

# apple review 2009

A Nutrition and  
Health Update

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## **ACCORDING TO THE LATEST SCIENCE, APPLES HAVE BEEN SHOWN TO:**

- reduce cancer risk – particularly cancer of the lung, colon and breast – and inhibit the growth of cancer cells
- protect against asthma
- reduce atherosclerosis (a precursor to cardiovascular disease)
- boost the immune system and protect against flu under stressful conditions such as extreme exercise
- have an emerging role in treatment of inflammatory bowel diseases such as Crohn's disease and ulcerative colitis





The Apple Review 2009 builds on the significant contribution made to our understanding of the unique benefits of apples by The Apple Report (2008),<sup>1</sup> which examined over 50 peer-reviewed papers from the previous 10 years and summarised the health and nutrition benefits of apples.

The Apple Review 2009 offers a scientific update on each of the key disease areas identified in The Apple Report, including cancer, cardiovascular disease, asthma and lung health, and diabetes and weight loss. In addition, the review includes the findings from new research on consumer awareness of the health benefits of apples and consumer consumption habits.

ONLY ONE IN FIVE AUSTRALIANS (21%) EAT AN APPLE A DAY.<sup>15</sup>

## CANCER

Apples are among a handful of foods specifically identified in population studies as having the capacity to reduce cancer risk – in particular cancers of the lung, colon and breast. Analyses of several large cohorts – including the Nurses Health Study – reveal eating just one apple a day is enough. Laboratory tests reveal compounds found in apples have the ability to inhibit human cancer cell growth in the test tube.<sup>1</sup>

### 2008/2009 RESEARCH UPDATE:

The evidence for a role for apples in cancer protection continues to grow with some promising scientific research published in the last year. Two papers out of Cornell University show apple extracts can suppress the growth of human breast cancer cells in the test tube and reduce tumour size in rats.<sup>2,3</sup> The team at Cornell University also isolated six flavonoid and three phenolic compounds from apple peels with potent antioxidant and antiproliferative activity in human cancer cell lines.<sup>4</sup>

A German review of the cancer preventative potential of apples concluded that "...apple extracts should be further investigated as part of a prevention strategy for cancer...."<sup>5</sup>

**Bottom line: The science is promising. Apples have been shown to reduce cancer risk – particularly cancer of the lung, colon and breast – and inhibit the growth of human cancer cells.**

## CARDIOVASCULAR DISEASE

Apple consumption has been associated with a reduced risk of cardiovascular disease. Several large women's health studies – including the Nurses Health Study and The Iowa Women's Health Study in the US – and a selection of smaller cohorts in the Netherlands and Finland have shown a link between apples, and their related antioxidants, and a reduced risk in cardiovascular disease and its related events, including heart attack, stroke or death. Results have been observed in both men and women including postmenopausal women.<sup>1</sup>

### 2008/2009 RESEARCH UPDATE:

In the past year the protective role apples may play in cardiovascular disease has been built upon by new research. French scientists showed atherosclerotic lesions (fatty build-up) in mouse blood vessels were reduced by up to 38% following dietary supplementation with apple extracts rich in polyphenols and or fibre.<sup>6</sup>

AUSTRALIANS ARE MOST LIKELY TO (INCORRECTLY) THINK HALF A PUNNET OF BLUEBERRIES (36%) HAS THE HIGHEST AMOUNT OF ANTIOXIDANTS, SLIGHTLY AHEAD OF A CUP OF TEA (34%).<sup>15</sup>

And when pure extracts of the dietary flavonoids quercetin or epicatechin (both common to apples) were given to healthy men in quantities similar to that which could be achieved by eating a flavonoid rich diet, an improvement in endothelial function was observed.<sup>7</sup> Dysfunction in the endothelium – the lining of blood vessels – is involved in the progression of atherosclerosis and hypertension.

**Bottom line: Research builds on results of epidemiological studies to offer a greater understanding of apples and their phytochemicals in protection from cardiovascular disease, with 2008/2009 data supporting a role for apples in the reduction of atherosclerosis.**

## ASTHMA & LUNG HEALTH

Asthma is an Australian health priority and apple consumption has been linked in several studies to protection against asthma.

