieties of elderberry, blue elderberries have cyanidin-based anthocyanins and a variety of flavonols, flavan-3-ols, and phenolic acids.



**Figure 1.** The predominant anthocyanin (a: cyanidin) and flavonol (b: quercetin) in elderberries

**Table 1. Variation in composition of elderberry subspecies**

	<i>S. nigra</i> ssp. <i>cerulea</i> <sup>a</sup>	<i>S. nigra</i> ssp. <i>canadensis</i> <sup>b</sup>	<i>S. nigra</i> ssp. <i>canadensis</i> <sup>c</sup>	<i>S. nigra</i> ssp. <i>nigra</i> <sup>c</sup>
pH	3.66 ± 0.12	4.92 ± 0.15	4.22 ± 0.11	3.88 ± 0.11
Brix or Soluble Solids	14.26 ± 1.34	10.92 ± 0.95	13.23 ± 0.71	13.08 ± 0.32
Titrateable Acidity (mg citric acid/100g)	0.62 ± 0.09	0.56 ± 0.06	0.70 ± 0.12	1.17 ± 0.19
Total phenolics (mg gallic acid equivalents/100g)	596.1 ± 92.6	591.8 ± 58.3	412.4 ± 55.2	460.8 ± 120.6

<sup>a</sup> Values represent elderberries harvested from five California farms in 2018 and 2019

<sup>b</sup> Values represent 12 genotypes at three locations across three growing years. Source: Thomas, A. L.; Perkins-Veazie, P.; Byers, P. L.; Finn, C. E.; Lee, J. A. Comparison of Fruit Characteristics among Diverse Elderberry Genotypes Grown in Missouri and Oregon. *J. Berry Res.* **2013**, 3 (3), 159–168.

<sup>c</sup> Values represent eight genotypes of *S. nigra* ssp. *canadensis* and two genotypes of *S. nigra* ssp. *nigra* across two growing years. Source: Lee, J.; Finn, C. E. Anthocyanins and Other Polyphenolics in American Elderberry (*Sambucus canadensis*) and European Elderberry (*S. nigra*) Cultivars. *J. Sci. Food Agric.* **2007**, 87, 2665–2675.

- High variation within subspecies and between subspecies
  - Growing location and conditions
  - Farming or cultivation practices
  - Genetics
- Trends across elderberry subspecies
  - High levels of phenolic compounds
  - Common phenolic compounds: cyanidin-based anthocyanins, quercetin-based flavonols, phenolic acids



- The preliminary data on the California blue elderberry demonstrates that this native plant is similar to the European and Eastern/Midwestern US elderberry varieties, a promising start to showing that it could perform similarly in elderberry-based products.
- Research continues to determine the variability in the blue elderberry year-to-year and to determine if there are any unique phenolic compounds to this variety.