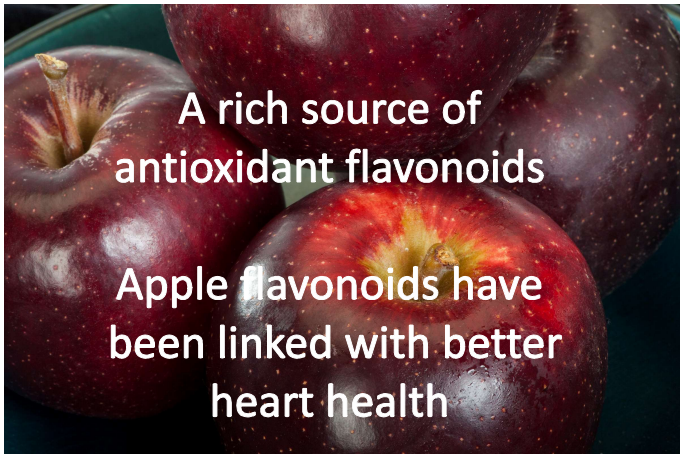




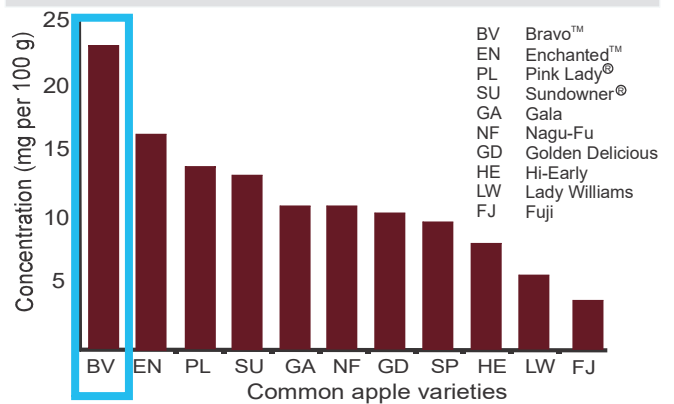
a new heart healthy apple
bred and grown in Australia

Why are apples healthy?

- More than 4 million deaths worldwide are attributed to a diet low in fruit
- Higher fruit consumption is protective against cardiovascular disease which causes around one third of all deaths globally
- Boosting your apple consumption can improve cardiovascular disease risk factors and is linked with lower risk of cardiovascular disease
- This is likely due to the unique combination of nutrients and phytochemicals found in apples
- Components of apples strongly linked with health benefits are the **flavonoids**
- The **BRAVO™** apple is a rich source of these flavonoids and important dietary fibre



Total flavonoids in Australian apples



Phytochemicals and macronutrient composition of BRAVO™ apple

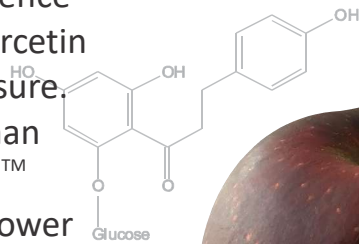
Flavonoids	Amount in 100g	Vitamins	Amount in 100g
Quercetin (mg)	16.17	Vitamin C (mg)	<1.0
Epicatechin (mg)	0.95	Beta-Carotene (ug)	43
Phloridzin (mg)	0.7	Vitamin E (mg)	0.3
Anthocyanins (mg)	3.54	Vitamin K1 (ug)	<1.0
Energy & macronutrients		Elements	
Total sugars (g)	13	Calcium (mg)	3.7
Total fat (g)	<0.2	Iron (mg)	0.31
Protein (g)	0.3	Magnesium (mg)	5.5
Carbohydrates (g)	15	Phosphorous (mg)	8.3
Energy (kj)	270	Potassium (mg)	130
Fibre, total dietary (g)	1.5	Zinc (ug)	74

Apple flavonoids

The key components of apples thought to be having a cardioprotective effect are the phytochemicals known as **FLAVONOIDS**. Flavonoids are found in the highest concentration in the skin of the apple. They are produced by plants to protect them from stress and are thought to have similar protective effects in humans and animals that eat these plants as food. The main flavonoids found in apples are **epicatechin, quercetin, phloridzin, and anthocyanins**. **BRAVO™** apples have one of the highest total flavonoid contents out of all varieties grown in Australia.

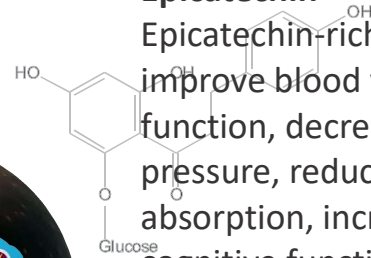
Quercetin

There is growing evidence that foods rich in quercetin can lower blood pressure. The intake of more than 33 mg/day - 1 BRAVO™ apple - is linked with lower heart disease



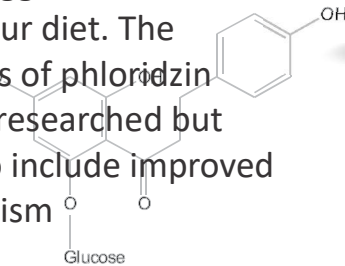
Epicatechin

Epicatechin-rich foods improve blood vessel function, decrease blood pressure, reduce cholesterol absorption, increase cognitive function and lower the risk of diabetes.



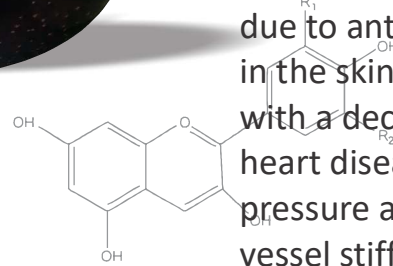
Phloridzin

Apple is the biggest source of phloridzin in our diet. The health benefits of phloridzin are still being researched but are thought to include improved sugar metabolism



Anthocyanins

The red colour of apples is due to anthocyanins found in the skin. They are linked with a decrease in coronary heart disease, lower blood pressure and reduced blood vessel stiffness



Why whole apple?

- Flavonoids and fibre work together to mediate health benefits
- Dietary fibre bind flavonoids and carries them to the large intestine
- There the flavonoids inhibit the growth of bad bacteria and stimulate the growth of beneficial bacteria
- Flavonoids may also work in conjunction with other nutrients in apples such as vitamins
- For this reason it is important to consume whole foods - such as apples - rather than supplements



References

1. Bondonno NP, Bondonno CP, Ward NC *et al.* (2017) The cardiovascular health benefits of apples: whole fruit vs. isolated compounds. *Trends Food Sci Technol.*
2. Ezzati M & Riboli E (2013) Behavioral and dietary risk factors for noncommunicable diseases. *New England Journal of Medicine* **369**, 954-964.
3. Wang X, Ouyang Y, Liu J *et al.* (2014) Fruit and vegetable consumption and mortality from all causes, cardiovascular disease, and cancer: systematic review and dose-response meta-analysis of prospective cohort studies. *Bmj* **349**, g4490.

This work was funded by grants from (i) the Department of Primary Industries and Regional Development through Horticultural Innovation Australia; (ii) The Agricultural Produce Commission, PomeWest; (iii) the National Health and Medical Research Council of Australia; and (iv) the Royal Perth Hospital Medical Research Foundation.

enquiries to <http://www.bravoapples.com.au/> and <http://fruitwest.com.au/>