Australian research in young adults found that eating whole apples was protective against asthma where total fruit and vegetable intake was not. The link between apples and asthma has also been observed by researchers in Britain and Finland and expanded by the Dutch. The Dutch investigation revealed the impact of maternal diet on the asthma risk of children and found mothers who eat apples during pregnancy may protect their children from developing asthma in later life.

Apples also have a role in the maintenance of general lung health. Apples have been associated with better lung function among older adults,

NEARLY HALF OF AUSTRALIANS (46%) EAT AN APPLE ONCE A WEEK, LESS OFTEN OR NEVER.<sup>15</sup>

particularly among those consuming five or more apples a week and greater apple intake has been related to improved symptoms in those with the chronic lung disease COPD.<sup>1</sup>

WHILE ALMOST ALL (98%) AUSTRALIANS HAVE HEARD OF ANTIOXIDANTS, AND TWO THIRDS (63%) FEEL THAT THEY KNOW WHY IT IS IMPORTANT TO EAT FOODS RICH IN ANTIOXIDANTS, AUSTRALIANS ARE CONFUSED ABOUT WHICH FOODS OFFER ANTIOXIDANTS.<sup>15</sup>

### 2008/2009 RESEARCH UPDATE:

The role of apples and their antioxidants in lung health is elaborated on by a review into the body's own antioxidant systems and their role in the pathogenesis of asthma.<sup>8</sup> Oxidative stress in asthma occurs through inflammation and exposure to environmental pollutants. Oxidant, antioxidant imbalances may be addressed with dietary or therapeutic antioxidants.

The progression of the chronic lung disease COPD is associated with the oxidative stress of smoking. US researchers reviewing the role of antioxidants in its therapeutic management commented on the importance of understanding how naturally occurring antioxidants such as polyphenols (common in apples) work, so therapeutic benefits may be created in the future.<sup>9</sup>

Additionally, in an animal study by the University of South Carolina, the antioxidant quercetin (found in high amounts in apples as well as onions and tea) was shown to boost the immune system and protect against flu during stressful conditions such as extreme exercise.<sup>10</sup>



## REAL FRUIT OR A FRUIT STRAP?

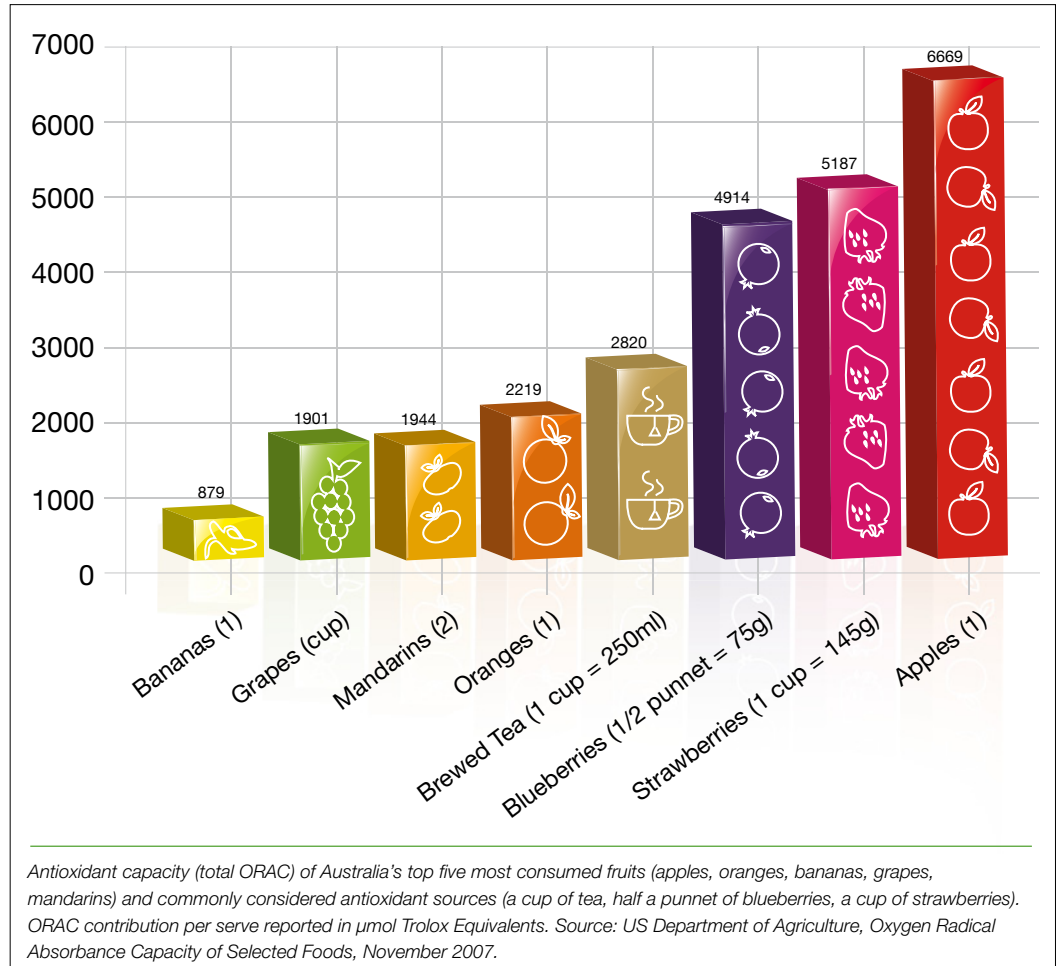
According to Choice, foods high in added sugar often have minimal nutritional value, so don't make very good everyday lunchbox snacks. And if they stick to kids' teeth they can encourage decay, so are best avoided.

