

## **Fruit Juices: Dr. J. S. Pai, Executive Director, PFNDAI**

Juice is prepared by squeezing fruits or vegetables. Juice may be prepared from fresh fruits and vegetables using a variety of juicers. Sometimes treatments may be necessary to macerate fruit or vegetable to pulp that could be easily extracted to get juice. Some juices like apple juice are filtered and also clarified either mechanically or using enzymes and chemicals to give them clarity, but others like orange juice are preferred cloudy by consumers so are not clarified. Juices are marketed as such after processing to preserve them as canned, pasteurised or aseptically packed. Some products are evaporated and made into concentrated form and frozen. These may be diluted with water to reconstitute as single strength. There are also dried powders made that could be reconstituted by water.

There are many fruits like apple, orange, grape, pineapple, mango, pomegranate, guava, grapefruit, cranberry etc. and some vegetables like tomato, carrot etc. from which juices are made. There are also some blends made from different fruits. There are also several juice bars where either concentrated juice products are diluted and served as single strength juices or juice centres may squeeze the fresh fruits to prepare juices.

There are many juice containing products. In UK or US, products labelled as pure juice or 100% juice may not contain anything other than juice. The sweetened juices may contain added sugar. There are many other fruit juice based products such as nectar, beverage or drink. These may contain sugar or other sweeteners besides many other thickeners, colours and flavours. In India, unsweetened juice must contain 100% juice but other products may contain less. Sweetened juice may contain 85% juice, squash, cordial, crush and syrup may contain 25% juice, mango nectar may contain 20% juice while the fruit beverage or drink may contain just minimum of 10% juice.

### **Fruit Juices & Obesity**

Fruit juice consumption has increased in recent years in many countries as consumers perceive them to be healthful. However, there is also some opposition to their consumption as opposed to eating whole fruits. This is mostly because of reduced fibre content as compared to whole fruits, and processing may be causing some losses to heat-sensitive vitamins. There is also some suggestion about relation of high amount of fructose together with low fibre with growing diabetes epidemic. Some are concerned about the high consumption of fruit juices by children and filling up on them so they consume less of foods containing other essential nutrients including proteins, essential fatty acids and other vitamins and minerals.

2005 Dietary Guidelines for Americans (My Pyramid) as well as recommendations from American Academy of Paediatrics (AAP) allow 4 to 6 oz of fruit juice per day for children from 1 to 6 years and 8 to 12 oz for those from 7 to 18 years. According to 2005 Guidelines, 1 cup of fruit or 100% fruit juice or ½ cup of dried fruit are all considered equal in fruit group.

Some years ago, physicians in the US advised parents not to let their children drink too much fruit juice because it may cause obesity. However, today the advice is different. A study done recently found no association between childhood obesity and 100 percent fruit juice with no added sugar.

Published in May/June issue of the American Journal of Lifestyle Medicine, statistics about overweight American children are alarming. Over past 20 years, there has been an increased prevalence of overweight in all ages and ethnic groups. In 2002, 10.3% children 2-5 years of age were overweight compared to 7.2% in 1994. In males and females 12-17 years of age, waist circumference increased by 4% and 5.2% respectively, between 1994 and 2004. In the article by O'Neil of Louisiana State University and Nicklas of Baylor College of Medicine, after examining 21 studies about relationship between consumption of 100% fruit juice by children and adolescent, they found no systematic association between consumption of 100% fruit juice and overweight in children and adolescents. They suggested that health professionals and policy makers should objectively review the literature on all beverages and encourage consumption of healthful beverages including water, milk and 100% fruit juice. Data supports consumption of moderate amounts of pure fruit juices and this may help children meet current recommendations for fruit.

The editorial endorsed this view and stated that these findings are very important as pure juices are nutrient dense and their consumption is an excellent way to help children meet the dietary guidelines for Americans.

