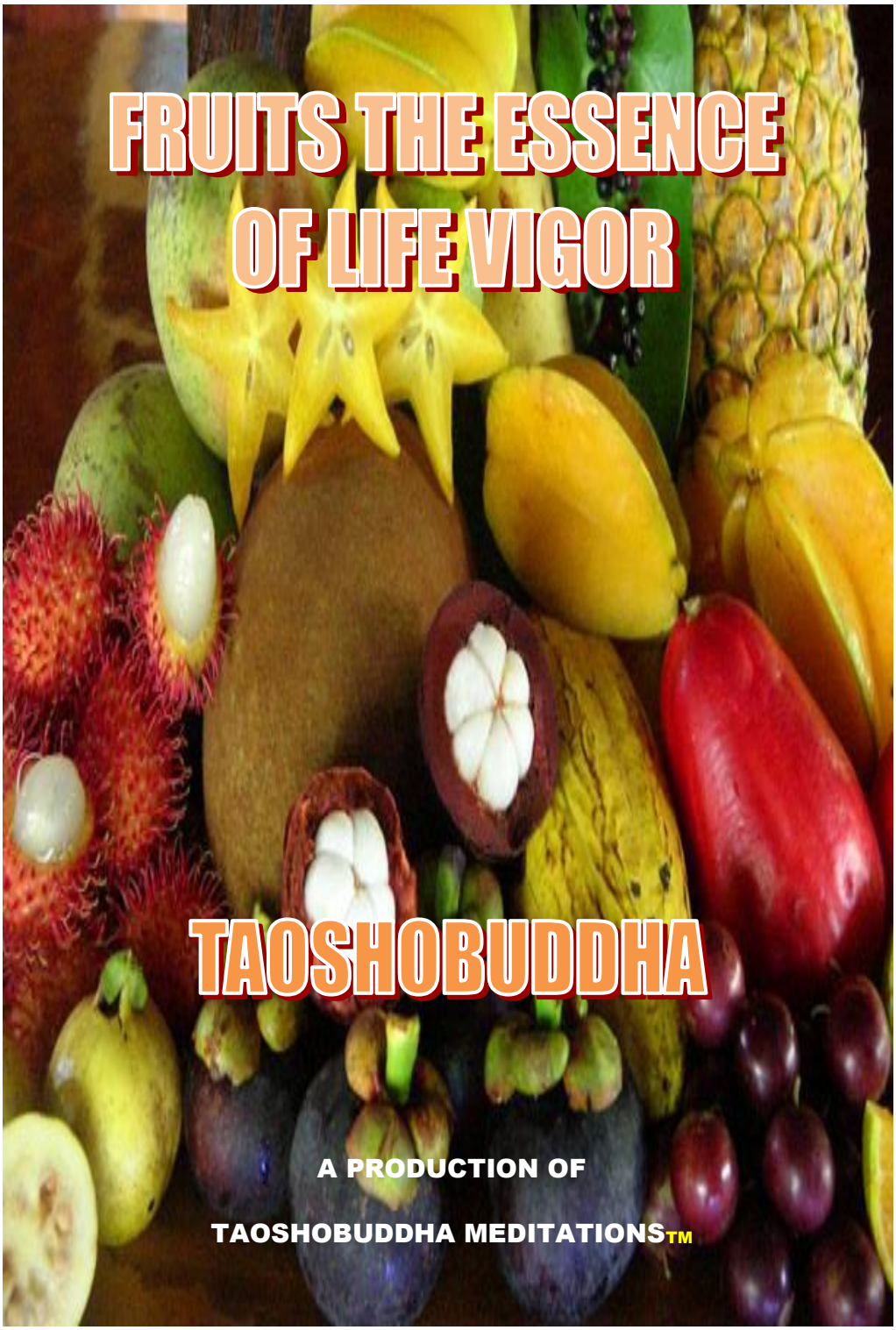
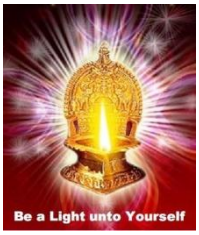

FRUITS THE ESSENCE
OF LIFE VIGOR
TAOSHOBUDDHA
A PRODUCTION OF
TAOSHOBUDDHA MEDITATIONS™



MEDITATION LEADS TO ULTIMATE FLOWERING

FRUITS THE ESSENCE OF LIFE VIGOR

Printed and Published by TAOSHOBUDDHA MEDITATIONS™

Cover design and graphics: Anand Neelamber

Photography: Taoshobuddha

NAQSHBANDI SUFI SHEIKH TAOSHOBUDDHA

The word Taoshobuddha comes from three words, 'tao,' 'sho,' and 'Buddha'. The word Tao was coined by the Chinese master, Lau Tzu. It means that which is and cannot be put into words. It is unknown and unknowable. It can only be experienced and not expressed in words. Its magnanimity cannot be condensed into finiteness. The word Sho implies, that which is vast like the sky and deep like an oc carries within its womb a treasure. It also means one on whom the existence showers its blessings. And lastly the word Buddha implies the Enlightened One; one who has arrived home.

Thus, Taoshobuddha implies one who is existential, on whom the existence showers its blessings and one who has arrived home. The Enlightened One!

Contents

Preface

Fruits are indeed the essence of life vigor. This is mystical. To understand this you will have to go deeper into the layers of consciousness. Fruits are energy. Fruits are the manifestation of cosmic harmony, oneness. All along the process of their growth fruits are in total harmony with the cosmos. Fruits are in a subconscious state of awareness. Fruits have feeling, sensitivity, and the way to flow with totality. This is how a man comes into life as a child pulsating with this harmony and vigor. Like the fruits the child is also in subconscious state of awareness. And then his inward journey begins. In this process he goes through various layers of consciousness until he is just conscious.

Fruits are the essence of life vigor. As a result I had decided to call this work as **'Fruits the Essence of Life Vigor'. The title is meaningful in many ways.**

Indeed it is a blessing that we are together. I am writing and you are reading. This togetherness is oneness. And oneness is blessing.

Life is a journey of transformation. Your body is the temple of the unknown. The harmony that body creates will certainly become the door to the beyond. The same harmony that body creates will certainly connect you to

your being first and then to that which is – the cosmic harmony.

Therefore love your body! Respect it! Take care of it! Nourish it with care, compassion and love.

Begin your journey at the gross level.

It has been prepared with loving tender care and is being served to you as a fresh platter for your nourishment both outer and inner.

It is for the overall development of Human Consciousness **Taoshobuddha Meditations** ™ embarked on Health and Healing Transformation Series. In this series **'Meditation the Ultimate in Healing'** is published as E Book. More titles will be released on such topics.

It is my joy that **Taoshobuddha Meditations** ™ presents this work **'Fruits the Essence of Life Vigor.'**

Love!

TAOSHOBUDDHA

E mail: mailtaoshobuddha@gmail.com

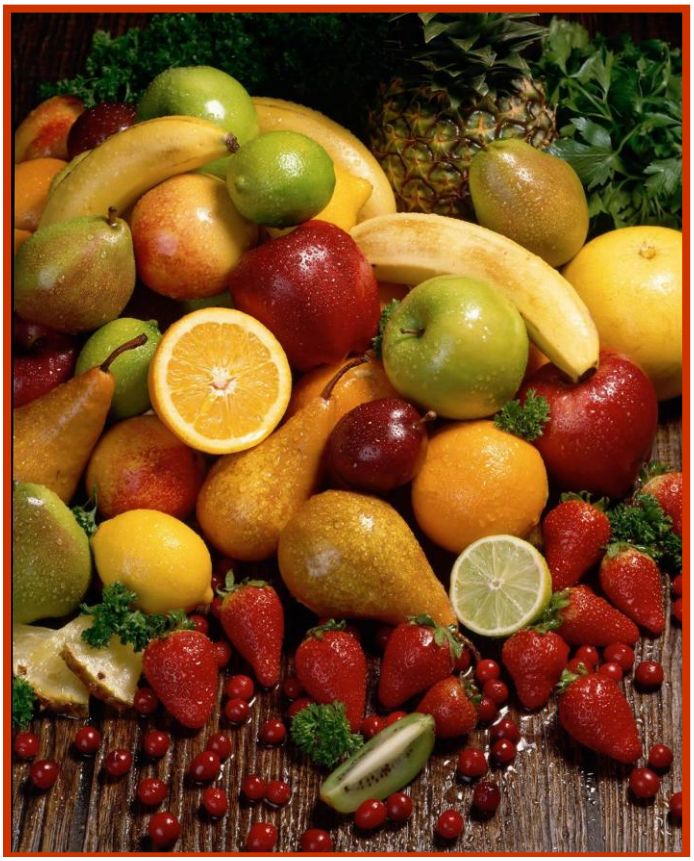
Remember the most important **Healing Nutrient** to YOUR BODY and the **IMMUNE SYSTEM**, more than your so – called Vitamins, Minerals, Enzymes, Fresh juices, even more than Herbs is indeed

LOVE!

Meditation the Ultimate in Healing – Taoshobuddha

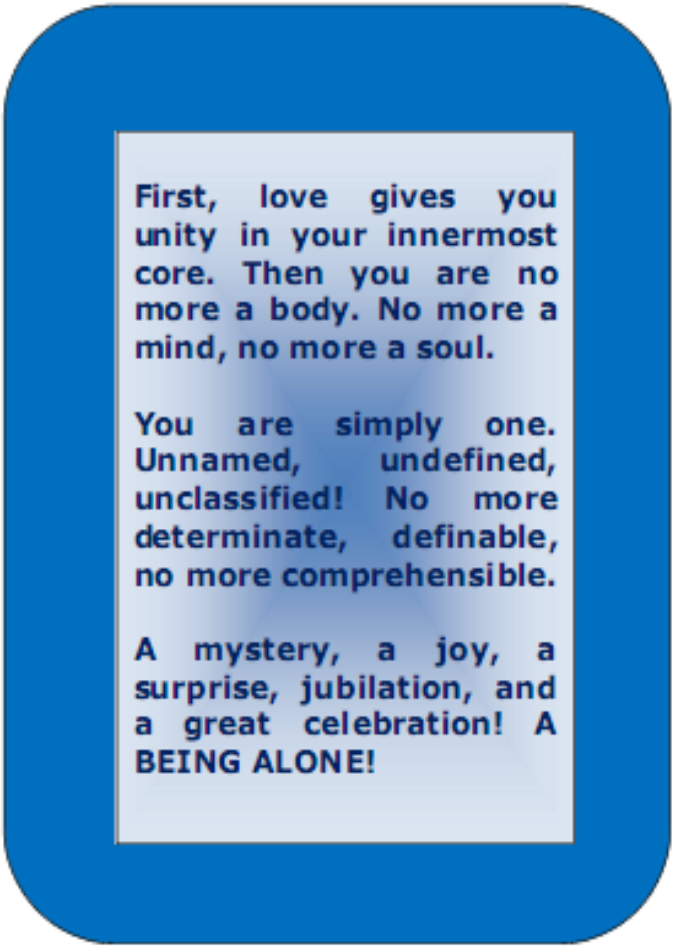
YET STILL FRUITS ARE THE ESSENCE OF LIFE VIGOR WHEN CONSUMED OUT OF LOVE AND AWARENESS!!

FRUITS, THE LOVE FOR FRESHNESS AND THE ESSENCE OF CREATIVITY OF THE UNKNOWN!!!



A GIFT FROM NATURE!!!

Symbol of Cosmic Oneness



Cucumbers

Got to Believe!

I have been writing on Fruits the essence of life vigor then why this information on cucumbers. Read through and you will be as stunned as I was when I decided to include this information for you as it appeared in 'The New York Times.'

This information was in The New York Times several weeks ago as part of their **'Spotlight on the Home'** series that highlighted creative and fanciful ways to solve common problems.

1. Cucumbers contain most of the vitamins you need every day, just one cucumber contains Vitamin B1, Vitamin B2, Vitamin B3, Vitamin B5, Vitamin B6, Folic Acid, Vitamin C, Calcium, Iron, Magnesium, Phosphorus, Potassium and Zinc.

2. Feeling tired in the afternoon, put down the caffeinated soda and pick up a cucumber. Cucumbers are a good source of B Vitamins and Carbohydrates that can provide that quick pick-me-up that can last for hours.

3. Tired of your bathroom mirror fogging up after a shower? Try rubbing a cucumber slice along the mirror, it will eliminate the fog and provide a soothing, spa-like fragrance.

4. Are grubs and slugs ruining your planting beds? Place a few slices in a small pie tin and your garden will be free of pests all season long. The chemicals in the cucumber react with the aluminum to give off a scent undetectable to humans but drive garden pests crazy and make them flee the area.

5. Looking for a fast and easy way to remove cellulite before going out or to the pool? Try rubbing a slice or two of cucumbers along your problem area for a few

minutes, the photo chemicals in the cucumber cause the collagen in your skin to tighten, firming up the outer layer and reducing the visibility of cellulite. Works great on wrinkles too!!!

6. Want to avoid a hangover or terrible headache? Eat a few cucumber slices before going to bed and wake up refreshed and headache free. Cucumbers contain enough sugar, B vitamins and electrolytes to replenish essential nutrients the body lost, keeping everything in equilibrium, avoiding both a hangover and headache!!

7. Looking to fight off that afternoon or evening snacking binge? Cucumbers have been used for centuries and often used by European trappers, traders and explores for quick meals to thwart off starvation.

8. Have an important meeting or job interview and you realize that you don't have enough time to polish your shoes? Rub a freshly cut cucumber over the shoe, its chemicals will provide a quick and durable shine that not only looks great but also repels water.

9. Out of WD 40 and need to fix a squeaky hinge? Take a cucumber slice and rub it along the problematic hinge, and voila, the squeak is gone!

10. Stressed out and don’t have time for massage, facial or visit to the spa? Cut up an entire cucumber and place it in a boiling pot of water, the chemicals and nutrients from the cucumber with react with the boiling water and be

released in the steam, creating a soothing, relaxing aroma that has been shown to reduce stress in new mothers and college students during final exams.

11. Just finish a business lunch and realize you don't have gum or mints? Take a slice of cucumber and press it to the roof of your mouth with your tongue for 30 seconds to eliminate bad breath, the photochemical will kill the bacteria in your mouth responsible for causing bad breath.

12. Looking for a 'green' way to clean your faucets, sinks or stainless steel? Take a slice of cucumber and rub it on the surface you want to clean, not only will it remove years of tarnish and bring back the shine, but is won't leave streaks and won't harm you fingers or fingernails while you clean.

13. Using a pen and made a mistake? Take the outside of the cucumber and slowly use it to erase the pen writing, also works great on crayons and markers that the kids have used to decorate the walls!!

Man is a universe within an outer universe. Just like the body of the universe, the human body is composed of cells. These cells are interconnected by an electromagnetic force. This force works through electrolytes present in each cell.

Individual human consciousness is a by-product of ego and mind. All States of pain and pleasure exist because of this ego mind combination. It is because of this eternal pair of ego and mind that we have innumerable desires.

Man requires tremendous energy to fulfill these desires. Unfulfilled desires cause illness and pain. This requires methods to cure disease and pain.

REF: MEDITATION THE WAY TO SELF REALIZATION-STERLING PUBLISHERS 2008 p.339
MEDITATION THE ULTIMATE IN HEALING 2010 Amazon.Com p: 29

Love the essential nutrient

SLIDE PRESENTATION – MEDITATION THE ULTIMATE IN HEALING, TAOSHOBUDDHA BOSTON

Fruits Lead to Ultimate in Healing!

Consumed meditatively in different combinations **Fruits Lead to Ultimate in Healing!**

Why do you eat fruits?

This chapter purposely I began with a question – why do we eat fruits? Answers to this question you will have to seek within. And this is the first thing I would like you to pay attention to by looking within. I am sure you never thought of this before.

We take certain things for granted. And eating fruits as part of our daily diet is one such thing. Therefore I would like you to pause and introspect why you take fruits, or why fruits be the part of human diet?

I give you a few hints:

WHY DO YOU EAT FRUITS?

1. For taste Yes/No/ don't Know
2. Because these are essential Yes/No don't Know
3. These are source of vitamins and minerals Yes/No/don't Know
4. Any other reason? Yes/No/ don't Know

SEEK THE ANSWER WITHIN FIRST!

Fruits are the essence of life vigor. Indeed fruits are. When it was to be decided of the Title Taoshobuddha, just said **'FRUITS ARE THE ESSENCE OF LIFE VIGOR'**, and it was suggested to keep this as the title of this work. As an explanation to the reason this is what he said:

"'Fruits are indeed the essence of life vigor.' This is mystical. To understand this you will have to go deeper into the layers of consciousness. Fruits are energy. Fruits are the manifestation of cosmic harmony, oneness. All along the process of their growth fruits are in total harmony with the cosmos. Fruits are in a subconscious state of awareness. Fruits have feeling, sensitivity, and the way to flow with totality. This is how a man comes into life as a child pulsating with this harmony and vigor. Like the fruits the child is also in subconscious state of awareness.

And I have told you earlier man is energy man means life. And life is energy. Life is an infinite reservoir of energy. On the shore of time infinite waves go on striking. No end! No beginning! Everything is just in the middle! You are a small insignificant wave. You are an infinitesimal seed of infinite possibilities. Quite naturally, the wave wants to be the ocean. And naturally the seed wants to be the tree. Unless the seed blossoms into a flower, fulfillment is impossible. Man has an insatiable quest to be God. Before this there are many temporary resting points or possibilities. None of these are the Ultimate Outcome. In the night you may stay at many places for rest. Never

make these places your permanent resting place. Only God can be your house or the resting place. 'God' does not mean a person sitting somewhere, as has been conceived by almost all the religions. God means your ultimate possibility. You cannot attain ultimate fruition unless energy moves in the right direction. What is the ultimate destination? God is the ultimate destination. God is ultimate possibility.

God is formless! Without any name! God is not sitting somewhere. God is your ultimate happening. Beyond which there is nothing and no possibility as well. Beyond which there is nowhere to go. This is the ultimate destination. This is fulfillment! You will remain restless and despondent until you attain to this fruition. You may become rich. You may become very famous. None of these things can ever fulfill you. Somewhere you will continue to feel something missing. No matter how hard you try to forget this, you will never succeed. In a sense it is good that you cannot forget this. Otherwise the seed will miss the opportunity for fruition. Until the seed attains to its fruition and the fragrance merges with the infinite, there is no possibility of fulfillment. Until the river of your life merges with the ocean of life it will not attain any meaning. And until this happens, even if you somehow succeed it will be the greatest failure of your life.

For the continuation of this all requires the energy. It is energy that becomes impetus one day for the continuation of journey. This energy comes from a

reservoir. Fruits are unfathomable ocean of the existential energy.

Consciously you have to bring this energy out of the sub conscious layer and bring it to the surface. And in the process you are embodiment of this energy.'

Therefore, '**Fruits are the essence of Life Vigor!'"**

We all think eating fruits means just buying fruits, cutting it and then consuming these. It is not as easy as you think. It is **important to know how and when to eat.**

What is the correct way of eating fruits?

IT MEANS NOT EATING FRUITS AFTER YOUR MEALS!
FRUITS SHOULD BE EATEN ON AN EMPTY STOMACH.

If you eat fruit like that, it will play a major role to detoxify your system, supplying you with a great deal of energy for weight loss and other life activities.

FRUIT IS THE MOST IMPORTANT FOOD. Let us say you eat two slices of bread and then a slice of fruit. The slice of fruit is ready to go straight through the stomach into the intestines, but it is prevented from doing so by the slice of the bread. This is not the way to eat fruits.

Fruit on Empty Stomach

Eat your fruits on an empty stomach or before your meals!

The minute the fruit comes in contact with the food in the stomach and digestive juices, the entire mass of food begins to spoil. Taking fruits this way is not the correct way.

So please take your fruits on an empty stomach or before your meals!

You must have heard people complaining - every time I eat watermelon I burp. When I eat during my meals or after meals stomach bloats up. When I eat a banana I feel like running to the toilet etc.

Actually nothing like this will arise if you eat the fruit on an empty stomach.

Because when fruit mixes with the putrefying other food it produces gas and as a result you will bloat!

When the whole meal rots and ferments it turns into acid. The minute the fruit comes into contact with the food in the stomach and digestive juices, the entire mass of food begins to spoil. And you burp, bloat and feel uncomfortable.

So please consume your fruits on an empty stomach or before your meals!

There other reasons as well why fruits should be taken on empty stomach.

Graying hair, balding, nervous outburst, and dark circles under the eyes are all common complaints that you face. These will NOT happen if you take fruits on an empty stomach.

There is a wide spread misconception among us that certain fruits like orange and lemon is acidic. This is misconception again. Remember all fruits become alkaline in our body, according to Dr. Herbert Shelton who did research on this matter.

If you have mastered the correct way of eating fruits, you have the Secret of Beauty, Longevity, Health, Energy, Happiness and Normal weight.

Dr. Herbert Shelton was a American alternative medicine advocate, author, pacifist, vegetarian, and supporter of raw Foodism and fasting cures. Shelton was nominated by the American Vegetarian Party to run as its candidate for President of the United States in 1956. He saw himself as the champion of original Natural hygiene ideas from the 1830s.

When you need to drink fruit juice - drink only fresh fruit juice.

Do Not's of Fruit eating habit:

1. NEVER take juices from the cans.
2. NEVER even drink juice that has been heated up.
3. NEVER eat cooked fruits. Cooking fruits destroys all nutrients. You only get to taste. Cooking destroys all the vitamins. In modern day culinary it has become necessary to use fruit juices as part of cooking.

It is always better eating a whole fruit than drinking the juice.

Drink the juice, mouthful by mouthful or slowly. This way juice mixes with saliva before it enters the digestive canal.

If you should drink the juice, drink it mouthful by mouthful slowly. This way juice mixes with saliva. Therefore allow the juice to mix with your saliva before swallowing it.

You can also go on a 3-day fruit fast to cleanse your body. Just eat fruits and drink fruit juice throughout the 3 days and you will be surprised when your friends tell you how radiant you look!

Fruits Fast - way to health

Go on a 3-day FRUIT FAST. This will cleanse your body. Just eat fruits. And drink fruit juice during the 3 day period. If you wish further to enhance the effect take the sprouted 'Moong' Beans (green sprout beans). Along with this maintain meditation sessions. If you cannot meditate listen to relaxing music morning and evening. And you will be surprised when your friends tell you how radiant you look!

Know your fruits

Knowing your fruits is essential before you are connected to the unfathomable reservoir of energy that fruits have fathomed within.

It is part of your life therefore you have to know all about a particular fruit. It is for this reason I decided to get you acquainted with various fruits. Another reason behind this is to set the process of a new awareness in you about fruits. In the following pages we will explore the following fruits.

1. Mango
2. Kiwi fruit
3. Apples
4. Strawberries
5. Oranges
6. Water melon
7. Papaya
8. Guava
9. Cherries
10. Plum
11. Dates
12. Grapes
13. Peaches
14. Melon

Still there are other fruits like, plum, and banana that are highly nutritious and therefore are consumed in large scale throughout the world.

I have prepared this book to assist you in knowing the fruits. This is the first step to get connected with the essence of the fruits.

Mango

Mango is the best fruit source of antioxidant carotenoids. Mango is extremely rich in fiber, especially soluble fiber. Soluble fiber is important in keeping blood cholesterol down. It is also one of the few good sources of Vitamin E. Mango is considered the king among fruits. Mango is one of the most versatile and delicious fruit.

A ripe mango is generally sweet, although the taste varies from variety to variety. The texture of the flesh varies between cultivars, some having a soft, pulpy texture similar to an over-ripe plum, while others have firmer flesh like a cantaloupe or avocado. In some cultivars, the

flesh has a fibrous texture. Mango is consumed both as ripe fruit and as raw fruit (vegetable). In the raw form and in pickle form, the skin of mango is consumed comfortably whereas in fruits, the skin gets thicker and bitter and is usually not eaten. The ripe mango is commonly eaten fresh.

Mangoes belong to the genus Mangifera, consisting of numerous species of tropical fruiting trees in the flowering plant family Anacardiaceae. The mango is indigenous to India. Cultivated in many tropical and subtropical regions and distributed widely in the world, mango is one of the most extensively used fruits for food, juice, flavor, fragrance and color. Its leaves are ritually used as floral decorations at weddings and religious ceremonies, in India and in Indian Diaspora.

Etymology:

The English word mango comes from the Portuguese manga, which is probably derived from the Malayalam മാങ്ങ (māṅṅa) (pronounced 'manga'), from the Tamil mānkāy, from mān 'mango tree' + kāy 'fruit'. The word's first recorded attestation in a European language was a text by Ludovico di Varthema in Italian in 1510, as Manga; the first recorded occurrences in languages such as French and post-classical Latin appear to be translations from this Italian text. The origin of the -o ending in English is unclear.

