

Sambucus Black Elderberry Liquid

TECHNICAL SUMMARY

Black elderberry (*Sambucus nigra*) fruit has a long history of use as a tonic in traditional European herbal systems.* Black elderberries are known to possess a variety of natural compounds that help to maintain health and well-being, such as potent, free radical-scavenging anthocyanins and other beneficial nutrients.* Protocol For Life Balance® Sambucus Black Elderberry Liquid Concentrate is a non-GMO supplement formulated with a 10:1 elderberry concentrate that delivers 500 mg per teaspoon serving.

Composition: The black elderberry extract used in this product is equivalent to a 10:1 concentrate of *Sambucus nigra* whole fruits. While this extract is not standardized, numerous laboratory studies have demonstrated that water extraction of black elderberry releases many bioactive compounds such as anthocyanins, flavanols and phenolic acids. The dominant anthocyanins in elderberries are cyanidin glycosides: 3-glucoside cyanidin and 3-sambubioside cyanidin (Figure 1). Other compounds commonly found in whole fruit elderberries are organic acids, sugars, pectins and vitamins.

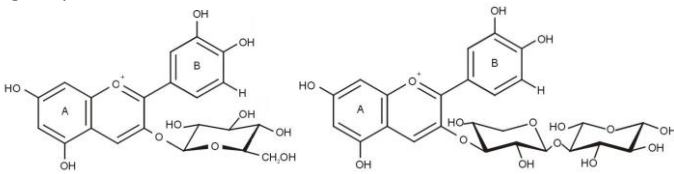


Figure 1: 3-glucoside cyanidin (left) and 3-sambubioside cyanidin (right)

Elderberries also yield proteins known as *Sambucus nigra* agglutinins (SNAs), which are lectins and ribosome-inactivating proteins (RIPs).

Allergen and Additive Disclosure: Not manufactured with yeast, wheat, gluten, soy, milk, egg, fish, or shellfish ingredients. Produced in a GMP facility that processes other ingredients containing these allergens. This product uses water as solvent during the extraction process.

Delivery Form: Liquid.

ROLE AS NUTRIENT/FUNCTION

While elderberry has a long history of use by herbalists, its mechanism of action has not yet been fully elucidated.

In vitro studies have shown that anthocyanins and flavanols extracted from elderberries possess powerful free radical-scavenging properties.*

In vitro data also suggest that elderberry extract has some immunomodulatory properties.*

NATUROKINETICS®

Liberation: Not applicable. Ingredients are in the form of a solution.

Absorption: The liquid form of this product is meant to maximize absorption.

Several pharmacokinetic studies have demonstrated that after oral administration of elderberry extract, anthocyanins can be detected in volunteers' blood. The average C_{max} , T_{max} and elimination half-life ($t_{1/2}$) for anthocyanins are 97.4 nmol/l, 72 min. and 133 min., respectively.

Supplement Facts

Serving Size 1 Teaspoon (5 mL)
Servings Per Container about 47

| | Amount Per Serving | % Daily Value |
|--|--------------------|---------------|
| Calories | 15 | |
| Total Carbohydrate | 4 g | 1%* |
| Black Elderberry (<i>Sambucus nigra</i>) (Fruit) (10:1 Concentrate) | 500 mg | † |

* Percent Daily Values are based on a 2,000 calorie diet.

† Daily Value not established.

Other ingredients: Vegetable Glycerin, De-ionized Water, Citric Acid and Potassium Sorbate (as preservative).

- **10:1 Concentrate**
- **500 mg per Teaspoon**

SUGGESTED USAGE: Shake well before using. Take 1 teaspoon (5 mL) 1 to 3 times daily, or as directed by your healthcare practitioner. Can be taken directly, or mixed with water or juice.

