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Mmm, Phytonutrients: New Respect for a Humble Juice

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For years, many pediatricians, child-rearing books and parenting Web sites have warned parents against apple juice, casting it as "sugar water" with fewer nutrients than other fruit juices. Parents have found this advice hard to swallow, because kids tend to love apple juice.

Now it appears that parents have been vindicated by new research showing that apples contain more beneficial nutrients than previously thought. The new thinking builds on scientists' growing understanding of the importance of phytochemicals (plant chemicals) in fighting chronic disease and promoting health. While much of the research underscores the importance of eating whole fruit, the findings also rehabilitate apple juice -- particularly the unfiltered kind -- as a source of valuable antioxidant compounds.

The new research shows that apples contain many of the same benefits of exotic fruits like pomegranates, Noni fruit and açai that are being marketed as antioxidant powerhouses. Studies at Cornell University's Department of Food Science have found that the unique combination of thousands of phytochemicals in apples -- mainly concentrated in the peel -- retard tumor growth in cell cultures and in animals. In particular, apples are high in triterpenoids, which have "very potent activity in tumor cell growth," says lead researcher Rui Hai Liu.

Dr. Liu believes that apples pack a powerful health benefit because the many phytochemicals work together, and he is currently studying how this potential synergy works. He says each phytochemical is metabolized differently, suggesting that a package can be effective on many different levels in the body.



Sergio Capursi/WSJ

Another series of studies, conducted over the past five years by researchers at the

Center for Cellular Neurobiology and Neurodegeneration Research at the University of Massachusetts Lowell, found that apple juice improved cognitive function in mice. The center is currently studying the juice's effect on Alzheimer's patients, says Tom Shea, the lead researcher.

Both sets of studies received some funding from the U.S. Apple Association and the Apple Products Research and Education Council, trade groups for the industry; the Cornell research also got funds from the American Institute for Cancer Research. Study results were published in peer-reviewed journals.

Doctors and nutrition experts warn that apple juice can still be overdone. For children, it is important to serve pure juice, with no sugar added, and limit total fruit-juice consumption to amounts recommended by the American Academy of Pediatrics: four to six ounces per day for children ages 1 through 6, and eight to 12 ounces for 7- to 18-year-olds. The limits are key because the sugars in juice can be hard for some children to digest and can cause gastrointestinal problems.

Nutritionists recommend eating whole fruit, which provides not only the entire peel but about 3.3 grams of fiber per medium-size apple. But apple juice can provide some of the benefits of whole fruit, says Suzanne Farrell, a spokeswoman for the American Dietetic Association.

Consumers can get more of a health benefit from juice by drinking unfiltered varieties, sometimes called apple cider. A study published this year by Polish scientists in the *Journal of the Science of Food and Agriculture* showed that unfiltered, or cloudy, apple juice is 50% to 80% more effective as an antioxidant than clear juice. Cloudy apple juice is made by shredding apples, straining the resulting juice and bottling it. Filtered juice goes through extra-fine sieves that remove more solids, which means it often contains less peel.

Most apple juice, filtered or unfiltered, is pasteurized. (The Food and Drug Administration requires that all fruit juice be pasteurized, or carry a label outlining the risks of unpasteurized juice, which has been linked to illness and a death in the past.) While pasteurization has been shown to reduce the level of some phytonutrients in apple juice, Dr. Liu says it could be possible that others actually become more potent through processing -- much as cooking tomatoes increases their lycopene content. More research is needed to determine pasteurization's exact effect.