### **Research findings on juice consumption and weight**

There are misconceptions about the fruit juices in children's diet. Scientific research does not support the belief that consumption of 100% fruit juice contributing to overweight problems in children or adults. Many research studies have been conducted to verify if such a link exists and they show no such connection with consumption of 100% fruit juice up to 12 ounces per day.

Nicklas et al. (Arch Pediatr Adolesc Med. 2008;162(6):557-565) investigated 100% juice consumption by children aged 2 to 11 years with up to 12 ounces daily consumption. Results showed significantly higher intakes of nutrients including vitamin C, B6, B2, folate, potassium, magnesium and iron with lower intakes of total fat, saturated fatty acids and added sugar. No significant differences were found in weight status and the amount of 100% juice consumed. It was concluded that on average, children consumed less than the maximum amount of 100% juice recommended by American Academy of Pediatrics with those consuming 100% juice had better

nutrient intake than non-consumption group. 100% juice consumption was not associated with being overweight in these children. (<http://archpedi.ama-assn.org/cgi/content/full/162/6/557>)

In another study, O'Neil et al. (American J. of Lifestyle Medicine, May-June 2008 – Online) reviewed nine studies exploring relationship between 100% fruit juice consumption and weight in children and adolescent and found only 3 studies reported any relationship whereas 6 showed no such relation. Studies showing relations had faulty subject selection with 2 studies were done with overweight children. None of these 3 studies were nationally representative and used small, local convenience samples. Data supports consumption of 100% fruit juice in moderate amounts and it may help children meet the current recommendations for fruit.

Faith et al. (Pediatrics, November 2006, 118:5:2066-75) studied preschool children and found that excessive consumption of fruit juice (24-30 ounces per day) promoted obesity but only in children who were already overweight. No association was found in normal weight children. Excessive consumption was far exceeding recommendations for preschool children, which is 4 to 6 ounces. Also overweight children did not show any weight gain when consuming recommended amounts of fruit juices.

Some other studies with large number of children also did not find any association with fruit juices with childhood obesity (Newby et al. J Am Diet Assoc July 2004, 104:7:1086-94 and Field et al. Intl. J of Obesity, 2003, 27:821-826).

### **Health Benefits of Fruit Juices**

Juices are considered nutritious and healthy. They contain many nutrients and phytochemicals that make consumption of these as healthful. Orange juice is rich in vitamin C, while prune juice contains good amount of iron and is also beneficial for digestive health. Cranberry juice has been known for alleviating bladder infections it is now shown that it prevents bacteria settling on bladder. Nowadays health professionals have changed their advice to parents and are recommending consumption of pure fruit juices. There are some fruits juices that have been identified as having powerful health benefits such as pomegranate, orange and cranberry juices.

#### **Pomegranate juice**

Pomegranate juice has received much attention recently. It is a rich source of antioxidants and has been shown to lower LDL cholesterol. It may also slow the growth of prostate cancer as it stabilises the levels of PSA (Prostate Specific Antigen), the protein in blood that is a measure of how rapidly prostate cancer is progressing. Another study found that pomegranate juice may increase blood flow to heart in patients with ischemic coronary heart disease.

#### **Orange Juice**

This popular breakfast drink may help prevent recurrence of painful kidney stones. A study has found that daily glass of orange juice can reduce kidney stone incident.

#### **Cranberry juice**

It has been a home remedy for urinary tract infections (UTI) for long. It has now been shown that cranberry juice to be helpful even before UTI develops. It is effective in preventing UTI, but it is not been proven to cure an existing infection.

There are other studies that have indicated that increased consumption of fruits and vegetable reduces one's risk of developing Alzheimer's disease. In 2006 a study showed that people drinking fruit and vegetable juices more than three times a week were 76% less likely to develop Alzheimer's than those who had juice less than once a week. (<http://www.sciencedaily.com/releases/2007/09/070905175237.htm>)

### **Phytochemicals in Fruit Juices**

These are plant substances having bioactivity and are found in plant foods like fruits, vegetables and their juices and other products. Many of these are found to protect against diseases and help promote good health. There are many antioxidants that inhibit the oxidative degradation and are very important group of phytochemicals. Some are becoming quite familiar to consumers including lycopene, resveratrol, lutein, limonene, quercetin etc. that are being studied for their healthful benefits upon consumption of fruits and fruit products including juices containing them.