Uses of Mango:

Generally, once ripe, mangoes are quite juicy and can be very messy to eat. A ripe mango will have an orange – yellow or reddish skin. To allow a mango to continue to ripen after purchase, it should be stored in a cool, dark place, but not in a refrigerator as this will slow the ripening process.

Mango is used to make juices, both in ripe and unripe form. Pieces of Mango can be mashed and used in ice cream. Mango pieces can be substituted for peaches in a peach pie. Or they can be put in a blender with milk, a little sugar, and crushed ice for a refreshing beverage.

Mangoes are often eaten with chili powder and/or salt in Latin American, Caribbean (Chow), India and other countries. They are also used as ingredients of sour salad in South East Asia countries. Dried unripe mango is used

as a spice in south and Southeast Asia. The seed of mango can be hairy or fibrous.

Mango trees (Mangifera indica L.) reach 35–40 m in height, with a crown radius of 10 m. The tree is long-lived with some specimens known to be over 300 years old and still fruiting. In deep soil the taproot descends to a depth of 6 metres (20 feet), and the profuse, wide-spreading feeder roots also send down many anchor roots which penetrate for several feet. The leaves are evergreen, alternate, simple, 15–35 cm long and 6–16 cm broad; when the leaves are young they are orange-pink, rapidly changing to a dark glossy red, and then dark green as they mature. The flowers are produced in terminal panicles 10–40 cm long; each flower is small and white with five petals 5–10 mm long, with a mild sweet odor suggestive of lily of the valley. The fruit takes from three to six months to ripen.

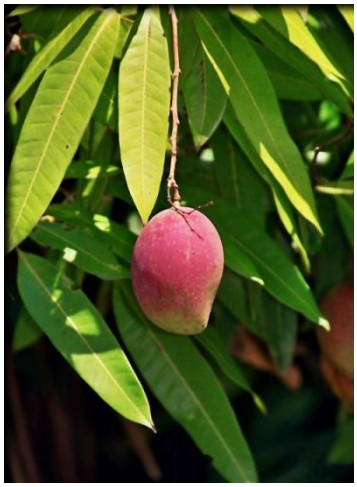
The ripe fruit is variable in size and color, and may be yellow, orange, red or green when ripe, depending on the cultivar. When ripe, the unpeeled fruit gives off a distinctive resinous sweet smell. In its center is a single flat oblong pit that can be fibrous or hairy on the surface, depending on the cultivar. Inside the pit 1–2 mm thick is a thin lining covering a single seed, 4–7 cm long, 3–4 cm wide, and 1 cm thick. The seed contains the plant embryo.

The 'hedgehog' style is a common way of eating mangoes (left). A cross section of a mango can be seen on the right

Cultivation and uses:

Mangoes have been cultivated in the Indian subcontinent for thousands of years and reached East Asia between the 5th – 4th century BC. By the 10th century AD, they were transported to East Africa and subsequently introduced to Brazil, West Indies and Mexico, where climate allows its appropriate growth. The 14th century Moroccan traveler, Ibn Battuta, reported it at Mogadishu.

Mango is now cultivated as a fruit tree in frost-free tropical and warmer subtropical climates like the Indian subcontinent; nearly half of the world's mangoes are cultivated in India alone.



Unripe mangoes in a mango tree

Other regions where mango is cultivated include North, South and Central America, the Caribbean, south, west and central Africa, Australia, China, Pakistan and Southeast Asia. It is easily cultivated yielding 1,000 cultivars, in varieties.

Though India is the largest producer of mangoes in the world, it accounts for less than one percent of the global mango trade.

Dwarf or semi – dwarf varieties serve as ornamental plants and can be grown in containers.

A wide variety of diseases can afflict mangoes; see List of mango diseases.

Indian and Pakistani Cuisine:

Mangoes are widely used in the South Asian cuisine. Ayurveda considers ripe mango sweet and heating, balancing all three doshas (humors), while also providing energy. Sour, unripe mangoes are used to make chutneys, pickles, side dishes like meth-amba in Maharashtra and manga pachadi in Kerala. They are also eaten raw with salt and chili. Raw mangoes are also preserved in a brine solution with dried red chillis, known as Fhodd. A cooling summer drink called panna or panha is also made from boiled or roasted mangoes.

Pack of amchur (or dry mango) powder made in India.

Ripe mangoes are typically eaten fresh. Mango lassi (mango smoothie), made by adding mango pulp to the North Indian yoghurt drink lassi, is a popular drink, both in India and in Indian restaurants world wide. Ripe mangoes are also used to make curries like mambazha kaalan in Kerala. Aamras is a popular pulp/thick juice

made of mangoes with sugar or milk and is consumed along with a variety of breads.

Mangoes are also used to make preserves like moramba, amchur (dried and powdered unripe mango) and pickles (commonly known as achaar). Different varieties of mango pickles are made in many regions of India, such as Avakaya Pachchadi of Andhra Pradesh, Vadu Maangaa pickle and Thokku Manga pickle from Tamil Nadu, miscut (pronounced mis-koot), a spicy mustard-oil pickle from Goa. Ripe mangoes are often cut into thin layers, desiccated, folded, and then cut. These bars, known as aampapdi,' amavat or halva in Hindi, are similar to dried guava fruit bars available in Colombia.

The fruit is also added to cereal products like muesli and oat granola.

Non-Indian cuisine:

Native green mangoes from the Philippines

In Australia, the mango season overlaps Christmas. Mangoes are eaten for breakfast during this period and the first box of mangoes is auctioned off for charity. In the Philippines, unripe mango is eaten with bagoong. Dried strips of sweet, ripe mango (sometimes combined with seedless tamarind to form Mangorind) are also popular, with those from Cebu exported worldwide. Mangoes are also used to make juices, mango nectar, and as a flavoring and major ingredient in ice cream and sorbetes. Guimaras produces a delicious mango.

In Mexico, mango is used to make juices, smoothies, ice cream, fruit bars, raspados, aguas frescas, pies and sweet chili sauce, or mixed with chamoy, a sweet and spicy chili paste. It is popular on a stick dipped in hot chili powder and salt or also as a main ingredient in fresh fruit combinations. In Central America (Guatemala, El Salvador, Honduras, Nicaragua and Costa Rica), mango is either eaten green with salt, pepper and hot sauce, or ripe in various forms. Only in Costa Rica, ripe mangoes are called manga to differentiate them. In Guatemala, toasted and ground pumpkin seed (called Pepita) with lime and salt are the norm when eating green mangoes. In Colombia mango is also eaten either green with salt and/or lime, or ripe in various forms.

Pieces of mango can be mashed and used as a topping on ice cream or blended with milk and ice as milkshakes. In Thailand and other South East Asian countries, sweet glutinous rice is flavored with coconut then served with sliced mango as a dessert. In other parts of South-east

Asia, mangoes are pickled with fish sauce and rice vinegar. In Indonesia and Thailand, green mango is sold by street vendors with sugar and salt and/or chili, or used in a sour salad called rujak or rojak in Indonesia and Singapore. Green mangoes can be used in mango salad with fish sauce and dried shrimps. In Taiwan, mango is a topping that can be added to shave ice along with condensed milk.

Nutrient and antioxidant properties:

Mangoes belong to the genus Mangifera, consisting of numerous species of tropical fruiting trees in the flowering plant family Anacardiaceae. The mango is indigenous to India. Cultivated in many tropical and subtropical regions and distributed widely in the world, mango is one of the most extensively exploited fruits for food, juice, flavor, fragrance and color.

Mango is rich in a variety of phytochemicals andnutrients. The fruit is high in prebiotic dietary fiber, vitamin C, polyphenols and provitamin A carotenoids.

Mango contains essential vitamins and dietary minerals. The antioxidant vitamins A, C and E comprise 25%, 76% and 9% of the Dietary Reference Intake (DRI) in a 165 g serving. Vitamin B6 (pyridoxine, 11% DRI), vitamin K (9% DRI), other B vitamins and essential nutrients such as potassium, copper and 17 amino acids are at good levels. Mango peel and pulp contain other phytonutrients,

such as the pigment antioxidants - carotenoids and polyphenols - and omega-3 and 6 polyunsaturated fatty acids.

Mango peel contains pigments that may have antioxidant properties, including carotenoids, such as the provitamin a compound, beta-carotene, lutein and alpha-carotene, polyphenols such as quercetin, kaempferol, gallic acid, caffeic acid, catechins, tannins, and the unique mango xanthone, mangiferin, any of which may counteract free radicals in various disease mechanisms as revealed in preliminary research. Contents of these phytochemicals and nutrients appear to vary across different mango species. Up to 25 different carotenoids have been isolated from mango pulp, the densest content for which was beta-carotene accounting for the yellow-orange pigmentation of most mango species. Peel and leaves also have significant content of polyphenols, including xanthones, mangiferin and gallic acid.

The mango triterpene, lupeol is an effective inhibitor in laboratory models of prostate and skin cancers. An extract of mango branch bark called Vimang, isolated by Cuban scientists, contains numerous polyphenols with antioxidant properties in vitro and on blood parameters of elderly humans.

The pigment euxanthin, known as Indian yellow, is often thought to be produced from the urine of cows fed mango leaves; the practice is described as having been outlawed in 1908 due to malnutrition of the cows and possible

urushiol poisoning.[26] One author claims these descriptions of the pigment's origin rely on a single anecdotal source and Indian legal records do not mention such a practice being outlawed.

Potential for contact dermatitis:

Mango peel contains urushiol, the chemical in poison ivy and poison sumac that can cause urushiol-induced contact dermatitis in susceptible people. Cross-reactions between mango contact allergens and urushiol have been observed. Those with a history of poison ivy or poison oak may be most at risk for an allergic reaction to mango skin. This compound is also present in mango leaves and vines. During mango's primary season, it is the most common source of plant dermatitis in Hawaii.

Cultural Aspects:

The mango is the national fruit of India, Pakistan and the Philippines.

In Hinduism, the perfectly ripe mango is often held by Lord Ganesha as a symbol of attainment, regarding the devotee’s potential perfection. Mango blossoms are also used in worship of Goddess Sarasvati.

Mango leaves are used to decorate archways and doors in Indian houses and also during weddings and celebrations like Ganesh Chaturthi. Mango motifs are widely used in

different Indian embroidery styles and are found in Kashmiri shawls, Kanchipuram silk saris etc.

Production and consumption:

A woman selling mangoes in Venezuela

Mangoes account for approximately fifty percent of all tropical fruits produced worldwide. The aggregate production of 10 countries is responsible for roughly 80% of the entire world mango production.

Alphonso, Benishan or Benishaan (Banganpalli in Telugu and Tamil) and Kesar mango varieties are considered among the best mangoes in the Southern states whereas Dussehri and Langda varieties are most popular in the Northern states of India.

Generally, once ripe, mangoes have an orange-yellow or reddish peel and are juicy for eating while those intended for export are often picked while under-ripe with green peels. Although producing ethylene while ripening, unripened exported mangoes do not have the same juiciness or flavor as fresh fruit. Like other drupaceous fruits, mangoes come in both freestone and clingstone varieties.

The Food and Agriculture Organization of the United Nations estimates worldwide production of mangoes at more than 33 million tons in 2007 (table below)

Top Mango Producers, 2007

Country	Production in Tons
India	13,501,000
People's Republic of China	3,752,000
Mexico	2,050,000
Thailand	1,800,000
Pakistan	1,719,180
Indonesia	1,620,000
Brazil	1,546,000
World total	33,445,279

Source
Food And Agricultural Organization of United Nations: Economic And Social Department: The Statistical Division

Cultivars:

Alphonso mangoes (local name: Hapoos, also known as the 'The King of Mangoes') are grown mainly in Devgad, Sindhudurg and Ratnagiri districts of Maharashtra, India and favored there, are now popular in the United States.

Many hundreds of named mango cultivars exist. In mango orchards, several cultivars are often intermixed to improve cross-pollination. Many desired cultivars are mono-embryonic and need to be propagated by grafting methods or else they will not be true-to-type.

A common (mono-embryonic) cultivar is Alphonso known in Asia under its original name, Hapoos (हापुस). This originates from the coastal side of Maharashtra especially city named DevGadh in Konkan is considered to be premium producer. As it is extremely popular, even outside the Indian subcontinent, Alphonso is an important export product. Alphonso is also cultivated in Sindh province of Pakistan is called Sindhari. It is exported to the Middle East.

Alphonso **(hapus)** Haapoos in Marathi, Aapoos in North Karnataka Kannada) is a mango cultivar that is considered by many to be one of the best in terms of sweetness and flavor although it does have a short shelf life. It is also one of the most expensive kinds of mango and is grown mainly in western India and south east

Pakistan. It is in season April through May and the fruit weigh between 150g and 300g each.

It is named after Afonso de Albuquerque. This was an exquisite and expensive variety of mango that he used to bring on his journeys to Goa. The locals took to calling it Aphoos in Konkani and in Maharashtra the pronunciation got further transformed to Hapoos. This variety then was taken to the Konkan region of Maharashtra and other parts of India.

The southern district of Ratnagiri and south northern parts of Sindhudurg in Maharashtra state, including regions around the Devgad and Taluka, produce the finest quality alphonso mangoes in India. Alphonso is also cultivated largely in Pune. The southern districts of Valsad and Navsari in Gujarat state and particularly Alphonso mangoes from the Amalsad region (including villages such as Dhamadachha, Kacholi, and all villages of Gandevi) produce Alphonso mangoes as well. Southern States in India are also major mango producing areas. From north to south, climatic changes occur which result in differences in the quality of the produce. Even in Ratnagiri and Devgad the finest fruit comes from a patch of 20 km from the seashore.

The variety grown in Devgad in the Kokan region of Maharashtra is supposed to be the best. It's also the most expensive amongst the sub-breeds of Alphonso. In most of the Indian market sub-varieties are fetching the price

of good quality alfonso. These varieties neither have the sweetness, nor have the flavour of hapoos.

The Alphonso is generally referred to as 'Hapoos' throughout South Asia.

In April 2007 the United States lifted its ban on the import of Indian mangoes, including the Alphonso. The first batch of alphonso mangoes arrived in the US after an 18 year hiatus. The ban on imports has also been lifted by other major countries like Japan and China.

Hapoos Mango

Hapoos is used to make sweets, candies and smoothies - Mango Milkshake, Mango Lassi (both smoothies), Aamba-Wadi (a gummy, chewy mango candy), Aam-Ras (Mango pulp which is eaten with puris - an Indian Bread), Sakhar Amba (Marathi word for a home-made mango jelly/jam), Mango barfi (a type of Aamba-Wadi), etc. Non aerated

Mango drinks like Frooti (Parle Agro Co.), Jumpin (Godrej Industries), Maaza (Coca Cola Co.), Dukes Mangola and Slice (PepsiCo Inc.) are very popular in India. Many other local brands are also available. Alphonso mangoes are mostly exported from Ratnagiri in Maharashtra.

Cultivars excelling in one climate may fail to achieve elsewhere. Forexample, Indian cultivars such as Julie, a prolific grower in Jamaica, require annual fungicide treatment to prevent a lethal fungal disease known as Anthracnose in Florida. Asian mangoes are resistant to Anthracnose.

The current world market is dominated by the cultivar Tommy Atkins, a seedling of Haden which first fruited in 1940 in southern Florida, USA. Despite being initially rejected commercially by Florida researchers, Tommy Atkins is now a favorite worldwide. For example, 80% of mangoes in UK supermarkets are Tommy Atkins. Despite its fibrous flesh and fair taste, growers worldwide have embraced the cultivar for its exceptional production and disease resistance, the shelf-life of its fruit, their transportability as well as size and appealing color. Tommy Atkins is predominant in the USA as well, although other cultivars, such Kent, Keitt, the Haitian grown Madame Francis and the Mexican grown Champagne are widely available.

In urban areas of southern Florida, small gardens, or lack thereof, have fueled the desire for dwarf mango trees. The

Fairchild Tropical Botanic Garden has promoted "condo mangoes" which produce at a height below 2–2.5 m.

A list of additional leading cultivars can be found at the cultivar list in the external links below.

There is an Australian variety of mango known as R2E2, a name based on the orchard row location of the original plant. The mango also is cultivated from Jamaica.

One Mango	**Amount**
Calories	107
Carbohydrate	26g
Total Fat	0.3g
Fiber	4.9g
Protein	1.4g
Cholesterol	0mg
Good Source of Vital Vitamins	Vitamin B3, C, E, Beta-carotene
Good Source of Dietary Minerals	Potassium, Manganese

Mango

Scientific classification	
Kingdom:	Plantae
Division:	Angiosperme
Class:	Magnoliopsa
Order:	Sapindales
Family:	Anacardiacee
Genus:	Mangifera
Species:	Indica

Mango, raw

Nutritional value per 100 g (3.5 oz)

Energy	272 kJ (65 kcal)
Carbohydrates	17.00 g
Sugars	14.8 g
Dietary fiber	1.8 g
Fat	0.27 g
Protein	.51 g

Vitamin A equiv.	38 µg (4%)
- beta-carotene	445 µg (4%)
Thiamine (Vit. B1)	0.058 mg (4%)
Riboflavin (Vit. B2)	0.057 mg (4%)
Niacin (Vit. B3)	0.584 mg (4%)
Pantothenic acid (B5)	0.160 mg (3%)
Vitamin B6	0.134 mg (10%)
Folate (Vit. B9)	14 µg (4%)
Vitamin C	27.7 mg (46%)
Calcium	10 mg (1%)
Iron	0.13 mg (1%)
Magnesium	9 mg (2%
Phosphorus	11 mg (2%)
Potassium	156 mg (3%)
Zinc	0.04 mg (0%)

Percentages are relative to US recommendations for adults.
Source: USDA Nutrient database

References:

1. Mango: botany and taxonomy, HorticultureWorld
2. a b c Ensminger 1994: 1373
3. Watson, Andrew J. (1983). Agricultural innovation in the early Islamic world: the diffusion of crops and farming techniques, 700–1100. Cambridge, UK: Cambridge University Press. pp. 72–3. ISBN 0-521-24711-X.
4. Jedele S, Hau AM, von Oppen M. An analysis of the world market for mangoes and its importance for developing countries. Conference on International Agricultural Research for Development, 2003[1]
5. India world's largest producer of mangoes, Rediff India Abroad, April 21, 2004
6. Mad About mangoes: As exports to the U.S. resume, a juicy business opportunity ripens, India Knowledge@Wharton Network, June 14, 2007
7. USAID helps Indian mango farmers access new markets, USAID-India, May 3, 2006
8. Nutrient profile for mango, Nutritiondata.com
9. Ajila CM, Prasada Rao UJ (2008). "Protection against hydrogen peroxide induced oxidative damage in rat erythrocytes by Mangifera indica L. peel extract". Food Chem Toxicol 46 (1): 303–9. doi:10.1016/j.fct.2007.08.024. PMID 17919803.
10. Berardini N, Fezer R, Conrad J, Beifuss U, Carle R, Schieber A (2005). "Screening of mango (Mangifera indica L.) cultivars for their contents of flavonol O- and xanthone C-glycosides, anthocyanins, and pectin". J Agric Food Chem 53 (5): 1563–70. doi:10.1021/jf0484069. PMID 15740041.
11. Gouado I, Schweigert FJ, Ejoh RA, Tchouanguep MF, Camp JV (2007). "Systemic levels of carotenoids from mangoes and papaya consumed in three forms (juice, fresh and dry slice)". Eur J Clin Nutr 61 (10): 1180–8. doi:10.1038/sj.ejcn.1602841. PMID 17637601.

12. Mahattanatawee K, Manthey JA, Luzio G, Talcott ST, Goodner K, Baldwin EA (2006). "Total antioxidant activity and fiber content of select Florida-grown tropical fruits". J Agric Food Chem 54 (19): 7355–63. doi:10.1021/jf060566s. PMID 16968105.
13. Singh UP, Singh DP, Singh M, et al. (2004). "Characterization of phenolic compounds in some Indian mango cultivars". Int J Food Sci Nutr 55 (2): 163–9. doi:10.1080/09637480410001666441. PMID 14985189.
14. Andreu GL, Delgado R, Velho JA, Curti C, Vercesi AE (2005). "Mangiferin, a natural occurring glucosyl xanthone, increases susceptibility of rat liver mitochondria to calcium-induced permeability transition". Arch Biochem Biophys 439 (2): 184–93. doi:10.1016/j.abb.2005.05.015. PMID 15979560.
15. Percival SS, Talcott ST, Chin ST, Mallak AC, Lounds-Singleton A, Pettit-Moore J (2006). "Neoplastic transformation of BALB/3T3 cells and cell cycle of HL-60 cells are inhibited by mango (Mangifera indica L.) juice and mango juice extracts". J Nutr 136 (5): 1300–4. PMID 16614420http://jn.nutrition.org/cgi/pmidlookup?view=long&pmid=16614420.
16. Rodríguez J, Di Pierro D, Gioia M, et al. (2006). "Effects of a natural extract from Mangifera indica L, and its active compound, mangiferin, on energy state and lipid peroxidation of red blood cells". Biochim Biophys Acta 1760 (9): 1333–42. doi:10.1016/j.bbagen.2006.04.005. PMID 16860486.
17. Rocha Ribeiro SM, Queiroz JH, Lopes Ribeiro de Queiroz ME, Campos FM, Pinheiro Sant'ana HM (2007). "Antioxidant in mango (Mangifera indica L.) pulp". Plant Foods Hum Nutr 62 (1): 13–7. doi:10.1007/s11130-006-0035-3. PMID 17243011.
18. Chen JP, Tai CY, Chen BH (2004). "Improved liquid chromatographic method for determination of carotenoids in Taiwanese mango (Mangifera indica L.)". J Chromatogr A 1054 (1–2): 261–8. PMID 15553152.

19. Barreto JC, Trevisan MT, Hull WE, et al. (2008). "Characterization and quantitation of polyphenolic compounds in bark, kernel, leaves, and peel of mango (Mangifera indica L.)". J Agric Food Chem 56 (14): 5599–610. doi:10.1021/jf800738r. PMID 18558692.
20. Chaturvedi PK, Bhui K, Shukla Y (2008). "Lupeol: connotations for chemoprevention". Cancer Lett 263 (1): 1–13. doi:10.1016/j.canlet.2008.01.047. PMID 18359153.
21. Prasad S, Kalra N, Singh M, Shukla Y (2008). "Protective effects of lupeol and mango extract against androgen induced oxidative stress in Swiss albino mice" (PDF). Asian J Androl 10 (2): 313–8. doi:10.1111/j.1745-7262.2008.00313.x. PMID 18097535. http://www.nature.com/aja/journal/v10/n2/pdf/aja2008241a.pdf.
22. Nigam N, Prasad S, Shukla Y (2007). "Preventive effects of lupeol on DMBA induced DNA alkylation damage in mouse skin". Food Chem Toxicol 45 (11): 2331–5. doi:10.1016/j.fct.2007.06.002. PMID 17637493.
23. Saleem M, Afaq F, Adhami VM, Mukhtar H (2004). "Lupeol modulates NF-kappaB and PI3K/Akt pathways and inhibits skin cancer in CD-1 mice". Oncogene 23 (30): 5203–14. doi:10.1038/sj.onc.1207641. PMID 15122342.
24. Rodeiro I, Cancino L, González JE, et al. (2006). "Evaluation of the genotoxic potential of Mangifera indica L. extract (Vimang), a new natural product with antioxidant activity". Food Chem Toxicol 44 (10): 1707–13. doi:10.1016/j.fct.2006.05.009. PMID 16857303.
25. Pardo-Andreu GL, Philip SJ, Riaño A, et al. (2006). "Mangifera indica L. (Vimang) protection against serum oxidative stress in elderly humans". Arch Med Res 37 (1): 158–64. doi:10.1016/j.arcmed.2005.04.017. PMID 16314203.
26. History of Indian yellow, Pigments Through the Ages
27. Finlay, Victoria (2003). Color : A Natural History of the Palette. New York: Random House Trade Paperbacks. ISBN 0-8129-7142-6.

