

# The Apple of my Eyes – power aid drinks from Aronia



Workshop with  
Vicki



# *Aronia mitchurinii* – The ‘Apple’ of my Eyes

- The wild breed, *Aronia melanocarpa*, is native to MD
- The pome group

Aronia – berry of my childhood!!!



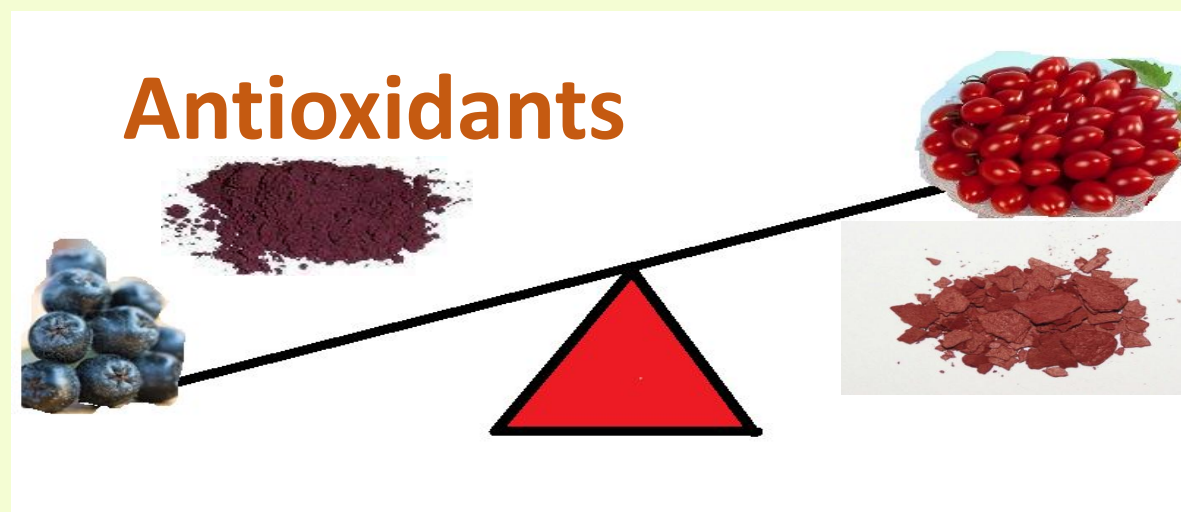
- High market value and many food related products
- Cultivated in the 19<sup>th</sup> century by a Russian plant breeder, Ivan Mitchurin
  - 75% *Aronia melanocarpa* + 25% of *Sorbus aucuparia* (mountain-ash) = *Aronia mitchurinii*

- Larger fruits, larger plants
- Relatively simple to grow
- Very little needs to be done after establishment
- Very hardy species
- Most management can be done organically, however Aronia does have major pests

Sample	Natural pH	APC, mg C3GE/100g juice	Flavonoids, mg QE/100g juice	Polyphenols, mg GAE/100g juice
<b>Ripened Aronia</b>	<b>3.47</b>	<b>109.745</b>	<b>50.384</b>	<b>495.047</b>
<b>Unripe Aronia</b>	<b>3.37</b>	<b>40.628</b>	<b>29.919</b>	<b>625.711</b>
Peach	4.16	0.384	7.675	155.729
Blueberry	3.13	14.236	10.292	155.585
Blackberry	3.70	28.791	14.491	150.145

N	%	%
Rate	Hydrophilic	Lipophilic
0	95.47	4.53
3	93.84	6.16
7	96.35	3.65
14	97.68	2.32

- Main antioxidant:  
lycopene
- lipophilic



- Main antioxidants:  
Anthocyanins,  
polyphenols,  
flavonoids, tannins.
- Hydrophilic



# DEVELOPING AN ALL-NATURAL SUGAR FREE ORGANIC POWER DRINK FROM ARONIA BERRIES

- All drinks on the market that are considered healthy, are not actually that healthy – sugar, artificial colorant, and synthetic taste compounds, preservatives, very few nutrients and minerals are claimed on the label
- None claims antioxidants (some claim antioxidants but actually list vitamins)