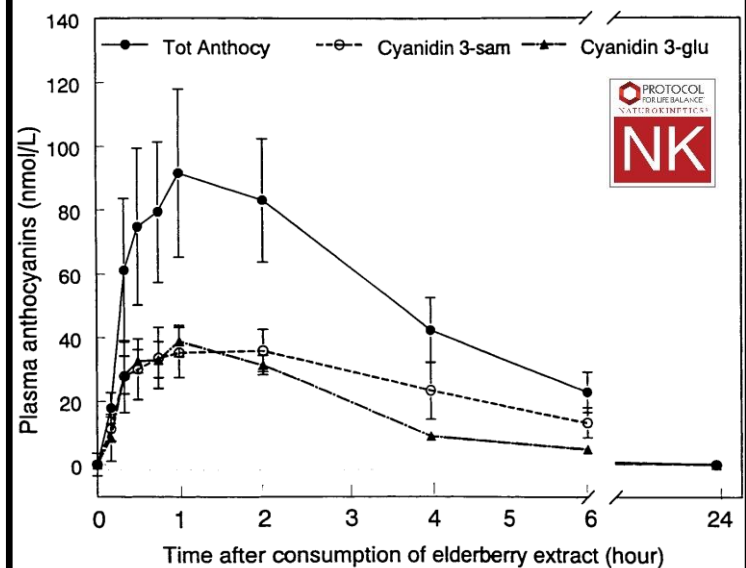


Figure 2: Plasma anthocyanin concentrations after the consumption of 720 mg anthocyanins. Data are presented as mean \pm S.E. of four subjects. The point at 24 h represents all three lines.

Distribution: While the distribution of elderberry anthocyanins has not yet been clinically evaluated, based on known data regarding anthocyanin bioavailability, distribution for these anthocyanins is expected to be in the GI wall, blood vessel walls, liver and brain.

Metabolism: The metabolism of elderberry anthocyanins has not yet been well researched. Some evidence indicates that both cyanidin-3-glucoside and cyanidin-3-sambubioside are methylated in the liver to peonidin-3-glucoside and peonidin-3-sambubioside, similar to what has been established for other flavonoids. Glucuronide forms of elderberry anthocyanins, peonidin monoglucuronide and cyanidin-3-glucoside

monoglucuronide, have been isolated in the urine of healthy volunteers after the ingestion of an elderberry extract, suggesting that conjugation with glucuronic acid is part of the metabolic pathway of elderberry anthocyanins in the body.

Elimination: Anthocyanins from elderberry extract are rapidly eliminated unchanged in urine after oral administration in healthy volunteers. A multi-dose clinical study showed a dose-dependent elimination of unchanged anthocyanins after ingestion of elderberry juice.

CLINICAL VALIDATION

Elderberry extracts have been extensively studied, and many randomized clinical trials using different type of proprietary extracts have been published that clinically confirm their health-supporting properties.

- An open-label pharmacokinetic study on eight healthy volunteers ingesting a single oral dose of 400 ml elderberry juice resulted in a significant increase of the free radical-scavenging capacity of plasma.*

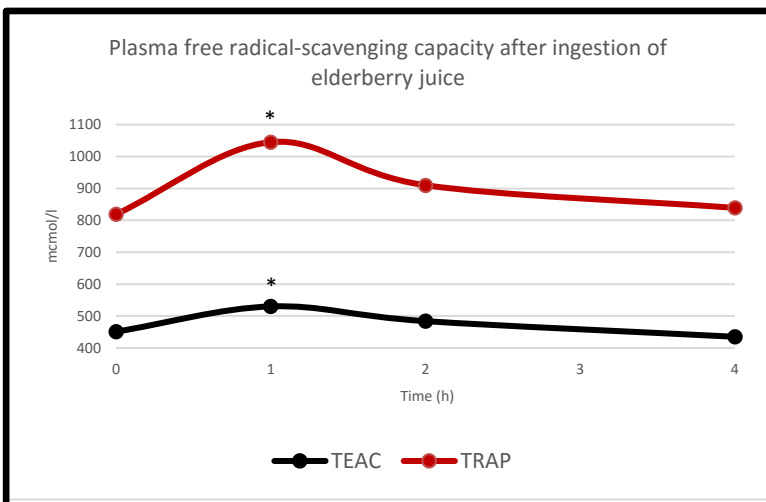


Figure 3: Plasma free radical-scavenging capacity using two different assays, the Trolox equivalent antioxidant capacity (TEAC) and the total radical-trapping antioxidant parameter (TRAP).

SAFETY INFORMATION

Tolerability: Elderberry extract is typically well tolerated.

Contraindications: *S. nigra* is not recommended for patients allergic or hypersensitive to plants belonging to the *Adoxaceae* or *Caprifoliaceae* families because of the risk of allergic reaction.

INTERACTIONS

Drug Interactions: None known

Supplement Interactions: None known

Interaction with Lab Tests: None known

STORAGE

Store in a cool, dry, dark place after opening.