28. Rocha Ribeiro SM, Queiroz JH, Lopes Ribeiro de Queiroz ME, Campos FM, Pinheiro Sant'ana HM (2007). "Antioxidant in mango (Mangifera indica L.) pulp". Plant Foods Hum Nutr 62 (1): 13–7. doi:10.1007/s11130-006-0035-3. PMID 17243011. "However, the mango peel has properties similar to sumac or poison ivy, resulting in allergic rashes around the mouth, eyes, cheeks, and genitalia if the urushiol oil is spread. Washing the affected area five minutes after contact should prevent some of the symptoms. Symptoms can be swelling, formation of yellow sores, redness, and if unmaintained, may be subjected to bacterial infection.".
29. Oka K, Saito F, Yasuhara T, Sugimoto A. (2004). "A study of cross-reactions between mango contact allergens and urushiol". Contact Dermatitis 51 (5–6): 292–6. doi:10.1111/j.0105-1873.2004.00451.x. PMID 15606656.
30. Hershko K, Weinberg I, Ingber A (2005). "Exploring the mango – poison ivy connection: the riddle of discriminative plant dermatitis". Contact Dermatitis 52 (1): 3–5. doi:10.1111/j.0105-1873.2005.00454.x.
31. McGovern TW, LaWarre S (2001). "Botanical briefs: the mango tree—Mangifera indica L.". Cutis 67 (5): 365–6.
32. Allen J. Mango mania in Portland, Oregon, New York Times, May 10, 2006
33. Black R. Plump it up. Sweet, juicy mangoes are at their peak, with seasonal varieties ripe for the picking, New York Daily News, May 13, 2007
34. a b Oxford English Dictionary, mango, n.1 (and adj.). Retrieved 2009-06-22.
35. American Heritage Dictionary of the English Language, 4th ed., mango. Retrieved 2009-12-19.

Kiwi Fruit

KIWI fruit is Tiny but mighty. This is a good source of potassium, magnesium, vitamin E & fiber. Its vitamin C content is twice that of an orange. Kiwi fruit is a 3-inch long fruit that weighs about four ounces.

It has a unique appearance, with green creamy flesh and tiny black seeds. It is an exotic fruit that has a wonderful flavor. It acts as a compact reservoir of vitamin C and in the present times it has become an important part of any party.

Talking about kiwi fruit nutrition, it is a very healthy fruit that contains a reasonable amount of potassium. This highly nutritious fruit adds on to the taste and look of fruit salad. Kiwi fruit has occupied the status of a commercialized fruit in California. California kiwi fruit is available November through May, while the New Zealand crop hits the market early June through October making fresh Kiwis available year round.

Its green flesh is almost creamy in consistency with an invigorating taste reminiscent of strawberries, melons and bananas combined, yet with its own unique sweet flavor.

Kiwifruits owe their name to a bird, native of New Zealand, named 'kiwi', and actually in many regions of Europe, North America and South America, kiwi fruits are generally referred to as 'kiwi'.

This fruit consists of a hairy, brown peel containing green flesh, with white pulp in the center, surrounded by black, edible seeds. The fruit has a sweet taste, similar to a mixture of banana, pineapple and strawberry. Kiwi fruits are native to China, where they were called 'macaque peach.'

Nutrition – wise, kiwi fruits contain about as much potassium as bananas, and also contain 1.5 times the DRI for Vitamin C. It is also rich in Vitamins A and E, and its black seeds can be crushed to produce kiwi fruit oil, which is very rich in Alfa-Linoleic Acid (an important Omega-3 essential fatty acid)

The Kiwifruit is native to the Yangtze River valley of northern China and Zhejiang Province on the coast of eastern China. The first seeds were brought out of China by missionaries to New Zealand at the turn of this century. Early nurserymen in New Zealand, such as Alexander Allison, Bruno Just, and Hayward Wright, recognized the potential of the fruit and it soon became a popular backyard vine. Several plants were sent to the Chico Plant Introduction Station in California and exist to this date. In addition to New Zealand and California, kiwifruit is also grown commercially in such areas as Italy, South Africa and Chile.

Adaptation:

The plants need a long growing season (at least 240 frost-free days) which will not be hampered by late winter or early autumn freezes. When fully dormant they can withstand temperatures to about 10° F (and perhaps a bit lower.) However they must acclimate to cold slowly and any sudden plunge in temperature may cause trunk splitting and subsequent damage to the vine. Late winter freezing temperatures will kill any exposed buds which limits the adaptable growing areas of Kiwifruit. In California the Kiwifruit is an appropriate crop wherever citrus fruits, peaches and almonds are successful. All cultivars need a certain period of winter chilling and their needs vary dramatically, dependent upon cultivar. The most popular cultivar, Hayward, does best with a winter rest of 800 hours of chilling (defined as total hours between 32° and 45° F.) For warm winter areas with low chill hours (such as southern California, southern Texas, and Florida), cultivars such as Elmwood, Dexter, Abbott, or Vincent would be more suitable. In very mild winter areas the vines may retain their leaves and fail to flower the following season. Kiwi vines can be successfully grown in large containers.

DESCRIPTION

Growth Habit:

In the forests where it is native, the plant is a vigorous, woody, twining vine (liana) or climbing shrub. It is not unusual for a healthy vine to cover an area 10 to 15 feet wide, 18 to 24 feet long and 9 to 12 feet high. In cultivation it is supported on a trellising system.

Foliage:

The large, deep green, leathery leaves are oval to nearly circular and 7 to 10 inches in diameter. Young leaves and shoots are coated with red hairs, while mature leaves are dark green and hairless on the upper surface, downy – white with prominent, light colored veins beneath.

Flowers:

The large (1 to 2 inch diameter), white to cream colored flowers are somewhat fragrant and produced as singlet to triplets in the leaf axiles. The flowering period extends over several weeks from early May to June, depending on climatic conditions. The plants are dioeciously, bearing either male or female flowers, thus needing plants of both sexes to produce fruit. Self – fruiting males are known to exist but produce less desirable fruit.

Fruit:

The oval, ovoid or oblong fruit is up to 2-1/2 inches long, with russet – brown skin densely covered with short, stiff brown hairs. The flesh, firm until fully ripe, is glistening, bright green or sometimes yellow, brownish or off – white, except for the white, succulent center from which radiate many fine, pale lines. Between these lines are scattered minute dark-purple or nearly black seeds, unnoticeable in eating. The flavor is sweet/tart to acid, somewhat like that of the gooseberry with a suggestion of strawberry.

CULTURE:

Location:

Kiwifruit will tolerate part shade but prefer a sunny location where they can ramble across some type of trellising system. The vines should be protected from strong winds. Spring gusts can snap off new growth where it emerges from the canes. Kiwifruit is not recommended for the hot dessert climates of the Southwest.

Site Preparation:

Kiwifruit plants need a substantial trellis, patio cover, or other permanent place to grow upon. For the trellis

system, either a single wire or T-bar system can be installed. Both have a 4 inch by 4 inch redwood post of 8 feet. For the T-bar, a 2 inch by 6 inch cross arm about 4 feet long is bolted in place. Bury the post 2 feet into the ground and cement in if at all possible. At each end of the system, a cemented dead man should be in place. Run wires across the posts and anchor tautly to the dead man. When using a patio cover, no extra trellising needs to be in place. Simply run the plant up a corner post to the top and allow the plant to then form a spoke work of shoots which would resemble an umbrella.

Soils:

Kiwifruit prefer somewhat acid (pH 5 - 6.5), well-drained soils that are rich in organic matter. The leaves may show nitrogen deficiency if the soil is too basic. The plants do not tolerate salty soils.

Irrigation:

Kiwifruit plants need large volumes of water during the entire growing season but must also be in well-drained soils. Watering regularly in the heat of the summer is a must. Never allow a plant to undergo drought stress. Symptoms of drought stress are drooping leaves, browning of the leaves around the edges, and complete defoliation with re - growth of new shoots when the stress is continuous. More plants probably die from water related problems than any other reason.

Fertilization:

Plants are heavy nitrogen feeders which should be applied in abundance during the first half of the growing season. Late season applications of nitrogen will enhance fruit size but are discouraged as the fruit then tends to store poorly. In basic soils, a citrus and avocado tree fertilizer should be broadcast about the vine and watered in well in early March. Follow up the initial fertilizing by supplemental additions to early summer. In other areas, use a high nitrogen fertilizer which contains trace elements unless it is known that the particular soil is deficient in another nutrient. Mulching with manures and/or straws is very beneficial. However, do not put the mulch directly in contact with the vine as crown rot will occur.

Pruning:

For best fruit production, pruning in the winter is a must. All pruning techniques are usually based on a 'cane replacement' and differ only based on the trellising method used. Kiwi vines need to be supported and this is usually done in one of three ways: single wire, 3-5 wire on a T-bar system, or onto a patio cover. In all cases, one stem is trained up to a wire at six feet and then allowed to grow along the wire. When growth ends in a 'pig-tailing' of the shoot, it is cut behind the entanglement and new a shoot allowed growing from a leaf base. After two years multiple shoots will now emerge from the lateral

mainline. During the growing season, each lateral cane will send out a new shoot about 1/3 of the way from its own starting point. The next winter, prune off the older cane at the point that it connects with last summer's new shoot. Repeat this every year.

Propagation:

Seeds from store bought fruit may be planted in the spring. This should be done in a fine, somewhat sandy planter mix which is kept moist but not soaking wet. Seed germinates in 4 to 5 weeks. Plants raised this way will need to be grafted the following season to produce better, known sex, plants. Nursery bought plants is usually either grafted or cutting grown. Both types have their own attributes. One slight advantage of the cutting grown plants would be advantageous to growers in areas that experience winter freeze problems. If a plant is killed to the ground, a cutting grown plant that survives will re grow from the roots and thus maintain its known characteristics. Otherwise, either type is acceptable to backyard growers.

Pests and diseases:

Kiwifruit plants are relatively free from problems, possibly due to their lack of heavy planting into areas so that pests begin to take a liking to the leaves, trunk, or roots. One odd problem is the fact that the trunks have a catnip-like aroma which cats love to rub against. When

plants are small, this can be a problem as they can rub off any new shoots which emerge in the spring. Garden snails can also be a problem on younger plantings. Other pests include deer browsing on the leaves and gophers attacking the roots. Scale insects can also be a problem if populations build up too extensively.

Harvest:

Ripening depends both on cultivar grown and local climatic conditions. Commercially, the fruit is harvested mature-ripe when its soluble sugars reach 6.5 brix on a refractometer. For the home grower it is best to wait for harvest until at least November 1, but November 15 would be preferable. Seed inside should be fully black by this time. If available, a specifically designed fruit ripening bowl can be used to quickly ripen a few fruit to see if the rest of the crop is ready to be picked. Once harvested, place the hard fruit into plastic bags and put into the refrigerator for keeping. When needed, the fruit can be taken out of the refrigerator and ripened on the counter for a few days in a plastic bag. Well stored fruit can last for several months. The long keeping qualities of the fruit made worldwide shipment possible and heavy planting of the Hayward variety brought the fruit into recognition.

Sliced Kiwifruits:

Studies have proven that kiwifruits are useful in improving conditions of asthmatic children, and in

decreasing the probability of colon cancer by providing a good amount of dietary fiber, for more information please refer to kiwifruit health benefits page.

Kiwifruits contain the protein-dissolving enzyme "actinidin" as a result these can be allergic to some individuals. The most common symptoms include itching of the mouth, lips and palate, but can range to a more severe level such as wheezing or collapsing.

Kiwi fruits are rich in many Vitamins, flavonoids and minerals. In particular, they contain a high amount of Vitamin C (more than oranges), as much potassium as bananas and a good amount of beta-carotene.

Studies in Italy, performed on 6-7 year old children, have also demonstrated additional health benefits to the respiratory tract. In particular, children that were fed 5-7 portions a week of citrus and kiwifruits had 44% less probability wheezing compared to children eating less than once a week.

Shortness of breath was reduced by 32%, night time cough by 27%, severe wheeze by 41%, chronic cough by 25%, and runny nose by 28%. This result is not only traceable to the content in Vitamin C or Potassium, but in substances which are still largely unknown contained in kiwi fruit.

These substances are most likely flavonoids that help protect our cells from oxidative damage, and are

therefore considered very helpful in protecting our DNA from mutations and damage.

Protection from Age-Related Macular Degeneration (ARMD)

A series of studies published by the Archives of Ophthalmology have proven that consuming 3 or more servings of fruit per day (including kiwi fruits) can reduce by 36% the risk of developing an eye – related disease called ARMD (the primary cause of vision impairment in adults), if compared to people who only consume 1.5 servings of fruit per day.

The study was conducted on 110.000 women and men and lasted several decades. Surprisingly, the study found that while vegetables were not correlated with an improved resistance to the disease, fruits containing high amount of Vitamin C,A and E (the most common antioxidant vitamins) helped significantly in protecting against ARMD.

Anti Oxidant properties of Kiwi Fruit:

It is important to note that kiwi fruits contain a remarkable amount of Vitamin C, E and A. Vitamin C is a water – soluble antioxidant that has been proven to protect our body from free radicals, dramatically improving the health of individuals who consumed it

regularly against all kinds of disease, from cardiovascular problems to cancer and obesity.

Vitamin E has been proven to have similar effects, but is fat-soluble and thus is complimentary to Vitamin C in its functions. Kiwi fruits contain both these vitamins in high amount, which help protect our body against free radicals from all fronts.

Kiwi fruits have a high fiber content

The high content in dietary fiber helps improving diseases such as diabetes, by controlling sugar levels, and colon cancer, since fiber binds to toxic compounds in the colon and helps us expel them.

Fiber has also been proven to reduce cholesterol levels, improving the conditions of patients with cardiovascular diseases and lowering the probability of heart attacks.

Summary of Kiwifruit Health Benefits

Eating kiwi fruit is clearly a healthy choice, and it is particularly useful in these cases:

1. Prevents Asthma
2. Prevents wheezing and coughing, especially in children
3. Protects our DNA from mutations
4. Provides a healthy amount of antioxidants and vitamins

5. Helps prevent colon cancer due to a high fiber content

It is known to contain more Vitamin C than oranges and as much potassium as bananas. Kiwi fruit is also very high in fiber, which is an element that is known to be essential for weight loss. The water-based fruit is low in both calories and cholesterol. Kiwi, which is green on the outside and has a thick brown skin, is a great fruit choice for anyone who is conscious of what they eat. Here are some of the things that you may be wondering about how to prepare and serve kiwi fruits.

Choosing Kiwi Fruits:

Much like choosing any other type of fruit, there are certain things that you will want to look out for when choosing kiwi. The most important thing is to feel for firmness. Kiwi fruit is better if eaten when it is semi – firm or semi – soft. Kiwi fruit that is too firm is not yet ready to be eaten. It is likely that it will still be very sour at this point. A kiwi fruit that feels too soft indicates that it will be mushy when you cut it. Also keep in mind that you will want to find a kiwi that does not have too many blemishes or bruises on it. Store the kiwi fruit in the refrigerator if you are not planning to cut it right away.

How to Prepare Kiwi Fruits:

It is important to wash any fruit before cutting it. This will prevent your chances of eating pesticides or bacteria. Simply rinse it off with warm water. Although you can use a vegetable cleaning spray, it is important to keep in mind that it really does not make a huge difference. You can use a paper towel to dry the kiwi fruit off.

In order to prepare a kiwi fruit, the first thing that you will want to do is peel the skin. To do this, cut off each end of the kiwi. Then, get your knife underneath the skin of the kiwi and peel it from all the way around the entire fruit. If this does not work for you, try peeling the fruit vertically, beginning from the top to the bottom. This will take slightly longer to do but can make the peeling process easier.

Once the kiwi has been peeled, the next thing that you will need to do is slice it. Kiwi fruits have a core in the center. Some people prefer to cut around the core. There are also people who prefer to scoop the seeds out of the fruit. Keep in mind that both of these things are not necessary to do. Slicing the kiwi fruit horizontally is the easiest way. If you want to cut around the core of the fruit, you can also cut the kiwi in vertical slices.

Many people do not realize that you do not need to peel and cut a kiwi fruit in order to eat it. The skin and seeds of

kiwi fruits can be eaten, but keep in mind that you will want to avoid eating the core of the fruit.

How to Serve Kiwi Fruits:

No matter what dish it is that you are thinking about serving, it is likely that kiwi fruit will make a great addition. Kiwi goes great in a fruit salad, especially if you are looking for a fruit that that will either complement or replace strawberries. Also keep in mind that kiwi can go great in a fruit salad with other tropical fruits, such as mango, pineapple, and papaya.

Since kiwi goes so great with strawberries, it will be a great addition to strawberry or vanilla varieties of yogurt or ice cream. All that you need to do is place a few slices of kiwi on top. Serve it with only kiwi or add any other fruits that you want. Strawberries and blueberries are great choices.

Mango salsa can be served with tortilla chips or on top of your meat, vegetables, or pasta. There are a wide variety of mango salsa recipes online. All that you need to do is add a kiwi to the mango salsa recipe that you are planning to use.

Kiwi can also be a great choice if you want to add some extra flavor to your smoothie. Since kiwi fruits are so small, you will probably want to add another fruit, such as strawberries. All that you need to do is add the fruit,

yogurt or ice cream, and ice to the blender. Blend until frothy enough for your liking. It is a summer delight.

Another way to serve kiwi fruit is to put it on top of a dessert. It can be added to any type of cake, cheesecake, pie, or even cupcakes. You can cut little chunks of kiwi to mix with the icing of your choice. If you have already put icing or cool whip on top of a dessert, simply place slices of the kiwi fruit on top.

If you are planning to have waffles or pancakes, you can serve them with kiwi fruit. You can use strawberry or blueberry jam. Lay slices of fruit on top of the jam, or add a layer of whipped cream in between. Strawberries, blueberries, and pineapple will also go great on top of your breakfast!

It is important to keep in mind that kiwi fruit is not a suitable choice for everyone. Babies and those who suffer from Acid Reflux may have a difficult time eating kiwi due to the high levels of acid that it contains. Keep in mind that those who can eat kiwi fruit will be sure to benefit from it, however. Although the fruit is often overlooked because it is so small and is not considered to have a very distinct flavor, kiwi is actually of very high nutritional value.

Kiwi fruits have a very recent and interesting history that deeply reflects their perceived usefulness, appreciation and popularity.

Sliced Golden Kiwifruits

In 1991, a new variety of golden, yellow kiwifruit was developed. It was originally named 'Hort16A' and it was bred in an orchard owned by Hort Research in Te Puke.

ince then, new species for commercial purposed were grown, and a mention must be made to the *Hayward* species, cultivated first around 1924 by Hayward Wright in Avondale (New Zealand). This new species led to the beginning of commercial production around 1940.

As of 2007, the leading producers of kiwifruit are, in order: Italy, New Zealand, Chile, France, Greece, Japan and the USA. Kiwi fruits are also cultivated in China, albeit in smaller amounts, in the regions of the mountainous Yangtze River and Sichuan.

Apple

An apple a day keeps the doctor away?

An apple a day keeps the doctor away? Although apple is quite low in its vitamin C content, it has antioxidants & flavonoids which enhance the activity of vitamin C thereby helping to lower the risks of colon cancer, heart attack & stroke.

Apples come in a variety of colors ranging from red, yellow and green. However all of them are delicious. Apples may help to reduce cholesterol and apples are a

great source of **Quercetin** (a yellow compound used in the treatment of fragile capillaries. Formula: $C_{15}H_{10}O_7$).

Flavonoids: *is a naturally occurring phenolic compound belonging to a large group that includes many plant pigments. Flavonoids have beneficial effects in the human diet as antioxidants, neutralizing free radicals which damage body tissue and lead to heart disease, strokes and cancer.*

During the autumn when the leaves begin to turn in the, it is time for fresh apples. Many families traditionally trek to the apple orchards for a fun day of picking apples in anticipation of the fall season. Bobbing for apples is an old, treasured pastime of children of all ages.

Apples have been around for over 4,000 years, and probably from the time of Adam and Eve. There are now literally thousands of varieties of apples worldwide. Out of the more than 7,000 varieties classified in the United States alone, most apples fall within a 50 variety category. The apple is native to Europe and Asia. However it is now grown worldwide in temperate regions. The United States produces approximately one – third of the world's entire crop.

Apple History:

The word *apple* comes from the Old English *aeppel.* It has been around since the Iron Age and was cultivated in Egypt. In the first century A.D., the Roman Pliny the Elder

listed thirty-six varieties of apples. There are many mythological associations over various civilizations, with the apple in the Garden of Eden being the most widely-known. Apple trees can live for hundreds of years.

The apple was brought to the United States by the Pilgrims in 1620. The French brought the apple to Canada. The first commercial trade of apples from the U.S. began in 1741 on Long Island, NY, with the product being exported to the West Indies.

One of America's fondest legends is that of Johnny Appleseed. There is truth behind this treasured story. John Chapman, born in Leominster, Massachusetts in 1774, is credited with planting over 10,000 square miles of orchards. He began in Pennsylvania, leaving his father's carpentry shop. He traveled barefoot, using a saucepan for a hat. He preached a Swedenborgian philosophy of life and lived as a vegetarian, who survived on buttermilk and bee pollen. He made it as far as Fort Wayne, Indiana, where he died in 1845 at the age of 71.

Captain Aemilius Simmons brought seeds to Fort Vancouver in Washington State in 1824. Two gentlemen from Idaho, Henderson, Luelling and William Meek, began the commercialization of the apple industry in the Northwest U.S. Washington which is now the top – producing apple state in the country.

Among various methods of consuming Apple is using fresh apple cut into wedges and then eating in small bites.

Strawberries

Strawberries have the highest total antioxidant quality among major fruits & therefore protect the body from cancer – causing, blood vessel – clogging free radicals.

STRAWBERRY is a Protective Fruit. Strawberries have the highest total antioxidant quality among major fruits and thus protect the body from cancer – causing, blood vessel – clogging free radicals.

The fragrantly sweet juiciness and deep red color of strawberries can brighten up both the taste and aesthetics of any meal. It is no wonder they are the most popular berry fruit in the world. Although strawberries have become increasingly available year – round, they are at the peak of their season from April through July when they are the most delicious and most abundant.

While there are more than 600 varieties of strawberries that differ in flavor, size and texture, one can usually identify a strawberry by its red flesh that has yellow seeds piercing its surface, and the small, regal, green leafy cap and stem that adorn its crown.

In addition to strawberries that are cultivated, there are also varieties that grow wild. These are much smaller in size, but feature a more intense flavor.

Strawberry is one of the most delicious and nutritious fruit. It has the ability to remove harmful toxin in the blood. It is also recommended for **sluggish liver**, **gout**, **rheumatism**, **constipation**, **high blood pressure**, **catarrh** and even **skin cancer**. Strawberry is one of the most delicious and nutritious fruit.

The health benefits of strawberry even include **eye care, proper brain function, and relief from high blood pressure, arthritis, gout and heart diseases.**

These berries, with their tempting looks and great taste, have secured their place in the list of favorites for ages.

Strawberries, has common scientific name Fragaria. As a result there are different suffixes for different varieties. These are:

1. Fragaria Vesca for wild strawberry,
2. Fragaria Orientalis for Eastern Strawberries etc., are berries which grow in bushes.

Strawberries are extensively used in food stuffs ice – creams, jams, jellies, squashes, syrups, confectionaries, bakeries, chocolates and even medicines for their extraordinarily rich flavor, taste and color. They are also consumed fresh. We know that all fruits, particularly berries with exotic colors are rich anti oxidants. Strawberries are no exceptions. In addition to anti oxidants, they have many other nutrients and can be efficiently used to prevent many diseases.

Let us look at these. The major health benefits of strawberry are as follows**:**

1. Eye Care:

The primary reasons for almost all the problems of eyes are free radicals and deficiency of certain nutrients. With the growing age and lack of these protective nutrients, the harmful oxidants or free radicals cause serious damage to our eyes, such as drying up of eyes, degeneration of optical nerves, macular degeneration (ophthalmology a small yellowish spot in the middle of the retina that

provides the greatest visual acuity and color perception), vision defects and make them prone to infections too.

The anti oxidants such as vitamin-C, Flavonoids, Phenolic Phyto chemicals and Elagic Acid, present in strawberries can help avoid this situation to a great extent. One more factor is ocular pressure, i.e. the pressure of the eyes. Any disturbance in it is also harmful for the eyes. Here too, strawberries are helpful as they contain potassium, which help maintain right pressure.

2. Arthritis and Gout:

The degeneration of muscles and tissues, drying up of the fluid which help mobility of the joints and accumulation of toxic substances and acids (such as uric acid) in the body are some of the ill effects of free radicals present in our body, which are primarily responsible for Arthritis and Gout. Strawberries, with their team of anti oxidants and detoxifiers, can effectively help push away such health hazards forever. It is a famous saying in India that a serving of any fruit a day will remove the rust from the joints. It is very true for strawberries.