Lollies are the worst, but fruit straps can be particularly sticky, and fruit bars in general were the most sugary snacks we looked at. The majority were around 65–75% sugar — that's about three teaspoons (15 g) of sugar in each little 20 g bar.

While fruit sugars contribute to this total, most are only around 25% fruit, so added sugar makes up the bulk.

Source: Choice Website <http://www.choice.com.au/viewArticle.aspx?id=104577&catId=100286&tid=100008&p=1&title=Test%3a+Kids'+lunch+snacks>

## TOTAL ANTIOXIDANT CAPACITY



**Bottom line: The science points to apples' rich source of antioxidants as the basis for its protective role in lung health.**

## DIABETES AND WEIGHT LOSS

Eating apples has been associated with a reduced risk of Type II diabetes in research conducted in both the US and Finland. In fact the American research conducted on 38,000 women revealed a 28% reduction of risk with eating an apple a day or more while the Finnish research found a reduction in risk with higher intakes of quercetin, a major component in apple peel.

Apple (and pear) intake was also associated with weight loss among overweight women in Brazil. Women consuming apples (or pears) three times a day had a significantly greater weight loss and lower

blood glucose levels compared with women eating oat cookies.<sup>1</sup>

### 2008/2009 RESEARCH UPDATE:

Low kilojoule foods and beverages consumed prior to a meal reduce the amount of food subsequently eaten at that meal. Dr Barbara Rolls, Professor of Nutrition at Penn State University and author of the Volumetrics Eating Plan has shown that whole apples eaten before just one meal a day can result in significant energy savings.<sup>11</sup> Over time these savings have the potential to translate to weight loss. Whole apples were also better at doing this than either apple juice or puree.

**Bottom line: Science supports an apple a day for a healthy weight.**



## EMERGING AREAS

And in a new area, research published by scientists in Japan has shown that apple phytochemicals may have an emerging role in treatment of inflammatory bowel diseases such as Crohn's disease and ulcerative colitis. Conducted on mice with colitis, the oral intake of apple procyanidins improved outcomes and showed anti-inflammatory and immunomodulatory effects on their intestinal cells.<sup>14</sup>

**Bottom line: Research demonstrating a role for apples in supporting the immune system and calming inflammatory processes continues to grow.**

ONLY 3% OF AUSTRALIANS CORRECTLY IDENTIFIED AN APPLE AS HAVING MORE ANTIOXIDANTS THAN OTHER FOODS (AN ORANGE, A BANANA, A CUP OF STRAWBERRIES, A CUP OF GRAPES, A CUP OF TEA OR HALF A PUNNET OF BLUEBERRIES).<sup>15</sup>

## ANTIOXIDANTS DEFINED

Antioxidants help neutralise free radicals – highly reactive, unstable compounds produced naturally within the body as well as being derived from external sources such as cigarette smoking, environmental pollutants and UV light.