Nutrition Facts	
Serving Size 1 Bottle (591 mL)	
Amount Per Serving	
Calories 130	
	% Daily Value*
Total Fat 0g	0%
Sodium 270mg	11%
Potassium 75mg	2%
Total Carbohydrate 34g	11%
Sugars 34g	
Protein 0g	
<small>Not a significant source of calories from fat, saturated fat, trans fat, cholesterol, dietary fiber, vitamin A, vitamin C, calcium, and iron.</small>	
<small>*Percent Daily Values are based on a 2,000 calorie diet.</small>	
WATER, SUGAR, DEXTROSE, CITRIC ACID, NATURAL FLAVOR, SALT, SODIUM CITRATE, MONOPOTASSIUM PHOSPHATE, GUM ARABIC, SUCROSE ACETATE ISOBUTYRATE, GLYCEROL ESTER OF ROSIN, YELLOW 6	
<small>Last updated on October 27, 2014.</small>	



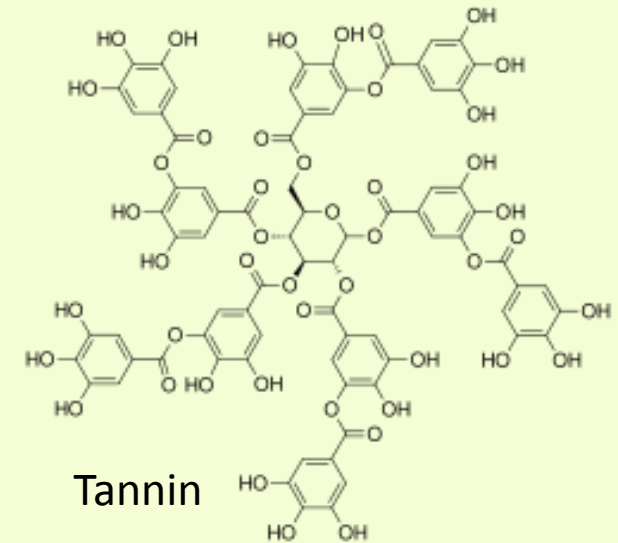
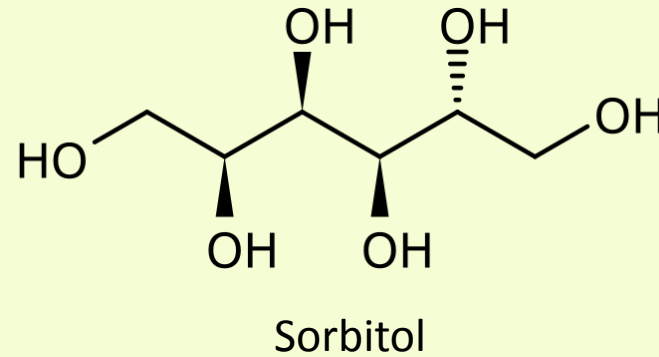
Nutrition Facts	
1 serving per container	
Serving Size 16.9 fl oz (500 mL)	
Amount Per Serving	
<b>Calories</b>	<b>120</b>
	% Daily Value*
Total Fat 0g	0%
Sodium 230mg	10%
Total Carbohydrate 30g	11%
Total Sugars 29g	
Includes 29g Added Sugars	57%
Protein 0g	
Potassium 60mg	0%
<small>Not a significant source of saturated fat, trans fat, cholesterol, dietary fiber, vitamin D, calcium, and iron.</small>	
<small>*The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.</small>	
WATER, ORGANIC SUGAR, CITRIC ACID, ORGANIC NATURAL FLAVOR, SEA SALT, SODIUM CITRATE, POTASSIUM CHLORIDE	
<small>Last updated on July 27, 2020.</small>	



Serving Size   1 Bottle	
Amount Per Serving	
<b>Calories</b>	<b>10</b>
Sodium	10mg
Potassium	160mg
Total Carbohydrate	11g
Sugars	1g
Erythritol	10g
Protein	0g
Vitamin C	

# Obstacles

- Sorbitol
- Taste of tannins (actually a good thing)
  - This gives Aronia it's bitter taste
  - Found in tea
- The amount of minerals to add
- Adding too much Aronia juice would be too overwhelming for taste, and would place limit for daily consumption
- Adding too little Aronia juice would not fit the target of antioxidants amount per bottle.