3. Cancer:

Vitamin-C, Folate and Anthocyanin (a water – soluble pigment that produces blue, violet, and red colors in plants), Quercetin and Kaempferol (few of the many Flavonoids in strawberries which possess excellent anti oxidant and anti carcinogenic properties – acting as anti

causing cancer) together form an excellent team to fight cancer and tumor. A daily intake of strawberries is seen to have remarkably brought down the growth of cancerous cells.

4. Brain Function:

It is a very common observation that old people tend to lose their memory and control over their activities, limbs etc. This is because of aging of their brain and the nervous system. Actually free radical agents (relating to or affecting the basic nature or most important features of something), are very much responsible for aging, and have an adverse effect on these systems. Due to them, the brain tissues start degenerating and the nerves get weaker. Strawberries can help in this process. The vitamin – C and the phytochemicals (a naturally occurring plant substance) and some phytochemicals have been shown in research certain quality to protect against disease. These have neutralize the effect of these oxidants and also rejuvenate the system. One more thing, strawberries are rich in iodine too, which is very helpful for proper functioning of the brain and nervous system.

5. High Blood Pressure:

Strawberries are a rich source of potassium and magnesium content, both of which are very effective in lowering high blood pressure caused by sodium.

6. Heart Diseases:

High fiber, Folate, no fats and high anti oxidants such as vitamin – C and phytochemicals (Flavonoids) together form an ideal cardiac health pack. They effectively reduce cholesterol. Some of the members of the vitamin – B family present in strawberries also strengthen the cardiac muscles and help better functioning of the heart.

7. Other Benefits:

Folate is known to protect from birth – defects. Vitamin – C effectively protects against infections and cold. The phyto nutrients also have anti inflammatory properties.

Wait! I forgot to tell you something about the best benefit of strawberry. The strawberry preserve tastes. Just awesome!

Orange

ORANGE is the sweetest medicine. Taking 2 – 4 orange a day may help keep colds away, lower cholesterol prevent and dissolve kidney stones as well as lessen the risk of colon cancer. An **orange** – specifically, the **sweet orange**—is the *Citrus.*

Description

Oranges are one of the most popular fruits around the world. They are delightful as a snack or as a recipe ingredient, for many Americans and people world over. Orange juice is most associated with good health. It has a reputation for being an integral part of a healthy breakfast.

Oranges are round citrus fruits with finely – textured skins that are, of course, orange in color just like their pulpy flesh. They usually range from about two to three inches in diameter.

Oranges are classified into two general categories – sweet and bitter – with the former being the type most commonly consumed. Popular varieties of the sweet orange (*Citrus sinensis*) include Valencia, Navel and Jaffa oranges, as well as the blood orange, a hybrid species that is smaller in size, more aromatic in flavor and has red hues running throughout its flesh. Bitter oranges (*Citrus aurantium*) are often used to make jam or marmalade, and their zest serves as the flavoring for liqueurs such as Grand Marnier and Cointreau.

History

Oranges originated thousands of years ago in Asia, in the region from southern China to Indonesia from which they spread to India. Although Renaissance paintings display

oranges on the table in paintings of The Last Supper, the assumption that they were grown in this region at this time seems to be erroneous since oranges were not cultivated in the Middle East until sometime around the 9th century. Sweet oranges were introduced into Europe around the 15th century by various groups including the Moors, and the Portuguese as well as the Italian traders and explorers who found them on their voyages to Asia and the Middle East.

Orange trees began to be grown in the Caribbean Islands in the late 15th century after Christopher Columbus carried the seeds there on his second voyage to the New World. Spanish explorers are responsible for bringing oranges to Florida in the 16th century. Spanish missionaries brought them to California in the 18th century, beginning the cultivation of this citrus fruit in the two states widely known for their oranges.

Before the 20th century, oranges were very expensive and therefore they were not regularly consumed, but rather eaten on special holidays such as Christmas and others. After more efficient means of transportation were developed, and food processors invented methods for utilizing orange by – products such as citric acid and bioflavonoids, the price of oranges dropped, and they could be consumed on a wide scale, as they are today. Currently, the countries that are some of the largest commercial producers of oranges include the United States, Brazil, Mexico, Spain, China and Israel.

How to Select and Store

Oranges do not necessarily require a bright orange color to be good. In fact, the uniform color of non – organic oranges may be due to injection of Citrus Red Number 2 (an artificial dye) into their skins at the level of 2 parts per million. Whether organic or not, oranges that are partially green or have brown russet ting may be just as ripe and tasty as those that are solid orange in color. Avoid those that have soft spots or traces of mold. And, because oranges are among the top 20 foods in which pesticide residues are most frequently found, buy organic oranges whenever possible.

Choose oranges that have smoothly textured skin and are firm and heavy for their size. These will have higher juice content than those that are either spongy or lighter in weight. In general, oranges that are smaller will be juicier than those that are larger in size, as will those that feature thinner skins.

For the most antioxidants, choose fully ripened oranges.

Research conducted at the University of Innsbruck in Austria suggests that as fruits fully ripen, almost to the point of spoilage, their antioxidant levels actually increase.

Key to the process is the change in color that occurs as fruits ripen, a similar process to that seen in the fall when

leaves turn from green to red to yellow to brown- a color change caused by the breakdown and disappearance of chlorophyll, which gives leaves and fruits their green color.

Until now, no one really knew what happened to chlorophyll during this process, but lead researcher, Bernard Kräutler, and his team, working together with botanists over the past several years, has identified the first decomposition products in leaves: colorless, polar NCCs (Nonfluorescing Chlorophyll Catabolytes), containing four pyrrole rings - like chlorophyll and heme.

After examining apples and pears, the scientists discovered that NCCs replace the chlorophyll not only in the leaves of fruit trees, but in their very ripe fruits, especially in the peel and flesh immediately below it.

'When chlorophyll is released from its protein complexes in the decomposition process, it has a phototoxic effect. When irradiated with light, it absorbs energy and can transfer it to other substances. For example, it can transform oxygen into a highly reactive, destructive form,' report the researchers. However, NCCs have just the opposite effect. Extremely powerful antioxidants, they play an important protective role for the plant, and when consumed as part of the human diet, NCCs deliver the same potent antioxidant protection within our bodies.

Oranges can either be stored at room temperature or in the refrigerator, depending upon your preference. They

will generally last the same amount of time, two weeks with either method, and will retain nearly the same level of their vitamin content. The best way to store oranges is loose rather than wrapped in a plastic bag since if exposed to moisture, they can easily develop mold.

Orange juice and zest can also be stored for later use. Place freshly squeezed orange juice in ice cube trays until frozen, and then store them in plastic bags in the freezer. Dried orange zest should be stored in a cool, dry place in an airtight glass container.

Tips for Preparing Oranges

Oranges can be eaten as a snack – just peel and enjoy. Before cutting the orange in half horizontally through the center, wash the skin so that any dirt or bacteria residing on the surface will not be transferred to the fruit. Proceed to cut the sections into halves or thirds, depending upon your personal preference.

Thin – skinned oranges can be easily peeled with your fingers. For easy peeling of the thicker skinned varieties, first cut a small section of the peel from the top of the orange. You can then either make four longitudinal cuts from top to bottom and peel away these sections of skin, or starting at the top, peel the orange in a spiral fashion.

Oranges are often used in recipes in the form of orange juice. As oranges, like most citrus fruits, will produce

more juice when warmer; always juice them when they are at room temperature. Rolling the orange under the palm of your hand on a flat surface will also help to extract more juice.

The juice can be extracted in a variety of ways. You could either use a juicer or do it the old fashioned way, squeezing by hand.

If your recipe calls for orange zest, make sure that you use an orange that is organically grown since most conventionally grown fruits will have pesticide residues on their skin and may be artificially colored. After washing and drying the orange, use a zester, paring knife or vegetable peeler to remove the zest, which is the orange part of the peel. Make sure not to remove too much of the peel as the white pith underneath is bitter and should not be used. The zest can then be more finely chopped or diced if necessary.

In – Depth Nutritional Profile

This system allows us to highlight the foods that are especially rich in particular nutrients. The chart with the link above shows the nutrients for which this food is either an excellent, very good, or good source. Below the chart you will find a table that explains these qualifications. If a nutrient is not listed in the chart, it does not necessarily mean that the food does not contain it. It simply means that the nutrient is not provided in a

sufficient amount or concentration to meet our rating criteria. To view this food's in – depth nutritional profile that includes values for dozens of nutrients - not just the ones rated as excellent, very good, or good - please use the link below the chart.

To read this chart accurately, you will need to glance up in the top left corner where you will find the name of the food and the serving size we used to calculate the food's nutrient composition. This serving size will tell you how much of the food you need to eat to obtain the amount of nutrients found in the chart. Now, returning to the chart itself, you can look next to the nutrient name in order to find the nutrient amount it offers, the percent Daily Value (DV%) that this amount represents, the nutrient density that we calculated for this food and nutrient, and the rating we established in our rating system. For most of our nutrient ratings, we adopted the government standards for food labeling that are found in the U.S. Food and Drug Administration's 'Reference Values for Nutrition Labeling.'

Below is the Table for Raw Orange.

Orange, raw, Florida

Nutritional value per 100 g (3.5 oz)

Energy 50 kcal 190 kJ	
Carbohydrates	11.54 g
- Sugars 9.14 g	
- Dietary fiber 2.4 g	
Fat	0.21 g
Protein	0.70 g
Thiamine (Vit. B1) 0.100 mg	8%
Riboflavin (Vit. B2) 0.040 mg	3%
Niacin (Vit. B3) 0.400 mg	3%
Pantothenic acid (B5) 0.250 mg	5%
Vitamin B6 0.051 mg	4%
Folate (Vit. B9) 17 µg	4%
Vitamin C 45 mg	75%
Calcium 43 mg	4%
Iron 0.09 mg	1%
Magnesium 10 mg	3%
Phosphorus 12 mg	2%
Potassium 169 mg	4%
Zinc 0.08 mg	1%

Percentages are relative to US recommendations for adults.
Source: USDA Nutrient database

Oranges & Orange Juice

Oranges are a citrus fruit grown in warm climates all over the world and if they are not peeled and eaten, they are usually squeezed to create orange juice. Orange juice is one of the most popular juices around the world. Brazil is the largest producer of orange juice, closely followed by the United States. Commercial orange juice production is accomplished by squeezing the fruit on huge juicers and the juice is then collected on trays underneath the oranges. Some orange juice is fresh, and put straight from the juicer into the carton, other orange juice is used to make concentrate, meaning it is freshly squeezed, frozen and then thawed for blending and ultimately, consumption.

History of Orange:

In 2007, oranges generated $230 million in sales in the California area, making the orange the number 2 crop on the state's agriculture's Top 10 list. Californian farmers expect to pick around 68 million oranges during each fall harvest, and around 61 million cartons of orange juice come from the central valley area annually.

Florida Oranges:

In 2008, the value of the Florida orange crop fell 19% to $1.2 billion, and according to the citrus industry observers, this was not unexpected because a drop in farm prices for oranges was predicted. Polk County has a total production of more than 31 million boxes of oranges, making up 15% of Florida's total orange production.

Valencia, Persian & Navel Oranges:

There have been several different types of oranges available over the years. Persian oranges grown in southern Europe were once popular, but were quite bitter and by the 15th century they had been replaced by sweeter ones. The navel orange came from a single mutation in 1820 in an orchard of sweet oranges. The navel mutation caused the oranges to develop a second orange at the base of the original fruit near the stem. Valencia oranges are one of the sweetest oranges that grown anywhere and are mainly used for juice extraction. Somewhat uncommon, blood oranges have streaks of red in the fruit which makes the juice a burgundy color.

Conclusion:

Oranges are deservedly one of the most popular fruits and they also are a great natural source of vitamin C. Oranges can be used for eating, drinking, marmalade and baking and they are popular around the globe as the biggest selling juice drink available.

The orange is one of the most common and popular fruit. It is well-liked because of its easy availability all year round, dense nutrition, and it tastes good.

Oranges are round citrus fruits ranging in diameter from about 2 to 3 inches, with finely texturized skins that are orange in color.

Its pulp is also orange in color and very succulent, surrounded by its skin which can vary in thickness depending on its variety.

There are oranges that are sweet, bitter and sour, so you'll need to know the variety you're buying. The sweet variety is usually more fragrant. They include Valencia, Navel and Jaffa oranges which are ideal for making juices.

Other variety:

In the orange family, there are also the Mandarin oranges (with loose skin), Clementine (loose skin and seedless),

the tangerine (orange – red Mandarin), the Minneola (cross between tangerine and grapefruit), the blood orange that has dark burgundy colored flesh, kumquat, and a few other lesser known ones.

The Mandarin oranges are especially popular with the Chinese as the word 'orange' in Chinese sounds like 'gold' or 'good luck'. Come the Lunar New Year, the Chinese buy oranges by the boxes to be given away to express good wishes for the New Year.

Nutritional Benefits:

Oranges are an excellent source of vitamin C and flavonoids. One orange (130 grams) supplies nearly 100 percent of the recommended daily dietary intake of vitamin C.

When you eat a whole orange, it provides good dietary fiber. Leave in the pith (the white matter under the peel) as much as possible as the pith contains the highest amount of valuable bioflavonoids and other anti – cancer agents.

In addition, oranges are a good source of vitamin A, the B vitamins, amino acids, beta-carotene, pectin, potassium, folic acid, calcium, iodine, phosphorus, sodium, zinc, manganese, chlorine and iron.

Health Benefits:

An orange packs over 170 different phytonutrients and more than 60 Flavonoids, many of which have been shown to have anti – inflammatory, anti – tumor and blood clot inhibiting properties, as well as strong anti – oxidant effects.

The combination of the high amount of anti – oxidant (vitamin C) and Flavonoids in oranges makes it one of the best fruits in helping to promote optimal health.

Oranges' Healing Phyto nutrients:

In recent research studies, the healing properties of oranges have been associated with a wide variety of phytonutrient compounds. These phytonutrients include

1. *citrus flavanones* (types of flavonoids that include the molecules *hesperetin* and *naringenin*),
2. *anthocyanins*, *hydroxycinnamic acids*, and
3. Variety of *polyphenols*.

When these phytonutrients are studied in combination with oranges' vitamin C, the significant antioxidant properties of this fruit are understandable.

But it is yet another *flavanone* in oranges, the *herperidin* molecule, which has been singled out in phytonutrient

research on oranges. Arguably, the most important *flavanone* in oranges, *herperidin* has been shown to lower high blood pressure as well as cholesterol in animal studies, and to have strong anti-inflammatory properties. Importantly, most of this phytonutrient is found in the peel and inner white pulp of the orange, rather than in its liquid orange center, so this beneficial compound is too often removed by the processing of oranges into juice.

Still a Healthy Dose of Vitamin C is needed for Antioxidant Protection and Immune Support

You may already know that oranges are an excellent source of vitamin C just one orange supplies 116.2% of the daily value for vitamin C. But do you know just how important vitamin C and oranges are for good health? Vitamin C is the primary water – soluble antioxidant in the body, disarming free radicals and preventing damage in the aqueous environment both inside and outside cells. Inside cells, a potential result of free radical damage to DNA is cancer. Especially in areas of the body where cellular turnover is especially rapid, such as the digestive system, preventing DNA mutations translates into preventing cancer. This is why a good intake of vitamin C is associated with a reduced risk of colon cancer.
Free radical damage to other cellular structures and other molecules can result in painful inflammation, as the body tries to clear out the damaged parts. Vitamin C, which prevents the free radical damage that triggers the inflammatory cascade, is thus also associated with

reduced severity of inflammatory conditions, such as asthma, osteoarthritis, and rheumatoid arthritis.

Free radicals also oxidize cholesterol. Only after being oxidized does cholesterol stick to the artery walls, building up in plaques that may eventually grow large enough to impede or fully block blood flow, or rupture to cause a heart attack or stroke. Since vitamin C can neutralize free radicals, it can help prevent the oxidation of cholesterol.

Vitamin C, which is also vital for the proper function of a healthy immune system, is good for preventing colds and may be helpful in preventing recurrent ear infections.

Consuming vitamin C supplements does not provide the same protective benefits as drinking a glass of orange juice, shows research by Italian researchers in the Division of Human Nutrition at the University of Milan, Italy (Guarnieri S, Riso P, et al., British Journal of Nutrition).

Seven healthy test subjects were given each of three drinks, two weeks apart: blood – orange juice containing 150 milligrams of vitamin C, fortified water containing 150 milligrams of vitamin C, and a sugar and water solution containing no vitamin C. Blood samples were collected immediately before the drink was consumed, then every hour for 8 hours, and finally 24 hours after consumption of each drink.

Blood samples were exposed to hydrogen peroxide, and free radical damage to DNA was evaluated at 3 and 24 hours. Only when orange juice was consumed was any protective effect was seen. After drinking orange juice, DNA damage was 18% less after 3 hours, and 16% less after 24 hours. No protection against DNA damage was seen after consumption of the vitamin C fortified drink or the sugar drink.

While another study, which looked at much larger quantities of vitamin C, did show a protective effect from the vitamin alone, this research indicates that not only is the protection afforded by fruit more complex, but smaller amounts of nutrients like vitamin C are all that are needed for benefit.

A lead researcher, Serena Guarnieri said, 'It appears that vitamin C is not the only chemical responsible for antioxidant protection.' In oranges, vitamin C is part of a matrix involving many beneficial phytochemicals (for example, cyaniding – 3 – glucoside, flavanones and carotenoids). 'But how they are interacting is still anyone's guess,' she added. Fortunately, we do not have to wait until scientists figure this out to receive oranges' DNA – protective benefits.

Practical Tip: For the best DNA protection, skip the vitamin C-fortified bottled drinks and enjoy a glass of real (preferably organic as organic foods have been shown to contain higher amounts of phytonutrients), freshly squeezed orange juice – or simply eat an orange!

Owing to the multitude of vitamin C's health benefits, it is not surprising that research has shown that consumption of vegetables and fruits high in this nutrient are associated with a reduced risk of death from all causes including heart disease, stroke and cancer.

Good Source of Fiber:

Oranges is more beneficial when consumed with their fiber. A single orange provides 12.5% of the daily value for fiber, which has been shown to reduce high cholesterol levels thus helping to prevent atherosclerosis. Fiber can also help out by keeping blood sugar levels under control. This may explain why oranges can be a very healthy snack for people with diabetes. In addition, the natural fruit sugar in oranges, fructose, can help to keep blood sugar levels from rising too high after eating. The fiber in oranges can grab cancer – causing chemicals and keep them away from cells of the colon, providing yet another line of protection from colon cancer. And the fiber in oranges may be helpful for reducing the uncomfortable constipation or diarrhea in those suffering from irritable bowel syndrome.

In addition to oranges' phytonutrients, vitamin C and fiber, they are a good source of thiamin, folate, vitamin A (in the form of beta-carotene), potassium and calcium.

Protection against Rheumatoid Arthritis:

New research published in the *American Journal of Clinical Nutrition* adds to the evidence that enjoying daily a glass of freshly squeezed orange juice can significantly lower your risk of developing rheumatoid arthritis.

Data collected by the European Prospective Investigation of Cancer Incidence (EPIC) – Norfolk study, a population – based, prospective study of over 25,000 subjects, showed that study participants with the highest daily intake of the carotenoids, zeaxanthin and Â-cryptoxanthin, had a much lower risk of developing rheumatoid arthritis compared to individuals consuming the least of these beneficial phytonutrients. Those whose intake of zeaxanthin was highest were 52% less likely to develop rheumatoid arthritis, while those with the highest intake of cryptoxanthin had a 49% reduction in risk. Pretty dramatic benefits for doing something as simple as enjoying a glass of freshly squeezed orange juice each day!

Arteriosclerosis:

Regularly consuming vitamin C retards the development of hardening of the arteries. And thus prevents the hardening of arteries.

Cancer prevention:

A compound in oranges called liminoid, has been found to help fight cancers of the mouth, skin, lung, breast, stomach and colon. The high vitamin C content also acts as a good anti-oxidant that protects cells from damages by free radicals.

Cholesterol:

The alkaloid synephrine found under the orange peel can reduce the liver's production of cholesterol. Whereas the anti-oxidant fights oxidative stress that is the main culprit in oxidizing the LDLs in our blood. Possible Cholesterol-Lowering Benefits

The ARS team is now investigating the potential cholesterol – lowering effects of limonin. Lab tests indicate that human liver cells produce less apo B when exposed to limonin. Apo B is a structural protein that is part of the LDL cholesterol molecule and is needed for LDL production, transport and binding, so higher levels of apo B translate to higher levels of LDL cholesterol.

Compounds in **Orange Peel May Lower Cholesterol as** Effectively as Statin Drugs.

A class of compounds found in citrus fruit peels called polymethoxylated flavones (PMFs) have the potential to lower cholesterol more effectively than some prescription

drugs, and without side effects, according to a study by U.S. and Canadian researchers that was published in the *Journal of Agricultural and Food Chemistry*.

In this study, when laboratory animals with diet – induced high cholesterol were given the same diet containing 1% PMFs (mainly tangeretin), their blood levels of total cholesterol, VLDL and LDL (bad cholesterol) were reduced by 19-27 and 32-40% respectively. Comparable reductions were also seen when the animals were given diets containing a 3% mixture of two other citrus flavonones, hesperidin and naringin.

Treatment with PMFs did not appear to have any effect on levels of beneficial HDL cholesterol, and no negative side effects were seen in the animals fed with PMF – containing diets.

Although a variety of citrus fruits contain PMFs, the most common PMFs, tangeretin and nobiletin, are found in the peels of tangerines and oranges. Juices of these fruits also contain PMFs, but in much smaller amounts. In fact, you would have to drink about 20 glasses of juice each day to receive an amount of PMFs comparable in humans to that given to the animals. However, grating a tablespoon or so of the peel from a well – scrubbed organic tangerine or orange each day and using it to flavor tea, salads, salad dressings, yogurt, soups, or hot oatmeal, buckwheat or rice may be a practical way of achieving some cholesterol – lowering benefits. The researchers are currently exploring the mechanism of action by which PMFs lower

cholesterol. Based on early results in cell and animal studies, they suspect that PMFs work like statin drugs, by inhibiting the synthesis of cholesterol and triglycerides inside the liver.

Constipation:

Even though the orange 'tastes acidic', it actually has an alkaline effect. As a result it helps in the digestive system and helps stimulate the digestive juices, relieving constipation.

Damaged sperms repair:

An orange a day is sufficient for a man to keep his sperms healthy. Vitamin C, an anti – oxidant, protects sperms from genetic damage that may cause a birth defect.

Heart disease:

A high intake of flavonoids and vitamin C has been known to halve the risk of heart diseases. Thus these provide protection against Cardiovascular Disease.

A 248 – page report, **'The Health Benefits of Citrus Fruits,'** released December 2003 by Australian research group, CSIRO (The Commonwealth Scientific and Industrial Research), reviews 48 studies that show a diet high in citrus fruit provides a statistically significant protective effect against some types of cancer, plus

another 21 studies showing a non – significant trend towards protection.

Citrus appears to offer the most significant protection against esophageal, oro – phayngeal/laryngeal (mouth, larynx and pharynx), and stomach cancers. For these cancers, studies showed risk reductions of 40 - 50%.

The World Health Organization's recent draft report, 'Diet, Nutrition and the Prevention of Chronic Disease,' concludes that a diet that features citrus fruits also offers protection against cardiovascular disease due to citrus fruits' folate, which is necessary for lowering levels of the cardiovascular risk factor, homo cysteine. Potassium, which helps in lowering blood pressure, protecting against stroke and cardiac arrhythmias; and the vitamin C, carotenoids and flavonoids found in citrus fruits, all of which have been identified as having protective cardiovascular effects.

One large US study reviewed in the CSIRO report showed that one extra serving of fruit and vegetables a day reduced the risk of stroke by 4%, and this increased by 5 - 6 times for citrus fruits, reaching a 19% reduction of risk for stroke from consuming one extra serving of citrus fruit a day.

The CSIRO Report also includes evidence of positive effects associated with citrus consumption in studies for arthritis, asthma, Alzheimer's disease and cognitive impairment, Parkinson's disease, macular degeneration,

diabetes, gallstones, multiple sclerosis, cholera, gingivitis, optimal lung function, cataracts, ulcerative colitis and Crohn's disease.

Finally, the CSIRO Report notes that as low fat, nutrient – rich foods with a low glycemic index, citrus fruits are protective against overweight and obesity, conditions which increase the risk of heart disease, certain cancers, diabetes, high blood pressure and stroke, and add to symptoms of other conditions like arthritis.