If not deactivated, free radicals go to war on the body damaging all types of cellular molecules including DNA. The human body has its own defenses against free radical attack, but when our environment is highly oxidative and our diet is poor it becomes easy for natural defenses to be overwhelmed.

## APPLE ANTIOXIDANT ACTION

Apple phytochemicals have the greatest total antioxidant capacity of Australia's most commonly

consumed fruits, as measured using ORAC, a technique adopted by The US Department of Agriculture.<sup>1</sup>

Recently apples have been put to the test with a more biologically relevant method of assessing antioxidant capacity – the cellular antioxidant activity assay (CAA).<sup>12</sup> Compared with 25 other fruits commonly consumed in the US, apples are the largest contributor of fruit phenolics and the greatest supplier of cellular antioxidant activity (along with strawberries) to the American diet.

Flavonoids are a major class of fruit phenolics, and Australian researchers consider apples significant in terms of their contribution to the dietary flavonoid intake of Australians.<sup>13</sup>

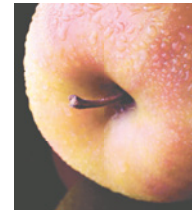
NEARLY HALF OF AUSTRALIANS (46%) EAT AN APPLE ONCE A WEEK, LESS OFTEN OR NEVER.<sup>15</sup>

A 2008 German review outlined the potential of apples and apple products to act as a chemopreventative ie able to block, inhibit or reverse the progression of cancer cells.<sup>5</sup> This review reveals test tube and animal studies that support the anti-inflammatory, anti-mutagenic, anti-proliferic as well as antioxidant activities of the phytochemicals found in apples.

Research is bridging the results of epidemiological studies showing apple benefits to health, with a greater understanding of specific apple compounds and how they act.

## A HEALTHY SNACK – APPLE OR FRUIT BAR?

Snacks are just as important as main meals for keeping children going. But it's important that besides being tasty and appealing they're nutritious too. With the array of brightly wrapped 'child' friendly snacks on supermarket shelves it's easy to keep kids happy. But for parents it's a different story. Products labeled 100% fruit, no added sugar and all natural, make it difficult to know the truth about commercial snack products especially when there's not always time to read the fine print.



Compare the difference between a medium apple and a fruit bar. A snack product such as this won't meet all the nutrition criteria laid down by Choice in their last review of kids lunch snacks.\* Dentists also don't recommend sweet, sticky foods such as these for children because of the contribution they make to tooth decay.

The truth emerges when you compare the addition of a medium apple OR a fruit bar to the lunch box. Compared to an apple, the fruit bars provide:

- a third of the fibre
- 12 times the sodium

Plus they have:

- saturated fat
- added sugar
- up to 13 other ingredients

Apples have no saturated fat, around 17% sugar (not 65-75%) and come with nature's own packaging – tasty and good for you. Plus what's left is 100% biodegradable so good for the earth too.

\*Choice on-line Kids Lunch Snacks 2005

## NEWSPOLL CONSUMER RESEARCH

In March 2009, 1200 Australians were polled via the Newspoll Omnibus questionnaire, on their awareness of the health benefits of apples and their apple consumption.<sup>15</sup> The research found that:

- Only one in five Australians (21%) eat an apple a day.
- Nearly half of Australians (46%) eat an apple once a week, less often (98%) or never.
- While almost all Australians have heard of antioxidants, and two thirds (63%) feel that they know why it is important to eat foods rich in antioxidants, Australians are confused about which foods offer antioxidants.
- Only 3% of Australians correctly identified an apple as having more antioxidants than other foods (an orange, a banana, a cup of strawberries a cup of grapes, a cup of tea or half a punnet of blueberries).
- Australians are most likely to (incorrectly) think half a punnet of blueberries (36%) has the highest amount of antioxidants, slightly ahead of a cup of tea (34%).



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