## 330 mL bottle, our best tasting sample:

- 100 – 150 mL of Aronia Juice
- 5-10 drops of Stevia
- 5-6 mL of Mineral Drops
- 10 drops of extract for flavors
- The rest is water
- Patented product – cannot tell exact amounts
- Price ~\$3.00



# Our Drinks – flavor additives are brewed in water before adding to the bottle.

## Original

- Improves liver health
- Boosts immunity
- Increases cancer prevention

## Raspberry

- Well known for anti-inflammatory attributes
- High in potassium
- Lowers blood pressure

## Chamomile

- Anxiety reducer
- Upset stomach and nausea relief

## Earl Grey

- Lowers cholesterol
- Lessens anxiety
- Increases teeth health

## Strawberry

- Increases HDL or good cholesterol
  - Excellent source of vitamin C

## Holy Basil Fig

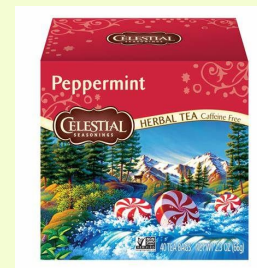
- Reduces high blood sugar levels
- Good source of vitamins A, B1 and B2, and Iron.

## Pomegranate

- Increases blood flow to the heart
- Prevents hardening of the arteries

## Peppermint

- Soothes irritable bowel syndrome
- Relieves chemotherapy-induced symptoms



# Phytochemical screening of drinks

## Phytochemical Screening

Drink sample	Flavonoids	Glycosidases	Polyphenols	Saponins	Steroids	Alkaloids	Oils	Carbohydrates	Proteins	Diterpenes	Anthraquinones	Tannins
Original	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y	Y
Raspberry	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	Y
Earl Grey	Y	Y	Y	Y	N	Y	Y	Y	N	Y	N	Y
Pomegranate	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y
Strawberry	Y	Y	Y	N	N	Y	N	Y	Y	Y	N	Y
HB FIG	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y
Chamomile	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	Y
Peppermint	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y

# Phytochemical Benefits

- Flavonoids: phytonutrients with beneficial anti-inflammatory effects that protect cells from oxidative damage.
- Glycosidases: antioxidants aiding in anti-inflammatory benefits, prevents heart complications
- Polyphenols: helps manage blood sugar levels & promotes good circulation
- Alkaloids: prevents cancers & relieves pains and muscle soreness
- Carbohydrates: fights bacteria in central nervous system, aids in digestion
- Proteins: increases muscle mass and strength, lowers blood pressure
- Diterpenes: improves liver detoxification to prevent cancers
- Tannins – antioxidants, found also in black tea.



# Tasting!!!



## Nutrition Information

Anthocyanins: 184 mg/L

Polyphenols: 0.7 mg/mL

Flavonoids: <0.1 mg/mL

### Minerals (%DV)...

- ❖ Iron: 21%
- ❖ Sodium: 26%
- ❖ Potassium: 44%
- ❖ Calcium: 23%
- ❖ Magnesium: 52%

pH: ~4.0

Soluble Sugars: 3.4%

## HAWK POWER

**The all-natural, organic, sugar-free power drink. Basic Flavor**

The basic HAWK POWER flavor using a simple blend of Aronia juice, water, stevia, and mineral drops. The Aronia juice itself is abundant in antioxidants, and contains tannins which create a astringent taste similar to that of black tea or red wine. Notably, the Alkaloids present in the drink are a very important phytochemical that is revered for pharmaceutical use as an antimalarial, antiasthma, and anticancer compound.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.