An orange has over 170 different phytonutrients and more than 60 flavonoids, many of which have been shown to have anti inflammatory, anti-tumor and blood clot inhibiting properties, as well as strong antioxidant effects
.
Phytonutrients, specifically, the class of polyphenols, are high in citrus with oranges containing 84mg Gallic Acid equivalents/100mg. The polyphenols so abundant in oranges have been shown to have a wide range of antioxidant, anti-viral, anti – allergenic, anti – inflammatory, anti - proliferative and anti – carcinogenic effects. Although most of the research has centered on citrus polyphenols' possible role in cancer and heart disease, more recently, scientists have begun to look at their role in brain functions such as learning and memory.

An increasing number of studies have also shown a greater absorption of the nutrients in citrus when taken not as singly as supplements, but when consumed within the fruit in which they naturally appear along with all the

other biologically active phytonutrients that citrus fruits contain. The Health Benefits of Citrus Fruits," released December 2003 by Australian research group, CSIRO (The Commonwealth Scientific and Industrial Research Organization. If you would like to read more, click CSIRO.

Long – Acting Liminoids in Citrus add to their ability to Promote Optimal Health.

In animal studies and laboratory tests with human cells, compounds in citrus fruits, including oranges, called limonoids have been shown to help fight cancers of the mouth, skin, lung, breast, stomach and colon. Now, scientists from the US Agricultural Research Service have shown that our bodies can readily absorb and utilize a very long – acting limonoid called limonin that is present is citrus fruits in about the same amount as vitamin C.

In citrus fruits, limonin is present in the form of limonin glucoside, in which limonin is attached to a sugar (glucose) molecule. Our bodies easily digest this compound, cleaving off the sugar and releasing limonin.

In the ARS (Agricultural Research Service) study, 16 volunteers were given a dose of limonin glucoside in amounts ranging from those that would be found in from 1 to 7 glasses of orange juice. Blood tests showed that limonin was present in the plasma of all except one of the subjects, with concentrations highest within 6 hours after consumption. Traces of limonin were still present in 5 of the volunteers 24 hours after consumption!

Limonin's bioavailability and persistence may help explain why citrus limonoids are potent anti – carcinogens that may continuously prevent cancerous cells from proliferating. Other natural anti – carcinogens are available for much less time; for example, the phenols in green tea and chocolate remain active in the body for just 4 to 6 hours.

High blood pressure:

Studies have shown that a flavonoid called hesperidin in oranges can lower high blood pressure.

Immune system:

The strong content of vitamin C stimulates white cells to fight infection, naturally building a good immune system.

Kidney stones prevent:

Drinking orange juice daily can significantly drop the risk of formation of calcium oxalate stones in the kidney.

Want to reduce your risk of calcium oxalate kidney stones? Drink orange juice. A study published in the *British Journal of Nutrition* found that when women drank ½ to 1 litre of orange, grapefruit or apple juice daily, their urinary pH value and citric acid excretion increased,

significantly dropping their risk of forming calcium oxalate stones.

Skin:

The anti – oxidant in orange help protect the skin from free radical damage known to cause signs of aging.

Protect Respiratory Health:

Consuming foods rich in beta – cryptoxanthin, an orange – red carotenoid found in highest amounts in oranges, corn, pumpkin, papaya, red bell peppers, tangerines, and peaches, may significantly lower one's risk of developing lung cancer. A study published in the September 2003 issue of *Cancer Epidemiology, Biomarkers and Prevention* reviewed dietary and lifestyle data collected from over 60,000 adults in Shanghai, China. Those eating the most crytpoxanthin – rich foods showed a 27% reduction in lung cancer risk. When current smokers were evaluated, those who were also in the group consuming the most cryptoxanthin – rich foods were found to have a 37% lower risk of lung cancer compared to smokers who ate the least of these health-protective foods.

Stomach ulcer:

Consuming vitamin C rich foods helps to lower the incidence of peptic ulcers and in turn, reduce the risk of

stomach cancer. Help prevent ulcers and reduce risk for stomach cancer.

An orange a day may help keep ulcers away, according to a study published in the *Journal of the American College of Nutrition*. In this study, researchers evaluated data from over 6,000 adults enrolled in the Third National Health and Nutrition Examination Survey. Study participants with the highest blood levels of vitamin C had a 25% lower incidence of infection with *Helicobacter pylori* (*H. pylori*), the bacterium responsible for causing peptic ulcers and in turn, an increased risk for stomach cancer. Researchers are uncertain whether *H. pylori* lowers blood levels of vitamin C or if high blood levels of vitamin C help protect against infection – either way, eating an orange or drinking a glass of orange juice each day may help prevent gastric ulcers. Lead researcher in this study, Dr. Joel A. Simon at the San Francisco VA Medical Center, urges people who have tested positive for *H. pylori* to increase their consumption of vitamin C – rich foods since this may help them combat *H. pylori* infection.

Viral infections, protection against:

The abundance of polyphenols has been shown to provide protection against viral infections. Choose oranges that are firm and heavy for their size. This indicates that they are full of juice. Lighter fruit has more skin and drier pulp indicating less juice.

Extracting Juice:

To extract most juice from oranges, always juice them when they are at room temperature. Rolling them under the palm of your hand on a flat surface will also help extract more juice.

Vitamin C gets destroyed fast when exposed to the air, so eat up an orange quickly once cut up. Do not leave the juice exposed for too long to preserve optimal nutrients.

Oranges can be stored at room temperature for up to two weeks or stored loosely in the refrigerator. Do not store wrapped to prevent moisture and mold.

Caution:

No doubt oranges have many health benefits, always remember to eat in moderation. **Excessive consumption of any citrus juices can leach calcium from the body system, causing decay of the bones and teeth.**

Although we often do not eat orange peel in significant quantity, it is good to know that citrus peels contain some oils that may interfere with the effects of vitamin A.

If drinking juice caused excessive mucus build-up in your throat, you could be allergic to oranges.

Citrus Oils – Aromatherapy

The oil extracted from citrus fruits is widely used in aromatherapy. The oils are extracted commonly from lemon and oranges. These are used in many ways for the treatment and other refreshing reasons.

Lemon:

The small evergreen lemon tree has serrated oval leaves, stiff thorny branches and fragrant white or pale pink flowers. The round or oval green fruits of Citrus limon or Citrus limonum turn sunshine yellow when ripe. A native of India and Asia, this member of the Rutaceae family grows about eighteen feet tall. Lemon trees grow wild in Mediterranean climates and are cultivated in Guinea, Israel, Italy, and North and South America.

Cold expression of the fresh peels of the fruit renders pale greenish yellow oil. Its scent is fresh and light, slightly sharp but sweet, with the tart and tangy smell of fresh lemons. About 1,000 lemons will yield one pound of oil.
Lemon oil has many therapeutic benefits as a result lemon oil is widely used.

Beauty Benefits:

Lemon oil balances overactive sebaceous glands that lead to oily or blemished skin. It helps in clearing acne and

controls oily hair and dandruff. It revitalizes underactive and mature skin and helps with cellulite by improving circulation and encouraging the elimination of wastes.

Lemon oil encourages the exfoliation of dead skin and enlivens the complexion. Long – term treatment with lemon oil reduces broken capillaries and varicose veins, softens scar tissue and minimizes warts and corns. Lemon oil can also strengthen brittle nails.

Emotional Effects:

Lemon oil is cooling, refreshing and uplifting. It encourages clarity, concentration and recall. It can calm or prevent emotional outbursts. It fights depression, eases fear, strengthens resolve and assists in communication and decision – making.

Orange Oils:

Smooth and shiny oblong leaves, fragrant white flowers and sweet tasting nutritious fruit adorn the bounteous orange tree. The bitter orange tree, Citrus aurantium, yields **orange oil** from its fruit, **neroli oil** from its flowers and **petitgrain oil** from its foliage. The sweet orange tree, Citrus sinensis, yields orange oil from its fruit and occasionally an oil called **neroli Portugal** from its blossoms.

Cold – expressing either whole oranges or orange peels, by hand or machine, yields yellow or orange oil with a zesty, refreshing, slightly green – smelling and very citrusy aroma. Some orange oil is steam – distilled from fresh orange peels. Approximately fifty oranges render one ounce of orange oil.

Native to China and India, the orange tree belongs to the Rutaceae family. Oranges grow abundantly in the Americas, Israel and Mediterranean countries. Brazil, Cyprus, Israel, Mexico and the United States are the primary producers of orange oil.

Beauty Benefits

Orange oil restores balance to dry or oily skin. It maintains healthy youthful skin by promoting the production of collagen. It reduces puffiness and discourages dry wrinkled skin. Orange oil stimulates circulation to the skin surface and softens rough skin. It also clears blemishes and improves acne – prone skin. It tends to increase perspiration, thus assisting the release of toxins from dull or blemished skin. Orange stimulates the circulation of lymphatic fluids and helps relieve tissue swelling and fluid retention. It improves cellulite, which is sometimes called orange – peel skin.

Emotional Effects:

Orange oil balances the emotional imbalances in many ways.

References:

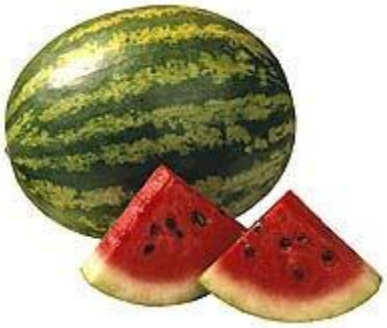
1. Cho E, Seddon JM, Rosner B, Willett WC, Hankinson SE. Prospective study of intake of fruits, vegetables, vitamins, and carotenoids and risk of age-related maculopathy. Arch Ophthalmol. 2004 Jun; 122(6):883-92. 2004. PMID: 15197064.
2. Ensminger AH, Ensminger, ME, Kondale JE, Robson JRK. Foods & Nutriton Encyclopedia. Pegus Press, Clovis, California 1983.
3. Ensminger AH, Esminger M. K. J. e. al. Food for Health: A Nutrition Encyclopedia. Clovis, California: Pegus Press; 1986 1986. PMID: 15210.
4. Fan Y, Ding Z, Yang L, et al. [A preliminary study on bioactivity of orange and tangerine peel extracts against aphis and mites]. Zhongguo Zhong Yao Za Zhi 1995 Jul; 20(7):397-8, 446 1995. PMID: 13090.
5. Fortin, Francois, Editorial Director. The Visual Foods Encyclopedia. Macmillan, New York 1996.
6. Galati EM, Monforte MT, Kirjavainen S, et al. Biological effects of hesperidin, a citrus flavonoid. (Note I): antiinflammatory and analgesic activity. Farmaco 1994 Nov; 40(11):709-12 1994. PMID: 13070.
7. Galati EM, Trovato A, Kirjavainen S, et al. Biological effects of hesperidin, a Citrus flavonoid. (Note III): antihypertensive and diuretic activity in rat. Farmaco 1996 Mar; 51(3):219-21 1996. PMID: 13060.
8. Guarnieri S, Riso P, Porrini M. Orange juice vs vitamin C: effect on hydrogen peroxide-induced DNA damage in mononuclear blood cells. Br J Nutr. 2007 Apr;97(4):639-43. 2007. PMID: 17349075.

9. Honow R, Laube N, Schneider A, Kessler T, Hesse. Influence of grapefruit-, orange- and apple-juice consumption on urinary variables and risk of crystallization. Br J Nutr. Aug; 90(2):295-300. 2003. PMID: 12908889.
10. Khaw KT, Bingham S, Welch A, et al. Relation between plasma ascorbic acid and mortality in men and women in EPIC-Norfolk prospective study: a prospective population study. European Prospective Investigation into Cancer and Nutrition. Lancet. 2001 Mar 3; 357(9257):657-63 2001.
11. Kurl S, Tuomainen TP, Laukkanen JA et al. Plasma vitamin C modifies the association between hypertension and risk of stroke. Stroke 2002 Jun; 33(6):1568-73 2002.
12. Kurowska EM, Manthey JA. Hypolipidemic effects and absorption of citrus polymethoxylated flavones in hamsters with diet-induced hypercholesterolemia. J Agric Food Chem. 2004 May 19; 52(10):2879-86. 2004. PMID: 15137829.
13. Pattison DJ, Silman AJ, Goodson NJ, Lunt M, Bunn D, Luben R, Welch A, Bingham S, Khaw KT, Day N, Symmons DP. Vitamin C and the risk of developing inflammatory polyarthritis: prospective nested case-control study. Ann Rheum Dis. 2004 Jul; 63(7):843-7. 2004. PMID: 15194581.
14. Rapisarda P, Tomaino A, Lo Cascio R, et al. Antioxidant effectiveness as influenced by phenolic content of fresh orange juices. J Agric Food Chem 1999 Nov; 47(11): 4718-23 1999. PMID: 13080.
15. Simon JA, Hudes ES, Perez-Perez GI. Relation of serum ascorbic acid to Helicobacter pylori serology in US adults: the Third National Health and Nutrition Examination Survey. J Am Coll Nutr. Aug; 22(4):283-9. 2003. PMID: 12897042.
16. Stange RR Jr, Midland SL, Eckert JW, Sims JJ. An antifungal compound produced by grapefruit and Valencia orange after wounding of the peel. J Nat Prod 1993 Sep; 56(9):1627-9 1993. PMID: 13100.
17. Wood M. Citrus Compound, Ready to Help Your Body!. Agricultural Research, February 2005 2005.
18. Wood, Rebecca. The Whole Foods Encyclopedia. New York, NY: Prentice-Hall Press; 1988 1988. PMID: 15220.

19. Yuan JM, Stram DO, Arakawa K, Lee HP, Yu MC. Dietary cryptoxanthin and reduced risk of lung cancer: the Singapore Chinese Health Study. Cancer Epidemiol Biomarkers Prev. 2003 Sep; 12(9): 890-8. 2003.

Water Melon

No other fruit is like the subtly crunchy, thirst quenching watermelon. Although watermelons can now be found in the markets throughout the year, the season for watermelon is in the summer when they are sweet and of the best quality.



As a member of the Cucurbitaceae family, the watermelon is related to the cantaloupe, squash and pumpkin, other plants that also grow on vines on the ground. Watermelons can be round, oblong or spherical in shape and feature thick green rinds that are often spotted or striped.

They range in size from a few pounds to upward of ninety pounds.

This chart graphically details the %DV that a serving of Watermelon provides for each of the nutrients of which it is a good, very good, or excellent source according to our Food Rating System. Additional information about the amount of these nutrients provided by Watermelon can be found in the Food Rating System Chart. A link that takes you to the In-Depth Nutritional Profile for Watermelon, featuring information over 80 nutrients, can be found under the Food Rating System Chart.

History:

Originating in Africa, watermelons were first cultivated in Egypt where testaments to their legacy were recorded in hieroglyphics painted on building walls. The fruit was held is such high regard that it was placed in the tombs of many Egyptian kings. It is not surprising that watermelon played such an important role in this country, and subsequently in countries in the Mediterranean region, since water was often in short supply in these areas, and people could depend upon watermelon for its thirst-quenching properties.

Watermelons were brought to China around the 10th century and then to the Western Hemisphere shortly after the discovery of the New World. In Russia, where much of the commercial supply of watermelons is grown, there is a popular wine made from this fruit. In addition to Russia, the leading commercial growers of watermelon include China, Turkey, Iran and the United States.

Concentrated Antioxidants

Sweet, juicy watermelon is actually packed with some of the most important antioxidants in nature. Watermelon is an excellent source of Vitamin C and a very good source of vitamin A, notably through its concentration of beta – carotene. Pink watermelon is also a source of the potent carotenoid antioxidant, lycopene. These powerful antioxidants travel through the body neutralizing free radicals.

Free radicals are substances in the body that can cause a great deal of damage. They are able to oxidize cholesterol, making it stick to blood vessel walls, where it can lead to heart attack or stroke. They can add to the severity of asthma attacks by causing airways to clamp down and close. They can increase the inflammation that occurs in osteoarthritis and rheumatoid arthritis and cause most of the joint damage that occurs in these conditions, and they can damage cells lining the colon, turning them into cancer cells. Fortunately, vitamin C and beta-carotene are very good at getting rid of these harmful molecules and can therefore prevent the damage they would otherwise cause. As a matter of fact, high intakes of vitamin C and beta-carotene have been shown in a number of scientific studies to reduce the risk of heart disease, reduce the airway spasm that occurs in asthma, reduce the risk of colon cancer, and alleviate some of the symptoms of osteoarthritis and rheumatoid arthritis. A cup of watermelon provides 24.3% of the daily value for vitamin

C, and, through its beta-carotene, 11.1% of the DV for vitamin A.

More on Watermelon's Lycopene:

Watermelon is also a very concentrated source of the carotenoid, lycopene. Well known for being abundant in tomatoes and particularly well absorbed from cooked tomato products containing a little fat such as olive oil, lycopene is also present in high amounts in watermelon and mangoes. Lycopene has been extensively studied for its antioxidant and cancer – preventing properties. In contrast to many other food phytonutrients, whose effects have only been studied in animals, lycopene has been repeatedly studied in humans and found to be protective against a growing list of cancers. These cancers now include prostate cancer, breast cancer, endometrial cancer, lung cancer and colorectal cancers.

A study published in the American Journal of Clinical Nutrition found that in patients with colorectal adenomas, a type of polyp that is the precursor for most colorectal cancers, blood levels of lycopene were 35% lower compared to study subjects with no polyps. Blood levels of beta – carotene also tended to be 25.5% lower, although according to researchers, this difference was not significant. In their final (multiple logistic regressions) analysis, only low levels of plasma lycopene (less than 70 microgram per liter) and smoking increased the likelihood of colorectal adenomas, but the increase in risk

was quite substantial: low levels of lycopene increased risk by 230% and smoking by 302%. The antioxidant function of lycopene, its ability to help protect cells and other structures in the body from oxygen damage has been linked in human research to prevention of heart disease. Protection of DNA (our genetic material) inside of white blood cells has also been shown to be an antioxidant role of lycopene.

Watermelon and Green Tea:

Watermelon and green tea works together to Prevent Prostate Cancer.

Choosing to regularly eat lycopene – rich fruits, such as watermelon, *and* drink green tea may greatly reduce a man's risk of developing prostate cancer, suggests research published the *Asia Pacific Journal of Clinical Nutrition* (Jian L, Lee AH, et al.)

In this case – control study involving 130 prostate cancer patients and 274 hospital controls, men drinking the most green tea were found to have an 86% reduced risk of prostate cancer compared, to those drinking the least.

A similar inverse association was found between the men's consumption of lycopene – rich fruits and vegetables such as tomatoes, apricots, pink grapefruit, watermelon, papaya, and guava. Men who most frequently enjoyed these foods were 82% less likely to

have prostate cancer compared to those consuming the least lycopene – rich foods.

Regular consumption of both green tea and foods rich in lycopene resulted in a synergistic protective effect, stronger than the protection afforded by either, the researchers also noted.

Practical Tips:

Get in the habit of drinking green tea and eating lycopene – rich foods such as watermelon.

1. Take a quart of iced green tea to work and sip throughout the day or take it to the gym to provide prostate protection while replenishing fluids after your workout.

2. Start your breakfast with a half grapefruit or a glass of papaya or guava juice.

3. For a great summer thirst-quencher, blend chunks of watermelon with a few ice cubes and a splash of lime juice. Serve with a fresh mint leaf.

4. Serve cooling watermelon chunks as a side dish to balance the flavor of spicy black beans or other fiery Mexican dishes.

Energy Production:

Watermelon is rich in the B vitamins necessary for energy production. Our food ranking system also qualified watermelon as a very good source of vitamin B6 and a good source of vitamin B1, magnesium, and potassium. Part of this high ranking was due to the higher nutrient richness of watermelon. Because this food has higher water content and lower calorie content than many other fruits (a whole cup of watermelon contains only 48 calories), it delivers more nutrients per calorie – an outstanding health benefit!

Protection against Macular Degeneration:

Your mother may have told you carrots would keep your eyes bright as a child, but as an adult, it looks like fruit is even more important for keeping your sight. Data reported in a study published in the *Archives of Ophthalmology* indicates that eating 3 or more servings of fruit per day may lower your risk of age – related macular degeneration (ARMD), the primary cause of vision loss in older adults, by 36%, compared to persons who consume less than 1.5 servings of fruit daily.

In this study, which involved over 110,000 women and men, researchers evaluated the effect of study

participants' consumption of fruits; vegetables; the antioxidant vitamins A, C, and E; and carotenoids on the development of early ARMD or neo vascular ARMD, a more severe form of the illness associated with vision loss. While, surprisingly, intakes of vegetables, antioxidant vitamins and carotenoids were not strongly related to incidence of either form of ARMD, fruit intake was definitely protective against the severe form of this vision-destroying disease. Three servings of fruit may sound like a lot to eat each day, but watermelon can help you reach this goal. What could be more delicious on a hot summer's day than a slice of sweet, refreshing watermelon? For a great summer drink, blend watermelon with a spoonful of honey and a splash of lemon or lime, then stir in seltzer water soda and decorate with a sprig of mint. If you did not experience the fun of a seed spitting contest as a child, it is not too late to introduce this summer ritual to your children or the child in you!

Arginine the essential amino acid:

Arginine is one of the constituents of protein with chemical formula: $C_6H_{14}N_4O_2$ it prevents Erectile Dysfunction, Lower Blood Pressure, and improves Insulin Sensitivity.

One more reason to enjoy watermelon before summer ends is its sweet, crunchy, cooling effect is exceptionally high in citrulline, an amino acid our bodies use to make

another amino acid, arginine, which is used in the urea cycle to remove ammonia from the body, and by the cells lining our blood vessels to make nitric oxide. Nitric oxide not only relaxes blood vessels, lowering high blood pressure, it is the compound whose production is enhanced by Viagra to prevent erectile dysfunction. Arginine has been shown to improve insulin sensitivity in obese type 2 diabetic patients with insulin resistance.

Am J Physiol Endocrinol Metab. 2006 Nov;291(5):E906-12.

In volunteers drinking three 8 – ounce glasses of watermelon juice each day for three weeks, blood levels of arginine (synthesized from citrulline provided by the watermelon) were 11% higher than in controls. Volunteers who drank six daily 8 – ounce glasses of watermelon juice for 3 weeks had arginine levels 18% higher than controls.

Nutrition. 2007 Mar; 23(3):261-6.

How to Select and Store:

The best way to choose a flavorful melon is to look at the color and quality of the flesh, which should be a deep color and absent from white streaks. If it features seeds, they should be deep in color.

Most of the times, however, we do not have this liberty when purchasing watermelon since it is more common to

buy a whole, uncut fruit. When choosing a whole watermelon, look for one that is **heavy for its size** with a **rind that is relatively smooth** and that is **neither overly shiny nor overly dull**. In addition, one side of the melon should have an area that is distinct in color from the rest of the rind, **displaying a yellowish or creamy tone.** This is the underbelly, the place that was resting on the ground during ripening, and if the fruit does not have this marking, it may have been harvested prematurely, which will negatively affect its taste, texture and juiciness.

For the most antioxidants, choose fully ripened watermelon:

Research conducted at the University of Innsbruck in Austria suggests that as fruits fully ripen, almost to the point of spoilage, their antioxidant levels actually increase.

Key to the process is the change in color that occurs as fruits ripen, a similar process to that seen in the fall when leaves turn from green to red to yellow to brown - a color change caused by the breakdown and disappearance of chlorophyll, which gives leaves and fruits their green color.

Until now, no one really knew what happened to chlorophyll during this process, but lead researcher, Bernard Kräutler, and his team, working together with botanists over the past several years, has identified the first decomposition products in leaves: colorless, polar

NCCs (Nonfluorescing Chlorophyll Catabolytes) that contain four pyrrole rings - like chlorophyll and heme.

After examining apples and pears, the scientists discovered that NCCs replace the chlorophyll not only in the leaves of fruit trees, but in their very ripe fruits, especially in the peel and flesh immediately below it.

'When chlorophyll is released from its protein complexes in the decomposition process, it has a phototoxic effect: when irradiated with light, it absorbs energy and can transfer it to other substances. For example, it can transform oxygen into a highly reactive, destructive form,' report the researchers. However, NCCs have just the opposite effect. Extremely powerful antioxidants, they play an important protective role for the plant, and when consumed as part of the human diet, NCCs deliver the same potent antioxidant protection within our bodies.

Angew Chem Int Ed Engl. 2007 Nov 19;46(45):8699-8702.

The quantity of carotenoids from watermelon, particularly lycopene and beta – carotene, *increases* if this melon is stored at room temperature, indicates a recent U.S. Department of Agriculture study published in the *Journal of Agricultural and Food Chemistry*.