Juices have been found to be comparable in reducing risk compared to whole fruits and vegetables according to researchers. Review of many studies published in Intl J of Food Science & Nutrition (2006) shows that reduction of risk of diseases including cancer and cardiovascular diseases is due to the effects of both fibre and antioxidants. The review observes that there is no evidence that pure fruit and vegetable juices are less beneficial than whole fruit and vegetables and that appropriate amounts of juices should be included in diets of both children and adults as per guidelines of health authorities. ([www.rdeig-nutrition.org/pdfs/2006IJFSNfruitjuice.pdf](http://www.rdeig-nutrition.org/pdfs/2006IJFSNfruitjuice.pdf))

Recent study in France explores how the natural compounds, flavonoids help reduce age-related decline in mental function. Flavonoids are found in fruits, vegetables, tea, coffee and many other plant materials. Scientists studied over 1600 normal subjects over 65 years monitoring their intake of flavonoids over 10 years. It was found that those who consumed most flavonoids had the least mental decline as observed by cognitive function tests. Results published in Am J of Epidemiology in June indicated that increasing consumption of fruits and vegetables containing nutrients such as vitamins, fibre, antioxidants, etc. is more important than just taking supplements.

Consumption of fruit and vegetable juices has been linked to reduced risk of Alzheimer's disease as per another study published in Am J of Medicine, Sept 06. Scientists found that those who drank 3 or more servings of fruit and vegetable juices per week had 76% lower risk of developing Alzheimer's disease than those who had less than once per week. This study was carried out in older Japanese population living in Japan, Hawaii and Seattle, Washington over a period of 2 to 10 years. Researchers indicated that more research is necessary to indicate the mechanism.

There are some skeptics who suggest that benefits are more with fruits and vegetables than their juices. In some cases it may be possible but many studies have suggested that most benefits are with either whole fruits and vegetables or their juices. One study by French researchers published in April 2008 in Molecular Nutrition & Food Research indicates that fruit juices may have some health benefits over whole fruit. Fruit juices were found to have a more powerful anti-atherosclerotic effect in animals than the fruit itself, showing for the first time that processing fruit may have a positive impact on its health benefits.

Juicing may affect the content of phenolic compounds, the powerful antioxidants in fruits. Hamsters were fed grape or apple or their juices or water along with a high fat diet known to promote atherosclerosis. Hamsters consumed fruit equivalent to 3 apples or 3 bunches of grapes daily. For juice, they drank equivalent of 4 glasses daily. Animal given fruit or fruit juices, had lower accumulation of cholesterol, less oxidative stress, and less fat accumulation in aorta compared with those on water. In both, grape and apple diet, juices had the strongest effect, grape juice being more effective than apple juice.

Drinking fruit juices especially 100% juices, has long been thought to be a healthy habit for both adults and children. More recently, people have become confused because of the sweet taste of juices especially since sugar lately has come under some criticism. There are fears of juices affecting dental health and consuming too much might affect consumption of other foods necessary for the balanced diet. However, drinking fruit juices has not been shown to be detrimental to health in any way. It bears no relation with obesity when consumed in recommended allowance. In fact, research has shown juices to be equivalent to fruits in most respect and at least one study has shown it to be better than fruit.

Another point that must be considered is that fruits and vegetable juice manufacturers ensure that they get their raw materials at the peak of their quality including nutrients. Care is taken to transport and store them under the optimum conditions to ensure maintenance of their peak quality and nutrients. Processing also takes similar care so juices at times contain very high quantities of nutrients and other phytochemicals, especially the sensitive ones, compared to fresh fruits and vegetables that at times may not have been taken as good a care. Fruit and vegetable juices are certainly healthful and nutritious and may be consumed by all in quantities recommended by various bodies.

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