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## Nutrition Information

Anthocyanins: 184 mg/L

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pH: ~4.0

Soluble Sugars: 3.4%

## HAWK POWER

**The all-natural, organic, sugar-free power drink. Raspberry Flavor**

The raspberry HAWK POWER flavor that incorporates organic raspberry flavoring to the original mix. This blend aims to lift the astringent taste with fresh fruit flavor.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.

## Phytochemicals

The Raspberry flavor is a significant source of...

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins



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# HAWK POWER

**The all-natural, organic, sugar-free power drink. Peppermint Tea Flavor**

Combined with the cooling sensation of menthol, this flavor of HAWK POWER utilizes the natural ability of peppermint to great effect. Benefits include helping to fight bacterial infections, soothing upset stomachs, and clearing sinuses, to name a few.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.

## Nutrition Information

Anthocyanins: 184 mg/L

Polyphenols: 0.7 mg/mL

Flavonoids: <0.1 mg/mL

Minerals (%DV)...

- ❖ Iron: 21%
- ❖ Sodium: 26%
- ❖ Potassium: 44%
- ❖ Calcium: 23%
- ❖ Magnesium: 52%

pH: ~4.0

Soluble Sugars: 3.4%

## Phytochemicals

The Peppermint flavor is a significant source of...

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Diterpenes
- ❖ Coumarin
- ❖ Saponin



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# HAWK POWER

**The all-natural, organic, sugar-free power drink. Strawberry Flavor**

A classic fruit popularized in its use in across plethora of different cuisines. The strawberry HAWK POWER brings in its own set of phenolics to the table, further enhancing the antioxidant capability of the drink. In addition to this, strawberry itself host a number of different vitamins, and fiber.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.

## Nutrition Information

Anthocyanins: 164 mg/L

Polyphenols: 0.8 mg/mL

Flavonoids: <0.1 mg/mL

Minerals (%DV)...

- ❖ Iron: 6%
- ❖ Sodium: 26%
- ❖ Potassium: 45%
- ❖ Calcium: 12%
- ❖ Zinc: 34%

pH: ~3.8

Soluble Sugars: 4%

## Phytochemicals

The Strawberry flavor is a significant source of...

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Vitamin C
- ❖ Ascorbic Acid



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### Nutrition Information

Anthocyanins: 146 mg/L

Polyphenols: 0.6 mg/mL

Flavonoids: <0.1 mg/mL

#### Minerals (%DV)...

- ❖ Iron: 3%
- ❖ Sodium: 48%
- ❖ Potassium: 51%
- ❖ Calcium: 12%
- ❖ Magnesium: 100%

pH: ~4.5

Soluble Sugars: 3.9%

# HAWK POWER

**The all-natural, organic, sugar-free power drink. Earl Grey Flavor**

The earl grey HAWK POWER flavor infuses the phytochemical power of the organic herb while also introducing a source of caffeine to the drink. Known for being able to lower cholesterol levels as well as aiding in weight loss.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.

### Phytochemicals

The Earl Grey flavor is a significant source of...

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Saponins
- ❖ Proteins
- ❖ Anthraquinones
- ❖ Caffeine



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### Nutrition Information

Anthocyanins: 146 mg/L

Polyphenols: 0.6 mg/mL

Flavonoids: <0.1 mg/mL

#### Minerals (%DV)...

- ❖ Iron: 3%
- ❖ Sodium: 54%
- ❖ Potassium: 47%
- ❖ Calcium: 13%
- ❖ Magnesium: 100%

pH: ~4.6

Soluble Sugars: 3.5%

# HAWK POWER

**The all-natural, organic, sugar-free power drink. Chamomile Flavor**

Chamomile is another organic herbal tea flavor of HAWK POWER that uses the same basic ingredients while infusing the phytochemical properties of the tea. Chamomile itself has been said to calm anxiety, and ease upset stomachs or settle nausea.

Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.

### Phytochemicals

The Chamomile flavor is a significant source of...

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Proteins



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## HAWK POWER

*The all-natural, organic, sugar-free power drink. Fig Flavor*

*A new addition to the HAWK POWER series, fig introduces the ability to support digestive and bone health, while also helping to maintain healthy blood pressure.*

*Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.*



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### Nutrition Information

*Anthocyanins: 114 mg/L*

*Polyphenols: 0.6 mg/mL*

*Flavonoids: <0.1 mg/mL*

*Minerals (%DV)...*

- ❖ Iron: 3%
- ❖ Sodium: 50%
- ❖ Potassium: 72%
- ❖ Calcium: 30%
- ❖ Magnesium: 100%

*pH: ~4.5*

*Soluble Sugars: 4%*

### Phytochemicals

*The Fig flavor is a significant source of...*

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Cartenoids



## HAWK POWER

*The all-natural, organic, sugar-free power drink. Yerba Mate Flavor*

*Similarly to the previous herbal teas, the yerba mate HAWK power flavor, infuses its health benefits and phytochemical properties into the drink. Yerba mate, though not as well known as chamomile or earl grey, has potential benefits in fighting fatigue thanks to its caffeine content, as well as helping in weight loss and combating depression.*

*Note that the sodium content is sufficient for the purpose of a power drink, yet not overwhelmingly high. To add to this, many of microelements absent in traditional power drinks are present here.*



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### Nutrition Information

*Anthocyanins: 161 mg/L*

*Polyphenols: 0.6 mg/mL*

*Flavonoids: <0.1 mg/mL*

*Minerals (%DV)...*

- ❖ Iron: 7%
- ❖ Sodium: 50%
- ❖ Potassium: 51%
- ❖ Calcium: 16%
- ❖ Magnesium: 100%

*pH: ~4.6*

*Soluble Sugars: 3.4%*

### Phytochemicals

*The Yerba Mate flavor is a significant source of...*

- ❖ Glycosides
- ❖ Phytosterols
- ❖ Alkaloids
- ❖ Carbohydrates
- ❖ Tannins
- ❖ Saponins
- ❖ Proteins
- ❖ Caffeine



**Survey – also available in hard copies**



# Let's get our hands dirty

- Open your bottled water
- Drink about 25 – 30% of water volume
- Add about quarter of the bottle volume of aronia juice
- Add stevia drops to your test
- Add about teas spoon of liquid mineral drops
- Add combinations of flavors to your taste
- Cool in refrigerator or ice
- Enjoy!



# Mulberry

- Mulberries grow on trees ranging from 30-60 ft tall, and 20-40 ft wide
- The berries themselves are rich in anthocyanins and alkaloids
- Mulberry fruits have multiple pharmacological properties including antioxidants, anti-diabetic, glucosidase inhibition, anti-hyperlipidemic, anti-atherosclerotic, anti-obesity, and cognitive enhancement abilities
- These berries have healthy phytochemicals and nutrients but do not possess a long shelf life, making sale of the fruit difficult, but not the drinks with their juice.



# Elderberry

- *Sambucus Canadensis* is another name for elderberry, which is native to North and Central America
- *Sambucus nigra*, *S. cerulea*, *S. ebulus*, and *S. racemosa* are the four species with three recognized hybrids
- Each of this species has different concentration of anthocyanins
- Elderberry help boost the immune system and can be used in juice, wines, jams and other fresh products.
- Elderberry seeds, stems, and roots are toxic !!! Think where you get it from!!! Must be FDA approved





# Haskap

- A Japanese fruit native to Hokkaido and Northern Honshu
- A deciduous shrub that can grow up to 2 meters in height
- they have been introduced into Oregon and Idaho
- production in Japan has declined since 1991 because of high labor cost
- Their high nutritional value and anthocyanin content made them very popular with native Ainu people
- Haskap prefer higher latitudes and colder temperatures to produce substantial yields.