Recent studies have linked lycopene to reducing the risk of prostate cancer and lowering inflammation that may cause hypertension and heart disease. A 180 gram (6.3 ounce) serving of watermelon is said to provide between

8 and 20 mg of lycopene, making it a rich source of the carotenoid.

The USDA research looked at the effect of storage on the carotenoid levels of three types of watermelon (open - pollinated seeded, hybrid seeded, and seedless) at 41°F(5°C), 55.4°F(13°C), and 69.8F(21°C) for 14 days.

Carotenoid levels increased in watermelons stored at 69.8°F (21°C). Compared to fresh fruit, watermelons stored at this temperature gained between 11-40% in lycopene, and beta-carotene content increased by between 50-139%. Fruit stored at 41°F (5°C) and 55.4°F(13°C), however, showed only very small changes in carotenoid content.

'The increased lycopene and beta – carotene contents of fruit held at 69.8 degrees Fahrenheit, but not at 55.4 or 41 degrees, indicate temperature sensitivity and enhancement of carotenoid pathway enzymes in watermelon,' wrote the researchers.

Lycopene is produced by increased conversion of Geranyl -Geranyl Diphosphate (GGPP) to phytoene by the enzyme, phytoene synthsase, which is then turned into lycopene by the enzyme, phytoene desaturase. So, increase the lycopene and beta – carotene your watermelon delivers by storing it at room temperature.

Yet, once cut, watermelons should be refrigerated in order to best preserve their freshness, taste and juiciness.

If the whole watermelon does not fit in your refrigerator, cut it into pieces (as few as possible), and cover them with plastic wrap to prevent them from becoming dried out and from absorbing the odors of other foods.

Tips for Preparing Watermelon:

Wash the watermelon before cutting it. Due to its large size, you will probably not be able to run it under water in the sink. Instead, wash it with a wet cloth or paper towel.

Depending upon the size that you desire, there are many ways to cut a watermelon. The flesh can be sliced, cubed or scooped into balls. Watermelon is delicious to eat as is, while it also makes a delightful addition to a fruit salad. Jam, sorbet and juice are some nutritious and delicious things you can make with watermelon.

While many people are just accustomed to eating the juicy flesh of the watermelon, both the seeds and the rind are also edible. If you choose to eat the rind, we would highly suggest purchasing organic watermelon.

A Few Quick Serving Recipes:

Purée watermelon, cantaloupe and kiwi together swirl in a little plain yogurt and serve as refreshing cold soup.

In Asian countries, roasted watermelon seeds are either seasoned and eaten as a snack food or ground up into cereal and used to make bread.

A featured item of Southern American cooking, the rind of watermelon can be marinated, pickled or candied.
Watermelon mixed with thinly sliced red onion, salt and black pepper makes a great summer salad.

Watermelon is a wonderful addition to fruit salad.

And fruit salad can be made days ahead since cut fruit, if chilled, retains its nutrients for at least 6 days.

It has been thought that cut fruit rapidly degrades, so fruit salad, which can take 15 minutes to prepare, would have to be freshly prepared to be good.

Now, a study published in the *Journal of Agricultural and Food Chemistry* has found that minimal processing of fruit – cutting, packaging and chilling does not significantly affect its nutritional content even after 6, and up to 9, days. This is great news for all who enjoy delicious, colorful fresh fruit salad and who does not since it is a perfect addition to any meal and makes a great snack or dessert?

Researchers cut up pineapples, mangoes, cantaloupes, watermelons, strawberries and kiwi fruit. The freshly cut fruits were then rinsed in water, dried, packaged in clamshells (not gastight) and stored at 41°F(5°C).

After 6 days, losses in vitamin C were less than 5% in the watermelon, mango, and strawberry pieces, 10% in pineapple pieces, 12% in kiwifruit slices, and 25% in cantaloupe cubes.

No losses in carotenoids were found in the watermelon cubes and kiwifruit slices. Pineapples lost 25%, followed by 10-15% in cantaloupe, mango, and strawberry pieces.

No significant losses in phenolic phytonutrients were found in any of the fresh – cut fruit products.

Contrary to expectations, it was clear that minimal processing had almost no effect on the main antioxidant constituents. The changes in nutrient antioxidants observed during nine days at five degrees Celsius would not significantly affect the nutrient quality of fresh cut fruit. In general, fresh-cut fruits visually spoil before any significant nutrient loss occurs," wrote lead researcher Maria Gil. In practical terms, this means that you can prepare a large bowl of fruit salad containing watermelon on the weekend, store it in the refrigerator, and enjoy it all week, receiving almost all the nutritional benefits of just prepared fruit salad. Before cutting up your watermelon, however, don't forget to store it at room temperature to maximize its carotenoid content (see Select and Store tips above).

Individual Concerns:

Watermelon is not a commonly allergenic food, is not known to contain measurable amounts of oxalates or purines and is also not included in the Environmental Working Group's 2009 report 'Shopper's Guide to Pesticides' as one of the 12 foods most frequently containing pesticide residues.

Nutritional Profile:

Watermelon is an excellent source of vitamin C. It is also a very good source of vitamin A and vitamin B6. In addition, watermelon is a good source of thiamin, potassium and magnesium.

For an in – depth nutritional profile click here: Watermelon.

In addition to the nutrients highlighted in our ratings chart, an in-depth nutritional profile for Watermelon is also available. This profile includes information on a full array of nutrients, including carbohydrates, sugar, soluble and insoluble fiber, sodium, vitamins, minerals, fatty acids, amino acids and more.

Food Rating System Chart:

In order to better help you identify foods that feature a high concentration of nutrients for the calories they contain, we created a Food Rating System. This system allows us to highlight the foods that are especially rich in particular nutrients. The following chart shows the nutrients for which this food is either an excellent, very good, or good source (below the chart you will find a table that explains these qualifications). If a nutrient is not listed in the chart, it does not necessarily mean that the food doesn't contain it. It simply means that the nutrient is not provided in a sufficient amount or concentration to meet our rating criteria. (To view this food's in – depth nutritional profile that includes values for dozens of nutrients not just the ones rated as excellent, very good, or good use the link below the chart.) To read this chart accurately, you will need to glance up in the top left corner where you will find the name of the food and the serving size we used to calculate the food's nutrient composition. This serving size will tell you how much of the food you need to eat to obtain the amount of nutrients found in the chart. Now, returning to the chart itself, you can look next to the nutrient name in order to find the nutrient amount it offers, the percent Daily Value (DV%) that this amount represents, the nutrient density that we calculated for this food and nutrient, and the rating we established in our rating system. For most of our nutrient ratings, we adopted the government standards for food labeling that are found in the U.S. Food and Drug

Administration's 'Reference Values for Nutrition Labeling.'

Read more background information and details of our rating system.

Watermelon,diced **1.00cup** **152.00grams** **48.64 calories**				
Nutrient	**Amount**	**DV (%)**	**Nutrient Density**	**World's Food ratings**
vitamin C	14.59 mg	24.3	9.0	excellent
vitamin A	556.32 IU	11.1	4.1	very good
vitamin B6 (pyridoxine)	0.22 mg	11.0	4.1	very good
vitamin B1 (thiamin)	0.12 mg	8.0	3.0	good
potassium	176.32 mg	5.0	1.9	good
magnesium	16.72	4.	1.5	good

	mg	2		

World's Healthiest Foods Rating	**Rule**				
excellent	DV>=75 %	OR	Density>=7.6	AND	DV>=10 %
very good	DV>=50 %	OR	Density>=3.4	AND	DV>=5%
good	DV>=25 %	OR	Density>=1.5	AND	DV>=2.5 %

In - Depth Nutritional Profile for Watermelon

Health Benefits:

Watermelon is not only great on a hot summer day, this delectable thirst – quencher may also help quench the inflammation that contributes to conditions like asthma, atherosclerosis, diabetes, colon cancer, and arthritis.

Concentrated in Powerful Antioxidants:

Sweet, juicy watermelon is actually packed with some of the most important antioxidants in nature. Watermelon is an excellent source of vitamin C and a very good source of vitamin A, notably through its concentration of beta –

carotene. Pink watermelon is also a source of the potent carotenoid antioxidant, lycopene. These powerful antioxidants travel through the body neutralizing free radicals. Free radicals are substances in the body that can cause a great deal of damage. They are able to oxidize cholesterol, making it stick to blood vessel walls, where it can lead to heart attack or stroke. They can add to the severity of asthma attacks by causing airways to clamp down and close. They can increase the inflammation that occurs in osteoarthritis and rheumatoid arthritis and cause most of the joint damage that occurs in these conditions, and they can damage cells lining the colon, turning them into cancer cells. Fortunately, vitamin C and beta – carotene are very good at getting rid of these harmful molecules and can therefore prevent the damage they would otherwise cause. As a matter of fact, high intakes of vitamin C and beta-carotene have been shown in a number of scientific studies to reduce the risk of heart disease, reduce the airway spasm that occurs in asthma, reduce the risk of colon cancer, and alleviate some of the symptoms of osteoarthritis and rheumatoid arthritis. A cup of watermelon provides 24.3% of the daily value for vitamin C, and, through its beta – carotene, 11.1% of the DV for vitamin A.

References:

1. Cho E, Seddon JM, Rosner B, Willett WC, Hankinson SE. Prospective study of intake of fruits, vegetables, vitamins, and carotenoids and risk of age-related maculopathy. Arch Ophthalmol. 2004 Jun; 122(6):883-92. 2004. PMID: 15197064.

2. Collins JK, Wu G, Perkins-Veazie P, Spears K, Claypool PL, Baker RA, Clevidence BA. Watermelon consumption increases plasma arginine concentrations in adults. Nutrition. 2007 Mar;23(3):261-6. 2007. PMID: 17352962.
3. Edwards AJ, Vinyard BT, Wiley ER et al. Consumption of watermelon juice increases plasma concentrations of lycopene and beta-carotene in humans. J Nutr 2003 Apr;133(4):1043-50 2003.
4. Ensminger AH, Ensminger, ME, Kondale JE, Robson JRK. Foods & Nutriton Encyclopedia. Pegus Press, Clovis, California 1983.
5. Ensminger AH, Esminger M. K. J. e. al. Food for Health: A Nutrition Encyclopedia. Clovis, California: Pegus Press; 1986 1986. PMID: 15210.
6. Erhardt JG, Meisner C, Bode JC, Bode C. Lycopene, beta-carotene, and colorectal adenomas. Am J Clin Nutr. 2003 Dec;78(6): 1219-24. 2003.
7. Fortin, Francois, Editorial Director. The Visual Foods Encyclopedia. Macmillan, New York 1996.
8. Gil MI, Aguayo E, Kader AA. Quality changes and nutrient retention in fresh-cut versus whole fruits during storage. J Agric Food Chem. 2006 Jun 14; 54(12):4284-96. 2006. PMID:16756358.
9. Jian L, Lee AH, Binns CW. Tea and lycopene protect against prostate cancer. Asia Pac J Clin Nutr. 2007;16 Suppl 1:453-7. 2007. PMID: 17392149.
10. Lucotti P, Setola E, Monti LD, Galluccio E, Costa S, Sandoli EP, Fermo I, Rabaiotti G, Gatti R, Piatti P. Beneficial effects of a long-term oral L-arginine treatment added to a hypocaloric diet and exercise training program in obese, insulin-resistant type 2 diabetic patients. Am J Physiol Endocrinol Metab. 2006 Nov;291(5):E906-12. Epub 2006 Jun 13. 2006. PMID: 16772327.
11. Perkins-Veazie P, Collins JK. Carotenoid changes of intact watermelons after storage. J Agric Food Chem. 2006 Aug 9; 54(16): 5868-74. 2006. PMID: 16881688.
12. Wood, Rebecca. The Whole Foods Encyclopedia. New York, NY: Prentice-Hall Press; 1988 1988. PMID: 15220.

Papaya

Top awards for vitamin C. They are the clear winners for their high vitamin C content. Guava is also rich in fiber, which helps prevent constipation. Papaya is rich in carotene; this is good for your eyes.

The papaya, Carica papaya L., is a member of the small family Caricaceae allied to the Passifloraceae. As a dual- or multi-purpose, early-bearing, space-conserving, herbaceous crop, it is widely acclaimed, despite its susceptibility to natural enemies.

In some parts of the world, especially Australia and some islands of the West Indies, it is known as papaw, or pawpaw, names which are better limited to the very different, mainly wild Asimina triloba Dunal, belonging to the Annonaceae. While the name papaya is widely recognized, it has been corrupted to kapaya, kepaya, lapaya or tapaya in southern Asia and the East Indies. In French, it is papaye (the fruit) and papayer (the plant), or sometimes figuier des Iles. Spanish-speaking people employ the names melón zapote, lechosa, payaya (fruit), papayo or papayero (the plant), fruta bomba, mamón or mamona, depending on the country. In Brazil, the usual name is mamao. When first encountered by Europeans it was quite naturally nicknamed 'tree melon'.

Origin and Distribution:

Though the exact area of origin is unknown, the papaya is believed native to tropical America, perhaps in southern Mexico and neighboring Central America. It is recorded that seeds were taken to Panama and then the Dominican Republic before 1525 and cultivation spread to warm elevations throughout South and Central America, southern Mexico, the West Indies and Bahamas, and to Bermuda in 1616. Spaniards carried seeds to the Philippines about 1550 and the papaya traveled from there to Malacca and India. Seeds were sent from India to Naples in 1626. Now the papaya is familiar in nearly all tropical regions of the Old World and the Pacific Islands and has become naturalized in many areas. Seeds were

probably brought to Florida from the Bahamas. Up to about 1959, the papaya was commonly grown in southern and central Florida in home gardens and on a small commercial scale. Thereafter, natural enemies seriously reduced the plantings. There was a similar decline in Puerto Rico about 10 years prior to the setback of the industry in Florida. While isolated plants and a few commercial plots may be fruitful and long-lived, plants in some fields may reach 5 or 6 ft, yield one picking of undersized and misshapen fruits and then are so affected by virus and other diseases that they must be destroyed.

In the 1950's an Italian entrepreneur, Albert Santo, imported papayas into Miami by air from Santa Marta, Colombia, Puerto Rico and Cuba for sale locally as well as shipping fresh to New York, and he also processed quantities into juice or preserves in his own Miami factory.

Since there is no longer such importation, there is a severe shortage of papayas in Florida. The influx of Latin American residents has increased the demand and new growers are trying to fill it with relatively virus-resistant strains selected by the University of Florida Agricultural Research and Education Center in Homestead.
Successful commercial production today is primarily in Hawaii, tropical Africa, the Philippines, India, Ceylon, Malaya and Australia, apart from the widespread but smaller scale production in South Africa, and Latin America.

Annual papaya consumption in Hawaii is 15 lbs (6.8 kg) per capita, yet 26 million lbs (11,838,700 kg) of fresh fruits were shipped by air freight to mainland USA in 1974, mainly direct from Hilo or via Honolulu.

Puerto Rican production does not meet the local demand and fruits are imported from the Dominican Republic for processing.

The papaya is one of the leading fruits of southern Mexico and 40% of that country's crop is produced in the state of Veracruz on 14,800 acres (6,000 ha) yielding 120,000 tons annually.

Fruits from bisexual plants are usually cylindrical with small seed cavity and thick wall of firm flesh which stands handling and shipping well. In contrast, fruits from female flowers are nearly round or oval and thin-walled. In some areas, bisexual types are in greatest demand. In South Africa, round or oval papayas are preferred.

Adaptation:

Papayas have exacting climate requirements for vigorous growth and fruit production. They must have warmth throughout the year and will be damaged by light frosts. Brief exposure to 32° F is damaging and prolonged cold without overhead sprinkling will kill the plants. Cold, wet soil is almost always lethal. Cool temperatures will also

alter fruit flavor. Papayas make excellent container and greenhouse specimens where soil moisture and temperature can be moderated.

Description:

The papaya is a short – lived, fast – growing, woody, large herb to 10 or 12 feet in height. It generally branches only when injured. All parts contain latex. The hollow green or deep purple trunk is straight and cylindrical with prominent leaf scars. Its diameter may be from 2 or 3 inches to over a foot at the base.

The leaves emerge directly from the upper part of the stem in a spiral on nearly horizontal petioles 1 to 3-1/2 feet long. The blade, deeply divided into 5 to 9 main segments, varies from 1 to 2 feet in width, and has prominent yellowish ribs and veins. The life of a leaf is 4 to 6 months.

The five – petalled flowers are fleshy, waxy and slightly fragrant. Some plants bear only short – stalked female flowers or bisexual (perfect) flowers also on short stalks, while others may bear only male flowers, clustered on panicles 5 or 6 feet long. Some plants may have both male and female flowers. Others at certain seasons produce short – stalked male flowers, at other times perfect flowers. This change of sex may occur temporarily during high temperatures in midsummer. Male or bisexual plants may change completely to female plants after being

beheaded. Certain varieties have a propensity for producing certain types of flowers. For example, the Solo variety has flowers of both sexes 66% of the time, so two out of three plants will produce fruit, even if planted singly. How pollination takes place in papayas is not known with certainty. Wind is probably the main agent, as the pollen is light and abundant, but trips and moths may assist. Hand pollination is sometimes necessary to get a proper fruit set.

There are two types of papayas, Hawaiian and Mexican. The Hawaiian varieties are the papayas commonly found in supermarkets. These, pear – shaped fruit generally weigh about 1 pound and have yellow skin when ripe. The flesh is bright orange or pinkish, depending on variety, with small black seeds clustered in the center. Hawaiian papayas are easier to harvest because the plants seldom grow taller than 8 feet. Mexican papayas are much larger than the Hawaiian types and may weigh up to 10 pounds and be more than 15 inches long. The flesh may be yellow, orange or pink. The flavor is less intense than that the Hawaiian papaya but still is

delicious and extremely enjoyable. They are slightly easier to grow than Hawaiian papayas. A properly ripened papaya is juicy, sweetish and somewhat like a cantaloupe in flavor, although musky in some types. The fruit (and leaves) contain papain which helps digestion and is used to tenderize meat as well. The edible seeds have a spicy flavor somewhat reminiscent of black pepper.

Culture:

Papayas like to be warm with both sunshine and reflected heat, so the hottest place against the house where nothing else seems happy is an ideal location. They also like to be as free from wind as possible, although this is not as critical as their need for sun. Papayas can be grown successfully in shade, but the fruit is rarely sweet. They are best planted in mounds or against the foundation of a building where water can be controlled.

Papayas need a light, well – drained soil. They are easily killed by excess moisture. The soil needs to be moist in hot weather and dry in cold weather. Since this is the opposite of California's rain pattern, in addition to good drainage, plastic coverings to prevent over – wetting in winter may also be worthwhile. Papayas do not tolerate salty water or soil.

Watering is the most critical aspect in raising papayas. The plants should be kept on to the dry side to avoid root

rot, but also need enough water to support their large leaves. In winter the plant prefers to remain as dry as possible. A plant that has been injured by frost is particularly susceptible to root rot.

The fast – growing papaya requires regular applications of nitrogen fertilizers but the exact rates have not been established. Feed monthly and adjust according to the plant's response. They can take fairly hot organic fertilizing such as chicken manure if used with deep irrigation after warm weather has started. Phosphorus deficiency causes dark green foliage with a reddish – purple discoloration of leaf veins and stalks.

Papayas do not need to be pruned, but some growers pinch the seedlings or cut back established plants to encourage multiple trunks.

Papayas need warmth and a frost – free environment, but can often withstand light freezes with some kind of overhead protection. This can be provided by building a frame around the plants and covering it with bedding, plastic sheeting, etc. when frost threatens. Electric light bulbs can also be used for added warmth. Potted specimens can be moved to a frost – secure area. Prolonged cold, even if it does not freeze, may adversely affect the plants and the fruit. Mexican papayas are hardier than Hawaiian varieties.

Papayas are normally propagated by seed. To start a plant, extract the seeds from ripe papayas and wash them

to remove the gelatinous covering. They are then dried; dusted with a fungicide and planted as soon as possible (the seeds lose their viability rapidly in storage). Plant the seeds in warm (80° F), sterile potting mix. Seeds should be planted in sterile soil as young papaya seedlings have a high mortality rate from damping off. Potting soil can be sterilized by mixing 50-50 with vermiculite and placing in an oven at 200° F for one hour. Under ideal conditions the seeds may germinate in about two weeks, but may take three to five weeks. Gibberellic acid can be used to speed up germination in some seasons. Seedlings usually begin flowering 9 - 12 months after they germinate.

Seedling papayas do not transplant well. Plant them in large containers so the seedlings will have to be transplanted only once, when they go into the ground. Transplant carefully, making sure not to damage the root ball. To prevent damping off, drench the potting mix with a fungicide containing benomyl or captan. Set the plants a little high to allow for settling. Plastic mulch will help keep the soil warm and dry in wet winter areas, but remove it as soon as the weather becomes warm. One has to plant at least three or four plants to be sure of having females or plant hermaphroditic ones.

Thrips, mites and white flies as well as in red spider and fruit spotting bugs are potential problems in some areas. The plants may also be attacked by mildew, anthracnose, root rot and various virus diseases Fruit flies often ruin the fruit in Florida and Hawaii. Nematodes can attack the roots and are often a factor in the decline of individual

plant. Gopher damage can be avoided by planting in wire baskets. Papaya plants should probably be replaced every 4 years or so.

Papayas are ready to harvest when most of the skin is yellow-green. After several days of ripening at room temperature, they will be almost fully yellow and slightly soft to the touch. Dark green fruit will not ripen properly off the tree, even though it may turn yellow on the outside. Mature fruit can be stored at 45° F for about 3 weeks. Papayas are often sliced and eaten by themselves or served with a myriad of other foods. They can also be cooked to make chutney or various desserts. Green papayas should not be eaten raw because of the latex they contain, although they are frequently boiled and eaten as a vegetable. In the West Indies, young leaves are cooked and eaten like spinach. In India, seeds are sometimes used as an adulterant in whole black pepper.

Papayas, raw, 1 cup cubes

Nutrient	Units	1.00 X 1 cup, cubes ------- 140g
Proximates		
Water	g	124.36
Energy	kcal	55
Energy	kj	228
Protein	g	0.85
Total lipid (fat)	g	0.20
Ash	g	0.85

Carbohydrate, by difference	g	13.73
Fiber, total dietary	g	2.5
Sugars, total	g	8.26
Minerals		
Calcium, Ca	mg	34
Iron, Fe	mg	0.14
Magnesium, Mg	mg	14
Phosphorus, P	mg	7
Potassium, K	mg	360
Sodium, Na	mg	4
Zinc, Zn	mg	0.10
Copper, Cu	mg	0.022
Manganese, Mn	mg	0.015
Selenium, Se	mcg	0.8
Vitamins		
Vitamin C, total ascorbic acid	mg	86.5
Thiamin	mg	0.038
Riboflavin	mg	0.045
Niacin	mg	0.473
Pantothenic acid	mg	0.305
Vitamin B-6	mg	0.027
Folate, total	mcg	53
Folic acid	mcg	0
Folate, food	mcg	53
Folate, DFE	mcg_DFE	53
Vitamin B-12	mcg	0.00

Vitamin B-12, added	mcg	0.00
Vitamin A, IU	IU	1532
Vitamin A, RAE	mcg_RAE	77
Retinol	mcg	0
Vitamin E (alpha-tocopherol)	mg	1.02
Vitamin E, added	mg	0.00
Vitamin K (phylloquinone)	mcg	3.6
Lipids		
Fatty acids, total saturated	g	0.060
4:0	g	0.000
6:0	g	0.000
8:0	g	0.000
10:0	g	0.000
12:0	g	0.001
14:0	g	0.010
16:0	g	0.045
18:0	g	0.003
Fatty acids, total monounsaturated	g	0.053
16:1 undifferentiated	g	0.028
18:1 undifferentiated	g	0.025
20:1	g	0.000
22:1 undifferentiated	g	0.000
Fatty acids, total polyunsaturated	g	0.043
18:2 undifferentiated	g	0.008

18:3 undifferentiated	g	0.035
18:4	g	0.000
20:4 undifferentiated	g	0.000
20:5 n-3	g	0.000
22:5 n-3	g	0.000
22:6 n-3	g	0.000
Cholesterol	mg	0
Amino acids		
Tryptophan	g	0.011
Threonine	g	0.015
Isoleucine	g	0.011
Leucine	g	0.022
Lysine	g	0.035
Methionine	g	0.003
Phenylalanine	g	0.013
Tyrosine	g	0.007
Valine	g	0.014
Arginine	g	0.014
Histidine	g	0.007
Alanine	g	0.020
Aspartic acid	g	0.069
Glutamic acid	g	0.046
Glycine	g	0.025
Proline	g	0.014
Serine	g	0.021
Other		

Alcohol, ethyl	g	0.0
Caffeine	mg	0
Theobromine	mg	0
Carotene, beta	mcg	386
Carotene, alpha	mcg	0
Cryptoxanthin, beta	mcg	1065
Lycopene **(1)**	mcg	0
Lutein + zeaxanthin	mcg	105

USDA National Nutrient Database for Standard Reference, Release 18 (2005)

Uses:

Ripe papayas are most commonly eaten fresh, merely peeled, seeded, cut in wedges and served with a half or quarter of lime or lemon. Sometimes a few seeds are left attached for those who enjoy their peppery flavor but not many should be eaten. The flesh is often cubed or shaped into balls and served in fruit salad or fruit cup. Firm – ripe papaya may be seasoned and baked for consumption as a vegetable. Ripe flesh is commonly made into sauce for shortcake or ice cream sundaes, or is added to ice cream just before freezing; or is cooked in pie, pickled, or preserved as marmalade or jam. Papaya and pineapple cubes, covered with sugar sirup, may be quick-frozen for later serving as dessert. Half-ripe fruits are sliced and crystallized as a sweetmeat.

Papaya juice and nectar may be prepared from peeled or unpeeled fruit and are sold fresh in bottles or canned. In Hawaii, papayas are reduced to puree with sucrose added to retard gelling and the puree is frozen for later use locally or in mainland USA in fruit juice blending or for making jam.

Unripe papaya is never eaten raw because of its latex content. [Raw green papaya is frequently used in Thai and Vietnamese cooking.] Even for use in salads, it must first be peeled, seeded, and boiled until tender, then chilled. Green papaya is frequently boiled and served as a vegetable. Cubed green papaya is cooked in mixed vegetable soup. Green papaya is commonly canned in sugar syrup in Puerto Rico for local consumption and for export. Green papayas for canning in Queensland must be checked for nitrate levels. High nitrate content causes detaining of ordinary cans, and all papayas with over 30 ppm nitrate must be packed in cans lacquered on the inside. Australian growers are hopeful that the papaya can be bred for low nitrate uptake.

A lye process for batch peeling of green papayas has proven feasible in Puerto Rico. The fruits may be immersed in boiling 10% lye solution for 6 minutes, in a 15% solution for 4 minutes, or a 20% solution for 3 minutes. They are then rapidly cooled by a cold water bath and then sprayed with water to remove all softened tissue. Best proportions are 1 lb (.45 kg) of fruit for every gallon (3.8 liters) of solution.

Young leaves are cooked and eaten like spinach in the East Indies. Mature leaves are bitter and must be boiled with a change of water to eliminate much of the bitterness. Papaya leaves contain the bitter alkaloids; carpaine and pseudocarpaine, which act on the heart and respiration like digitalis, but are destroyed by heat.

In India, **papaya seeds** are sometimes found as an adulterant of whole black pepper. Collaborating chemists in Italy and Somalia identified 18 amino acids in papaya seeds, principally, in descending order of abundance, glutamic acid, arginine, proline, and aspartic acid in the endosperm; and proline, tyrosine, lysine, aspartic acid, and glutamic acid in the sarcotesta. A yellow to brown, faintly scented oil was extracted from the sundried, powdered seeds of unripe papayas at the Central Food Technological Research Institute, Mysore, India. White seeds yielded 16.1% and black seeds 26.8% oil and it was suggested that the oil might have edible and industrial uses.

Food Value:

The papaya is regarded as a fair source of iron and calcium; a good source of vitamins A, B and G and an excellent source of vitamin C (ascorbic acid). The following figures represent the minimum and maximum levels of constituents as reported from Central America and Cuba.

Food Value Per 100 g of Edible Portion

	Fruit	*Leaves**
Calories	23.1-25.8	
Moisture	85.9-92.6 g	83.3%
Protein	.081-.34 g	5.6%
Fat	.05-.96 g	0.4%
Carbohydrates	6.17-6.75 g	8.3%
Crude Fiber	0.5-1.3 g	1.0%
Ash	.31-.66 g	1.4%
Calcium	12.9-40.8 mg	0.406% (CO)
Phosphorus	5.3-22.0 mg	
Iron	0.25-0.78 mg	0.00636%
Carotene	.0045-.676 mg	28,900 I.U.
Thiamine	.021-.036 mg	
Riboflavin	.024-058 mg	
Niacin	.227-555 mg	
Ascorbic Acid	35.5-71.3 mg	38.6%
Tryptophan	4-5 mg	
Methionine	1 mg	
Lysine	15-16 mg	
Magnesium		0.035%
Phosphoric Acid		0.225%

*Analyses made in Malaya.

Papain:

The latex of the papaya plant and its green fruits contains two proteolytic enzymes, papain and chymopapain. The latter is most abundant but papain is twice as potent. In 1933, Ceylon (Sri Lanka) was the leading commercial source of papain but it has been surpassed by East Africa where large-scale production began in 1937.

The latex is obtained by making incisions on the surface of the green fruits early in the morning and repeating every 4 or 5 days until the latex ceases to flow. The tool is of bone, glass, sharp-edged bamboo or stainless steel (knife or raxor blade). Ordinary steel stains the latex. Tappers hold a coconut shell, clay cup, or glass, porcelain or enamel pan beneath the fruit to catch the latex, or a container like an "inverted umbrella" is clamped around the stem. The latex coagulates quickly and, for best results, is spread on fabric and oven-dried at a low temperature, then ground to powder and packed in tins. Sun-drying tends to discolor the product. One must tap 1,500 average-size fruits to gain 1 1/2 lbs (0.68 kg) of papain.

The lanced fruits may be allowed to ripen and can be eaten locally, or they can be employed for making dried papaya "leather" or powdered papaya, or may be utilized as a source of pectin.

Because of its papain content, a piece of green papaya can be rubbed on a portion of tough meat to tenderize it. Sometimes a chunk of green papaya is cooked with meat for the same purpose.

One of the best known uses of papain is in commercial products marketed as meat tenderizers, especially for home use. A modern development is the injection of papain into beef cattle a half-hour before slaughtering to tenderize more of the meat than would normally be tender. Papain-treated meat should never be eaten "rare" but should be cooked sufficiently to inactivate the enzyme. The tongue, liver and kidneys of injected animals must be consumed quickly after cooking or utilized immediately in food or feed products, as they are highly perishable.

Papain has many other practical applications. It is used to clarify beer, also to treat wool and silk before dyeing, to de-hair hides before tanning, and it serves as an adjunct in rubber manufacturing. It is applied on tuna liver before extraction of the oil which is thereby made richer in vitamins A and D, It enters into toothpastes, cosmetics and detergents, as well as pharmaceutical preparations to aid digestion.

Papain has been employed to treat ulcers, dissolve membranes in diphtheria, and reduce swelling, fever and adhesions after surgery. With considerable risk, it has been applied on meat impacted in the gullet. Chemopapain is sometimes injected in cases of slipped

spinal discs or pinched nerves. Precautions should be taken because some individuals are allergic to papain in any form and even to meat tenderized with papain.

Folk Uses:

In tropical folk medicine, the fresh latex is smeared on boils, warts and freckles and given as a vermifuge. In India, it is applied on the uterus as an irritant to cause abortion. The unripe fruit is sometimes hazardously ingested to achieve abortion. Seeds, too, may bring on abortion. They are often taken as an emmenagogue and given as a vermifuge. The root is ground to a paste with salt, diluted with water and given as an enema to induce abortion. A root decoction is claimed to expel roundworms. Roots are also used to make salt.

Crushed leaves wrapped around tough meat will tenderize it overnight. The leaf also functions as a vermifuge and as a primitive soap substitute in laundering. Dried leaves have been smoked to relieve asthma or as a tobacco substitute. Packages of dried, pulverized leaves are sold by "health food" stores for making tea, despite the fact that the leaf decoction is administered as a purgative for horses in Ghana and in the Ivory Coast it is a treatment for genito-urinary ailments. The dried leaf infusion is taken for stomach troubles in Ghana and they say it is purgative and may cause abortion.

Antibiotic Activity:

Studies at the University of Nigeria have revealed that extracts of ripe and unripe papaya fruits and of the seeds are active against gram-positive bacteria. Strong doses are effective against gram-negative bacteria. The substance has protein-like properties. The fresh crushed seeds yield the aglycone of glucotropaeolin benzyl isothiocyanate (BITC) which is bacteriostatic, bactericidal and fungicidal. A single effective does is 4-5 g seeds (25-30 mg BITC).

In a London hospital in 1977, a post-operative infection in a kidney-transplant patient was cured by strips of papaya which were laid on the wound and left for 48 hours, after all modern medications had failed.

Papaya Allergy:

Mention has already been made of skin irritation in papaya harvesters because of the action of fresh papaya latex, and of the possible hazard of consuming undercooked meat tenderized with papain. It must be added that the pollen of papaya flowers has induced severe respiratory reactions in sensitive individuals. Thereafter, such people react to contact with any part of the plant and to eating ripe papaya or any food containing papaya, or meat tenderized with papain.

Guava

The fruit are not only relished by humans, but by many mammals and birds as well. The spread of introduced guavas owes much to this fact, as animals will eat the fruit and disperse the seeds in their droppings.

Guavas are primarily self – fruitful, although some strains seem to produce more fruit when cross – pollinated with another variety. Guavas can bloom throughout the year in mild-winter areas, but the heaviest bloom occurs with the onset of warm weather in the spring. The exact time can vary from year to year depending on weather. The chief pollinator of guavas is the honeybee.

Common Names:

Guava, guyava, kuawa, and Hindi name 'Amrood.' Another term for guavas is 'pera' or variants thereof. It is common around the western Indian Ocean and probably derives from Spanish or Portuguese, which means 'pear', or from some language of southern India, though it is so widespread in the region that its origin cannot be clearly discerned anymore. 'Pera' itself is used in Malayalam, Sinhala and Swahili. In Marathi it is 'peru', in Bengali 'pearah', in Kannada it is 'pearaley', and in Dhivehi 'feyru'.

In northern India and Southeast Asia, there are some other names for guavas which have a more limited use. These include. 'Jaama' is used in Telugu, 'jaamba' (in addition to peru) in Marathi, 'jambu' or 'jambu batu' in Indonesian and Malay, and 'jhamruk or jaamfal' in Gujarati. Note that 'jambu or jumbu' may also refer to Syzygium fruit (rose apples or water apples).

The more widespread name for guavas in Northern India is 'jaam' (used in Farsi, Hindi, Punjabi and Urdu) 'amrood'

(used in Farsi, Hindi, Punjabi and Urdu as an alternative to jaam), 'bihi' (used in some Central Indian dialects of Hindi), 'rhuni' in Bhojpuri , 'da-bike' (Khmer), ổi (Vietnamese), paṫ-á (Min Nan), peguulli (Oriya), fa-rang (Thai), sii-da (Lao) and seebe kayi (Kannada). In Assam (India), it is known as "Modhuri Aam" in Assamese & the fruit is very popular. In Sri Lanka it is known as Pera. In Nepal, specially in Kathmandu, guava is called Amba and in newari Amasi.

Related species:

There are several varieties of Guava. The important ones are. Brazilian guava, Guisaro (*Psidium guinense* Sw.), Cattley Guava, Strawberry Guava (*P. cattleianum* Sabine), Costa Rican Guava (*P. friedrichsthalianum* Ndz.), Para Guava (*P. acutangulum* DC.), Rumberry, Guavaberry (*Myrciaria floribunda* Berg).

Origin:

The place of origin of the guava is quite uncertain, but it is believed to be an area extending from southern Mexico into or through Central America. It has been spread by man, birds and other animals to all warm areas of tropical America and in the West Indies since 1526.

Adaptation:

The tropical guava is best adapted to the warm climate of Florida and Hawaii. Although it can be grown in coastal Southern California, and with some protection, in selected areas north to Mendocino County yet still the climate of Florida is well suited. It grows very well in northern plains of India during winter time and the variety is one of the sweetest and beautiful.

Guavas actually thrive in both humid and dry climates, but can survive only a few degrees of frost. The tree will recover from a brief exposure to 29° F but may be completely defoliated. Young trees are particularly sensitive to cold spells. Older trees, killed to the ground, have sent up new shoots which fruited 2 years later. Guavas can take considerable neglect, withstanding temporary water logging and very high temperatures. They tend to bear fruit better in areas with a definite winter or cooler season. The adaptability of the guava makes it a serious weed tree in some tropical areas.

DESCRIPTION:

Growth Habit:

Guavas are evergreen, shallow – rooted shrubs or small trees to 33 ft, with spreading branches. Growth in California is rarely over 10 - 12 feet. The bark is smooth,

mottled green or reddish brown and peels off in thin flakes to reveal the attractive 'bony' aspect of its trunk. The plant branches close to the ground and often produces suckers from roots near the base of the trunk. Young twigs are quadrangular and downy.

Foliage:

Guava leaves are opposite, short – petiole, oval or oblong – elliptic, somewhat irregular in outline, 2 - 6 inches long and 1 - 2 inches wide. The dull – green, stiff but leathery leaves have pronounced veins, and are slightly downy on the underside. When crushed, leaves are aromatic.

Flowers:

Faintly fragrant, the white flowers, borne singly or in clusters in the leaf axils, are 1 inch wide, with 4 or 5 white petals. These petals are quickly shed, leaving a prominent tuft of perhaps 250 white stamens tipped with pale – yellow anthers.

Guavas are primarily self – fruitful, although some strains seem to produce more fruit when cross – pollinated with another variety. Guavas can bloom throughout the year in mild – winter areas, but the heaviest bloom occurs with the onset of warm weather in the spring. The exact time can vary from year to year depending on weather. The chief pollinator of guavas is the honeybee.

Fruits:

Guava fruits may be round, ovoid or pear – shaped, 2 - 4 inches long, and has 4 or 5 protruding floral remnants (sepals) at the apex. Varieties differ widely in flavor and seediness. The better varieties are soft when ripe, creamy in texture with a rind that softens to be fully edible. The flesh may be white, pink, yellow, or red. The sweet, musky odor is pungent and penetrating. The seeds are numerous but small and, in good varieties, fully edible. Actual seed counts have ranged from 112 to 535. The quality of the fruit of guavas grown in cooler areas is often disappointing.

CULTURE:

Location:

Like other tender sub tropical, guavas need a frost – free location, but are not too fussy otherwise. They prefer full sun.

Soil:

The guava will tolerate many soil conditions, but will produce better in rich soils high in organic matter. They also prefer a well – drained soil in the pH range of 5 to 7.

The tree will take temporary water logging but will not tolerate salty soils.

Irrigation:

Guavas have survived dry summers with no water in California, although they do best with regular deep watering. The ground should be allowed to dry to a depth of several inches before watering again. Lack of moisture will delay bloom and cause the fruit to drop.

Pruning:

Shaping the tree and removing water shoots and suckers are usually all that is necessary. Guavas can take heavy pruning, however, and can be used as informal hedges or screens. Since the fruit is borne on new growth, pruning does not interfere with next year's crop.

Fertilization:

Guavas are fast growers and heavy feeders. The plant benefits from regular applications of fertilizer. Mature trees may require as much as 1/2 pound actual nitrogen per year. Apply fertilizer monthly, more so just prior to heavy pruning.

Frost protection:

Overhead protection and planting on the warm side of a building or structure will often provide suitable frost protection for guavas in cooler areas. A frame over the plant covered with fabric will provide additional protection during freezes, and electric lights can be included for added warmth. Potted plants can be moved to a more protected site if necessary.

Propagation:

Guava seed remain viable for many months. They often germinate in 2 - 3 weeks but may take as long as 8 weeks. Since guavas cannot be depended upon to come true from seed, vegetative propagation is widely practiced. They are not easy to graft, but satisfactory techniques have been worked out for patch – budding by the Forkert Method (probably the most reliable method), side – veneer grafting, approach grafting and marcotting the tree can also be grown from root cuttings. Pieces of any roots except the smallest and the very large, cut into 5 - 10 inch lengths, are placed flat in a prepared bed and covered with 2 - 4 inches of soil, which must be kept moist. They may also be grown by air-layering or from cuttings of half – ripened wood. Pieces 1/4 - 1/2 inch will root with bottom heat and rooting – hormone treatment. Trees grown from cuttings or air – layering have no taproot, however, and are apt to be blown down in the first 2 or 3 years. One of the difficulties with budded and grafted

guavas is the production of water sprouts and suckers from the rootstocks.

Disease Protection:

Foliage diseases, such as anthracnose, can be a problem in humid climates. They can be controlled with regular fungicide applications. Where present, root – rot nematodes will reduce plant vigor. Guava whitefly, guava moth and Caribbean fruit fly can be major problems in southern Florida, but have not been reported in California. Mealy-bugs, scale, common white flies and thrips can be problems in California. In some tropical countries the where fruit flies are a problem, the fruit is covered when small with paper sacks to protect it and assure prime quality fruits for the markets.

Harvest:

In warmer regions guavas will ripen all year. There is a distinctive change in the color and aroma of the guava that has ripened. For the best flavor, allow fruit to ripen on the tree. The can also be picked green – mature and allowed to ripen off the tree at room temperature. Placing the fruit in a brown paper bag with a banana or apple will hasten ripening. Mature green fruit can be stored for two to five weeks at temperature between 46° and 50° F and relative humidity of 85 to 95 percent. Fruit that has changed color cannot be stored for any extended periods. It bruises easily and will quickly deteriorate or rot.

Commercial juice varieties have rock hard inedible seeds, deep pink flesh and hard yellow rinds. They are not good for eating out of hand but have extremely high vitamin C content.

Commercial Potential:

Guavas are the only commercially significant mordacious fruit. It is an important fruit in many parts of the world suitable for its production. Guava is one of the leading fruits of Mexico. Commercial production of guava in Hawaii and Florida is hampered by the presence of fruit flies. California is too cool except for a few selected sites. It grows abundantly in India.

Cultivation of fruit

Guavas are cultivated in many tropical and subtropical countries for their edible fruit. Several species are grown commercially; Apple Guava (P. guajava) and its cultivars are those most commonly traded internationally.

Mature trees of most species are fairly cold – hardy and can survive as low as 5 °C (41 °F) for short periods of time, but younger plants will not survive. They are known to survive in Northern Pakistan where they can get down to 5°C or lower during the night. Guavas are also of interest to home growers in temperate areas, being one of

the very few tropical fruits that can be grown to fruiting size in pots indoors.

Guava fruit:

Guava fruit, usually 4 to 12 cm long, are round or oval depending on the species. The outer skin may be rough, often with a bitter taste, or soft and sweet. Varying between species, the skin can be any thickness, is usually green before maturity, but becomes yellow, maroon, or green when ripe.

Guava fruit generally have a pronounced and typical fragrance, similar to lemon rind but less sharp. Guava pulp may be sweet or sour, off-white ('white' guavas) to deep pink ('red' guavas), with the seeds in the central pulp of variable number and hardness, again depending on species.

Culinary Uses:

In India, guava fruit is eaten raw typically cut into quarters with a pinch of salt and pepper and sometimes cayenne powder. It is a popular snack among students, with street vendors selling each for a couple of rupees outside schools and colleges.

The fruit is also often prepared as a dessert, in fruit salads and as fruit drinks. In Asia, fresh guava slices are often

dipped in preserved prune powder or salt. In India it is often sprinkled with red rock salt, which is very tart.

Because of the high level of pectin, guavas are extensively used to make candies, preserves, jellies, jams, marmalades (Brazilian goiabada), and also for juices and aguas frescas.

Guava juice is very popular in Cuba, Puerto Rico, Colombia, Egypt, Mexico and South Africa.

'Red' guavas can be used as the base of salted products such as sauces, constituting a substitute for tomatoes, especially for those sensitive to the latter's acidity. In Asia, a drink is made from an infusion of guava fruits and leaves. In Brazil, the infusion made with guava tree leaves (chá-de-goiabeira,i.e. 'tea' of guava tree leaves) is considered a medicine.

Nutritional value:

Guavas are often marketed as 'superfruits', being rich in vitamins A and C with seeds that are rich in omega -3, omega-6 polyunsaturated fatty acids and especially dietary fiber. A single Apple Guava (P. guajava) fruit contains over four times the amount of vitamin C as a single orange (over 200 mg per 100 g serving) and also has good levels of the dietary minerals, potassium, magnesium, and generally a broad, low-calorie profile of essential nutrients.

However, nutritional value is greatly dependent on species, the Strawberry Guava (P. littorale var. cattleianum) notably containing only 30–40 mg of vitamin C per 100g serving, a fifth of the vitamin C found in more common varieties. Vitamin C content in the Strawberry Guava is still a high percentage (62%) of the Dietary Reference Intake, however.

Green apple guavas are less rich in antioxidants. Guavas contain both carotenoids and polyphenols – the major classes of antioxidant pigments giving them relatively high dietary antioxidant value among plant foods. As these pigments produce the fruits' color, guavas that are red or orange in color have more potential value as antioxidants sources than yelllowish – green ones.

'Thai Maroon' guavas, a red Apple Guava cultivar extremely rich in antioxidants

Apple Guava, per 100 g of edible portion	
Calories	36-50
Moisture	77-86 g
Dietary Fiber	2.8-5.5 g
Protein	0.9-1.0 g
Fat	0.1-0.5 g
Ash	0.43-0.7 g
Carbohydrates	9.5-10 g
Calcium	9.1–17 mg

Phosphorus	17.8–30 mg
Iron	0.30-0.70 mg
Carotene (Vitamin A)	200-400 I.U
Ascorbic acid (Vitamin C)	200-400 mg
Thiamin (Vitamin B_1)	0.046 mg
Riboflavin (Vitamin B_2)	0.03-0.04 mg
Niacin (Vitamin B_3)	0.6-1.068 mg

Nutrient data source: US Department of Agriculture

The guava is native to the Caribbean. Its skin is thin, light yellow and blushed with pink. A ripe guava softens to the touch. Guavas emit a strong, sweet, pungent fragrance. The flesh is white, red or salmon – colored and flavor ranges from strawberry to lemon to tropical.
Guavas are one of the best fruits available. Guava's are cholesterol, saturated and sodium free, plus low in fat and calories. Guavas are high in fiber.

Certain studies find a lower risk of cancer among people who eat more fruits and vegetables rich in dietary fiber, carotenoids and vitamin C. The edible rind of a guava contains 5 times more vitamin C than an orange.

Guavas like other tropical fruits should not be refrigerated unless over ripe. The seeds of a guava can be eaten and the taste is often described as a cross between pears and strawberries.

Others find a lower risk among people who eat more of any fruits or vegetables. But fruit aficionados may want to pick the most nutritious of the bunch.

Guava is a great fruit because it contains key nutrients like: vitamin C, carotenoids, folate, potassium, fiber, calcium and iron. Calcium is typically not found in high amounts in many fruits. Diets low in saturated fat and cholesterol and rich in fruits and vegetables that contain certain types of dietary fiber may reduce the risk of coronary heart disease.

Good quality guavas should be firm and free of bruises. Ripe guavas should exhibit a fragrant fruity aroma. They will continue to ripen after harvest and should be stored at room temperature unless it is very ripe it should be refrigerated.
The health benefits of guava include treatment of diarrhea, dysentery, constipation, cough, cold, skin care, high blood pressure, weight loss, scurvy, etc.

Many of you might have tasted this mouth – watering treat, or at least have seen it or heard about it. Guava is very common in Asian countries. It is a good looking pear shaped or round shaped seasonal fruit, light green or yellow or maroon in color from outside when ripe, with white or maroon flesh and lots of small hard seeds enveloping very soft and sweet pulp. It is eaten raw (ripe or semi – ripe) or in form of jams and jellies. This attractive fruit is a real storehouse of nutrients.

If it is said “An apple a day keeps the doctor away” in Europe and Americas, it must be “A few guavas in the season keeps the doctor away for the whole year” in the Indian Subcontinent and places where guavas grow. Its scientific name is Psidium Guajava.

Let me share some of its brilliant health benefits with you.

1. Diarrhea & Dysentery:

Guava is very rich in astringents (compounds those make your gums feel tighter and fresh after you chew guava leaves or eat a raw guava or use some toothpaste) which binds up loose bowels in diarrhea. These astringents are alkaline in nature and have disinfectant and anti-bacterial properties, thus help cure dysentery by inhibiting microbial growth and removing extra mucus from the intestines. Further, other nutrients in guava, such as vitamin-C, Carotenoids and potassium strengthens and tones up the digestive system and disinfect it. Guava is also beneficial in gastroenteritis due to reasons stated above.

2. Constipation:

Guava is one of the riches sources of dietary fiber. Its seeds, if ingested whole or chewed, serve as excellent laxatives. These two properties of guava help forming bowels, retaining water and clean your intestines and

excretory system thoroughly. It is said that single constipation can lead to seventy two types of ailments. It is absolutely true. The way to your total health goes through proper digestion and more importantly, proper excretion. Guava ensures both of these.

3. Cough & Cold:

Juice of raw and immature guavas or decoction of guava – leaves is very helpful in giving relief in cough and cold by loosening cough, reducing mucus, disinfecting the respiratory tract, throat and lungs and inhibiting microbial activity due to its astringent properties. Guava is one of richest in vitamin-C and iron which are proven to be preventive against cold and viral infections. In some areas in India, roasted ripe guava is used as a remedy against extreme cases of cough and cold and congestion.

4. Skin Care:

Guavas can help improve your skin texture and avoid skin problems more than the best of beauty creams or skin toner gels can do. This is chiefly due to the abundance of astringents in its fruits (more in immature ones) and in leaves. You can benefit from it either by eating the fruits (this help tighten your muscles apart from your skin) or by washing your skin with the decoction of its immature fruits and leaves. It will tone up and tighten the loosened skin. In addition to the astringents, guava is very-very

rich in vitamin-A, B, C and potassium which are very good anti oxidants and detoxifiers and keep your skin glowing and free from aging, wrinkles and other disorders.

5. High Blood Pressure:

Guava helps reduce cholesterol in blood and prevents it from thickening, thereby maintaining fluidity of blood and reducing blood pressure. Studies have shown that food stuffs which lack fiber (such a refined flour) add to blood pressure, due to quick conversion to sugar. Guava, being very rich in fiber and hypoglycemic in nature, helps reduce blood pressure.

6. Weight Loss:

Guava is very helpful for those who want to lose weight without compromising with their intake of proteins, vitamins and fiber. Guava, being very high in roughage and very rich in vitamins, proteins and minerals, but with no cholesterol and less digestible carbohydrates, is very filling and satisfies appetite very easily. Just have a medium sized guava in the lunch and you will not feel hungry till night. But ironically, it helps gaining weight in lean and thin people. This is probably due to its richness in nutrients, which keeps your metabolism right helping proper absorption of nutrients.

7. Scurvy:

Guava can outdo many other fruits, including orange and other citrus fruits, when it comes to concentration of vitamin-C, whose deficiency causes scurvy and which is the only remedy to it. It contains five times the vitamin-C in oranges.

8. Other Benefits:

Where to begin? Shall I start with the fact that guava helps control diabetes, protects prostrate, its Lypocene reduces the risk of cancer, the juice of the leaves cures toothache, swollen gums & oral ulcers, heals wounds when applied externally, convulsions, epilepsy, bacterial infections and so on and so forth.
Actually, I do not know where to stop.

Grapes

The combination of crunchy texture and dry, sweet, tart flavor has made grapes an ever popular between meal snack as well as a refreshing addition to both fruit and vegetable salads. American varieties are available in September and October while European varieties are available year round.

Grapes are small round or oval berries that feature semi-translucent flesh encased by a smooth skin. Some contain edible seeds while others are seedless. Like blueberries,

grapes are covered by a protective, whitish bloom. Grapes that are eaten as is or used in a recipe are called table grapes as opposed to wine grapes (used in viniculture) or raisin grapes (used to make dried fruit).

Grapes:

Grapes are native to the Mediterranean region and Central Asia. They grow in clusters on a deciduous woody vine, *Vitis vinifera*, and come in many colors. Blue, red, purple, black, golden, and green are the most common. The original grapes were red, and the dark grapes all contain a rich supply of *anthocyanins*, the antioxidant polyphenolic that conveys many health-promoting properties of grapes. Grapes rank with blueberries and blackberries as excellent sources of antioxidants.

Grapevine:

Grapes can be eaten fresh or dried (raisins), while grape juice is a favorite beverage. Although seedless grapes are highly sought after for table grapes, the absence of seeds does diminish the phytochemical content of the grape. Grapes are also used for making jam, jelly, and wine.

Currants:

Currents are dried Zante grapes, but the name currant has also been applied to two berries, black currants and red currants, that are unrelated to grapes. Sultanas were originally raisins derived from a lighter grape of Turkish

origin. Many varieties of currents and raisins are available in the market.

Grape seeds:

Grape seed provide edible oil. Grape seed extract is also available as a supplement. It is claimed to strengthen capillary walls, so that it finds use in the treatment of venous insufficiency, and edema following surgery. It also reduces the risk of blood clots.

Many of the health benefits attributed to red/purple grapes are due to the **pigments** that are concentrated largely in the skin and seeds, which have about 100 times higher level than the pulp of the grape. *Anthocyanins* is the main polyphenolics in red grapes while the catechins are the more abundant phenolic in white grapes. The phenolic content of grape skins depends upon the variety, the soil, climate, geography, cultivation practice, and exposure to fungal infections. Grapes are also rich in ellagic acid, a potent flavonoid that helps fight cancer.

Grapes and grape juice function in different ways in the cardiovascular system. The pigments in red, purple and black grapes protect the cardiovascular system by a number of mechanisms that include the suppression of blood clots, inhibition of LDL cholesterol oxidation, reduced homocysteine levels, and anti – atherosclerotic properties. Grapes stimulate endothelial nitric oxide production which induces relaxation of the blood vessel

walls, and a reduction in blood pressure levels. Recently, it was shown that a Concord grape extract lowered LDL cholesterol, raised HDL cholesterol, and decreased plasma inflammatory biomarkers.

Resveratrol (3,5,4'-trihydroxy-trans-stilbene), a dietary constituent found in grapes exerts a wide variety of pharmacological activities. Resveratrol is as an effective agent for cancer chemoprevention due its ability to block many steps in the carcinogenesis process. Resveratrol contained in red grapes and berries has been shown to inhibit prostate cancer cell growth, induce apoptosis, influence interleukin-6, and exert immuno – modulatory effect on mouse lymphocytic leukemia. One of the possible mechanisms for the protective activity of resveratrol is by down regulation of inflammatory responses. Resveratrol also inhibits the nuclear transcription factor, NFkappaB.

Anthocyanins and **proanthocyanidins** are two groups of polyphenolics in Concord and similar grape juices. These substances show cancer preventive and anti – proliferative properties and can detoxify the activity of some cancer – causing substances. Concord grape juice can protect healthy breast cells from DNA damage caused by a chemical carcinogen. Grape juice also suppresses the growth and development of breast cancer cells in laboratory animals given chemically induced tumors. The grape juice reduced both mammary tumor size and the number of tumors per animal. The pigments in grape juice also improve immune responsiveness.

Promising data suggests the **use of grape juice to promote brain health and delay neurodegenerative diseases**. Participants that drank purple grape juice and similar fruit juices three times a week were about 70% less likely to develop Alzheimer's disease. When laboratory animals were fed Concord grape juice they showed significantly improved scores on memory and coordination tests.

The combination of crunchy texture and dry, sweet, tart flavor has made grapes an ever popular between meal snack as well as a refreshing addition to both fruit and vegetable salads. American varieties are available in September and October while European varieties are available year round.

Grapes are small round or oval berries that feature semi-translucent flesh encased by a smooth skin. Some contain edible seeds while others are seedless. Like blueberries, grapes are covered by a protective, whitish bloom. Grapes that are eaten as is or used in a recipe are called table grapes as opposed to wine grapes (used in viniculture) or raisin grapes (used to make dried fruit).

Health Benefits:

Over 100 research studies on grapes (or products made from them, like red wine) have shown many of their health benefits to come from a category of phytonutrients called polyphenols. Three types of polyphenols seem most important with respect to grapes and their health benefits:

1. flavonoids,
2. phenolic acids, and
3. resveratrol.

Interestingly, all three types of polyphenols appear to be most concentrated in the skins, stems, and seeds of grapes rather than their juicy middle sections.

Flavonoids are phytonutrients that give the vibrant purple color to grapes, grape juice and red wine; the stronger the color, the higher the concentration of flavonoids. These flavonoid compounds include quercitin, as well as a second flavonoid – type compound (falling

into the chemical category of stilbenes) called resveratrol. Both compounds appear to decrease the risk of heart disease by:

1. Reducing platelet clumping and harmful blood clots
2. Protecting LDL cholesterol from the free radical damage that initiates LDL's artery – damaging actions

Grapes and products made from grapes, such as wine and grape juice, may protect the French from their high – fat diets. Diets high in saturated fats like butter and lard, and lifestyle habits like smoking are risk factors for heart disease. Yet, French people with these habits have a lower risk of heart attack than Americans do. One clue that may help explain this 'French paradox' is their frequent consumption of grapes and red wines.

Protection against Heart Disease:

In a study in which blood samples were drawn from 20 healthy volunteers both before and after they drank grape juice, researchers found several beneficial effects from their juice consumption.

1. First:

An increase occurred in levels of nitric oxide, a compound produced in the body that helps reduce the formation of clots in blood vessels.

2. Second:

A decrease occurred in platelet aggregation, or blood clotting, by red blood cells.

3. Lastly:

Researchers saw an increase in levels of alpha – tocopherol, an antioxidant compound that is a member of the vitamin E family, and this increase was accompanied by a 50% increase in plasma antioxidant activity.

These findings confirmed the benefits found in an earlier study, where researchers found not only an increase in blood antioxidant activity, but also discovered that grape juice protected LDL cholesterol from oxidation, a phenomenon that can turn LDL into an artery – damaging molecule. (Although LDL is often called the 'bad' form of cholesterol, it is actually benign and only becomes harmful after it is damaged by free radicals or 'oxidized.'

Additionally, investigators have found that phenolic compounds in grape skins inhibit protein tyrosine kinases, a group of enzymes that play a key role in cell regulation. Compounds that inhibit these enzymes also suppress the production of a protein that causes blood vessels to constrict, thus reducing the flow of oxygen to the heart. This protein, called endothelin-1, and is thought to be a key contributing agent in the development of heart disease.

A study published in the journal *Hypertension* sheds new insight on the mechanisms of action through which resveratrol inhibits the production of the potent blood vessel constrictor, endothelin-1 (ET-1). Resveratrol appears to work at the genetic level, preventing the strain – induced expression of a gene that directs the production of ET-1. Normally, ET-1 is synthesized by endothelial cells (the cells comprising the lining of blood vessel walls) in response to free radicals formed as a result of strain or stress. Resveratrol prevents the expression of ET-1, at least in part, by significantly lessening free radical formation, thus preventing the production of the agents that, in turn, activate the signaling pathways that control the creation of ET-1.

Resveratrol:

Resveratrol Helps Keep the Heart Muscle Flexible and Healthy!

A team of researchers led by Gary Meszaros and Joshua Bomser at the Northeastern Ohio Universities College of Medicine has shown that resveratrol not only inhibits production of endothelin-1, but also directly affects heart muscle cells to maintain heart health.

Their research, published in the *American Journal of Physiology: Heart and Circulatory Physiology*, shows that resveratrol inhibits angiotensin II, a hormone that is

secreted in response to high blood pressure and heart failure.

Angiotensin II has a negative effect on heart health in that it signals cardiac fibroblasts, the family of heart muscle cells responsible for secreting collagen, to proliferate. The result is the production of excessive amounts of collagen, which causes the heart muscle to stiffen, reducing its ability to pump blood efficiently.

In addition to inhibiting angiotensin II, and therefore the proliferation of cardiac fibroblasts, resveratrol also prevented the cardiac fibroblasts that were already present from changing into myofibroblasts, the type of cardiac fibroblast that produces the most collagen.

Role of Grapes' Saponins:

The Role of Grapes' Saponins in Supporting Heart Health is recently recognized at the 226th national meeting.

Research presented at the 226th national meeting of the American Chemical Society provides yet another explanation for red wine's cardio – protective effects – phytonutrients that help lower cholesterol called saponins. A plant protective agent found in the grapes' waxy skin, which dissolves into the wine during its fermentation process, saponins are believed to bind to and prevent the absorption of cholesterol and are also

known to settle down inflammation pathways, an effect that could have implications in not only heart disease, but cancer. The research team, led by Andrew Waterhouse, PhD, from the University of California, Davis, thinks that alcohol may make the saponins more soluble and thus more available in wine.

Currently, a hot research topic, saponins are glucose – based compounds, which are being found in an increasing number of foods including olive oil and soybeans. Waterhouse tested six varieties of California wines, four red and two white, to compare their saponin content, which varied among brands, but was found present in high concentrations in all the red wines tested. Red wines contained 3 to 10 times the amount of saponins found in white wines. The saponin content of red wine also showed a positive correlation with alcohol content, the stronger the wine, the more saponins. Among the red wines tested, red Zinfandel, which also had the highest level of alcohol – 16% - contained the highest levels. Syrah came in second, followed by Pinot noir and Cabernet Sauvignon, which had a comparable amount. The white varieties tested, Sauvignon blanc and Chardonnay, contained much less.

'Average dietary saponin intake has been estimated at 15 mg, while one glass of red wine has a total saponin concentration of about half that, making red wine a significant dietary source,' Waterhouse said.

Strokes occur when blood clots or an artery bursts in the brain, interrupting its blood supply. In the U.S., where every 45 seconds, someone will experience a stroke, according to the American Stroke Association, strokes are the leading cause of disability and the 3rd leading cause of death.

Resveratrol, a flavonoid found in grapes, red wine and peanuts, can improve blood flow in the brain by 30%, thus greatly reducing the risk of stroke, according to the results of an animal study published in the *Journal of Agricultural and Food Chemistry*.

Lead researcher Kwok Tung Lu hypothesized that resveratrol exerted this very beneficial effect by stimulating the production and/or release of nitric oxide (NO), a molecule made in the lining of blood vessels (the endothelium) that signals the surrounding muscle to relax, dilating the blood vessel and increasing blood flow.
In the animals that received resveratrol, the concentration of nitric oxide (NO) in the affected part of the brain was 25% higher than that seen not only in the ischemia-only group, but even in the control animals.

Pterostilbene:

Pterostilbene is another Antioxidant found in Grapes that may Lower Cholesterol. In addition to resveratrol and saponins, grapes contain yet another compound called

pterostilbene (pronounced TARE-oh-STILL-bean), powerful antioxidants that is already known to fight cancer and may also help lower cholesterol.

In a study using animal liver cells, scientists at the USDA Agricultural Research Service compared the cholesterol – lowering effects of pterostilbene to those of ciprofibrate, a lipid-lowering drug, and resveratrol, another antioxidant found in grapes with a chemical structure similar to pterostilbene that has been shown to help fight cancer and heart disease.

They based their comparison on each compound's ability to activate PPAR-alpha (short for peroxisome proliferator-activated receptor alpha). The PPARs are a family of receptors on cells all throughout the body that are involved in the absorption of compounds into cells for use in energy production. PPAR-alpha is crucial for the metabolism of lipids, including cholesterol.

Pterostilbene was as effective as ciprofibrate and outperformed resveratrol in activating PPAR-alpha. In addition to grapes, pterostilbene is found in berries of the *Vaccinium* genus such as cranberries and blueberries. The take away message: turn up your cholesterol burning machinery by eating more grapes, blueberries and cranberries.

Grape Polyphenols:

Grape Polyphenols helps in lowering key factors for Coronary Heart Disease in women.

More evidence shows grapes and grape juice, not just red wine, offer considerable cardiovascular benefits. Consuming a drink made from adding just 36 g (1.26 ounces) of a powder made from freeze – dried grapes to a glass of water daily for 4 weeks resulted in a wide variety of cardioprotective effects in 24 pre – and 20 postmenopausal women, shows a study published in the *Journal of Nutrition*.

1. Blood levels of LDL cholesterol and apolipoproteins B and E dropped significantly. (These apolipoproteins are involved in the binding of LDL and VLDL cholesterol to blood vessel walls, one of the beginning steps in the development of atherosclerosis.)

2. Triglycerides dropped 15 and 6% in pre- and postmenopausal women, respectively.

3. Cholesterol ester transfer protein activity dropped 15%. (Inhibition of this protein has been shown to increase levels of HDL while decreasing LDL levels.)

4. Levels of urinary F (2) - isoprostanes (a marker of free radical damage in the body) dropped significantly as did blood levels of TNF-alpha (tumor necrosis factor-

alpha, which plays a major role in the inflammation process).

The rich mixture of phytonutrients found in grapes - which includes flavans, anthocyanins, quercetin, myricetin, kaempferol, as well as resveratrol is thought to be responsible for these numerous protective effects on cholesterol metabolism, oxidative stress (free radical activity) and inflammation.

Wine Protective for Hypertension:

If you have high blood pressure, a glass of wine with your evening meal may be a good idea, according to research published in the *American Journal of Clinical Nutrition*. In persons with high blood pressure, the risk of death from cardiovascular disease is much higher in northern Europe and the United States than in Mediterranean countries. When French researchers tested the hypothesis that drinking wine reduces the risk of hypertension – related death, they found that, in persons with hypertension, moderate regular wine drinking reduced the risk of death from *all* causes, not just coronary artery disease.

Grapes and Cardio-protective Benefits of Red Wine:

Grapes provide several Cardio protective benefits of Red Wine.

While studies show red wine offers numerous protective benefits, grape juice also provides the majority of these effects without the risks of alcohol consumption, which, if excessive can lead to accidents, liver problems, higher blood pressure, heart arrhythmias – and alcoholism.

In addition, red wine causes migraines in some people and may bring on an attack of gout in others. Wine often contains added preservatives, colors and flavors, which are not listed on the label and may cause adverse reactions. Sulfur dioxide, for example, is an additive frequently found in red wine that can trigger an asthma attack in individuals sensitive to this chemical.

If consumed by pregnant women, any alcoholic beverage including wine can cause fetal alcohol syndrome.

If you prefer not to consume alcoholic beverages, take heart-grapes may still provide many of the cardio protective benefits attributed to red wine.

Resveratrol, which is concentrated in red wine but only appears in very small amounts in grapes, has been touted as the main agent responsible for the 'French paradox,' i.e., the health benefits associated with drinking red wine. But, Lawrence M. Szewczuk and Trevor M. Penning from the University of Pennsylvania, in a study published in the *Journal of Natural Products*, point out that other constituents found in far greater amounts in grapes as well as red wine, namely grapes' catechins and epicatechins, might be due the most credit.

One of the primary ways in which resveratrol is reported to have its cardio protective effects is its ability to modify activity of cyclooxygenase enzymes. Two forms of cyclooxygenase (COX-1 and COX-2) have been closely studied in the research literature (often by drug companies developing new prescription medications). These cyclooxygenase enzymes have many roles in metabolism, including roles in triggering the body's inflammatory response. COX-2 appears to be the more important of these two enzyme forms when it comes to inflammatory response. Resveratrol appears to help block COX-2 activity indirectly, through changes in another system of messaging molecules called NF-kappaB and I-kappaB kinase. It also appears to directly block activity of COX-1. Unfortunately, the average wine drinker appears to absorb resveratrol in quantities too small to significantly lower cyclooxygenase activity. Catechins and epicatechins are present in much greater amounts in grapes as well as red wine, and smaller amounts of these compounds appear to be needed for reduction of cyclooxygenase activity.

To receive comparable benefits as those gained from drinking a glass of red wine, however, you need to drink more grape juice. A recent study found that six glasses of grape juice produced the same beneficial effect as two glasses of red wine in reducing platelet aggregation, the clumping that leads to blood clots, heart attacks and strokes.

Another option is to drink dealcoholized red wine. A study published in the *American Journal of Clinical Nutrition* suggests the alcohol-free alternative provides comparable cardio protective benefit. In this six month study, female laboratory animals with an inbred susceptibility to develop cardiovascular disease were given a normal diet along with red, white or dealcoholized red wine to compare their effects on atherosclerosis development. Dealcoholized red wine provided effective protection comparable to that of either white or red wine, significantly decreasing the development of atherosclerosis. Researchers credit the polyphenolic compounds found in the wine, rather than alcohol, with these beneficial effects.

So, if you want to avoid alcohol and protect your heart, toast your health with at least three daily glasses of red or purple grape juice.

Resveratrol for Optimal Health:

Recently, several studies have also identified resveratrol as an excellent candidate for use as a cancer-preventive agent in prostate, lung, liver and breast cancer. Resveratrol has demonstrated striking inhibitory effects on the cellular events involved in cancer initiation, promotion, and progression, and its safety in animal studies of cancer development resulting from exposure to chemical toxins is excellent.

One of the most exciting studies, published in the *Journal of Applied Toxicology*, suggested that resveratrol can provide protection against benzopyrene, a major environmental carcinogen involved in the development of lung cancer. Resveratrol works its protective magic by inhibiting a receptor on cells called the **Aryl Hydrocarbon Receptor** (AhR) to which benzopyrene (and other carcinogens called polycyclic aromatic hydrocarbons) bind. The AhR turns on a whole battery of genes that is involved in carcinogenesis. In this study, significant DNA damage was found in laboratory animals exposed to benzopyrene, but when they were also given resveratrol, their DNA damage was less than half, plus, in those cells whose DNA was damaged, resveratrol also caused a significant rise in apoptosis (the self – destruction sequence the body uses to eliminate cancerous cells). Other studies suggest that resveratrol can also inhibit the growth of liver and breast cancer cells.

French scientists have discovered a potent anti – cancer agent, acutimissin A, in red wine that has been aged in oak barrels. A member of a class of polyphenols called ellagitannins, acutimissin A develops when a grape flavonoid called catechin combines with a phenol in oak called vescalagin. Discovered 16 years ago in the sawtooth oak, acutimissin A blocks the action of an important enzyme whose activity is essential to the development of cancerous cells. In preliminary tests, acutimissin A has been shown to be 250 times more potent than the clinical anti – cancer drug VP-16.

Lung Health:

Red, but not white wine, may offer protection against lung cancer, suggests a study published in *Thorax* by Professor Juan Barros-Dios and his team at the University of Santiago de Compostela, Spain, who reported the results of their hospital – based case – control study. While a daily glass of white wine was associated with a 20% increased risk of lung cancer, a daily glass of red wine lowered risk an average of 13%. No association was noted between lung cancer and the consumption of beer or spirits.

What might explain these different effects seen in individuals drinking red and white wine? Most likely, red wine's concentration of the phytonutrient, resveratrol. Another study published in the *American Journal of Physiology: Lung, Cellular and Molecular Physiology* found that resveratrol has a number of anti – inflammatory effects on human airway epithelial cells, the cells lining the lungs and nasal passages.

Resveratrol blocked the release in these epithelial cells of a number of inflammatory molecules including IL-8, inducible nitric oxide synthase and NF-kappaB, inhibiting the latter more effectively than the powerful gluco cortico steroid drug, dexamethasone.

Resveratrol's anti – inflammatory actions also inhibited the production of COX-2 in these epithelial cells. COX-2 is

the pro – inflammatory compound whose production the non – steriodal anti – inflammatory drugs Vioxx and Celebrex were developed to prevent. While these drugs are now being pulled off the market due to the increased risk of heart attack and death associated with their use, resveratrol's anti-inflammatory actions pose no such risks.

In fact, the researchers concluded their report by saying, 'This study demonstrates that resveratrol and quercetin have novel nonsteroidal anti – inflammatory activity that may have applications for the treatment of inflammatory diseases.' Louise Donnelly, lead researcher in the study, was so impressed with resveratrol's broad anti – inflammatory effects that she has begun investigating its use in an aerosol spray to treat chronic obstructive pulmonary disease and asthma.

Grapes and Women's Health:

Red grape skins and seeds contain recently isolated compounds that a study published in *Cancer Research* has shown reduce the size of estrogen – dependent breast cancer tumors. In breast cancer, local estrogen production has been demonstrated to play a major role in promoting tumor growth. An enzyme called aromatase, which converts other hormone substrates (specifically, androgens) into estrogens, is present in greater amounts in breast cancer tissue compared to normal breast tissue and is thought to play a crucial role in breast cancer

initiation and progression. Grape skins and seeds contain compounds called procyanidin B dimers that can inhibit aromatase, and in this study, were used to significantly reduce the size of mammary tumors in laboratory animals. Lead researcher, Shiuan Chen, of the City of Hope Cancer Center in Los Angeles, believes these phytonutrients in grape skins and seeds, while not as powerful as drugs used to inhibit aromatase (e.g., anastrozole, letrozole and exemestane), could play an important role as cancer preventive agents. If you drink wine, choose red. And next time you buy grapes, consider choosing red grapes with seeds.

Another way Grapes promote Optimal Health:

Research published in *Cancer Letters* provides one reason why diets high in fruit help prevent cancer: raspberries, blackberries and muscadine grapes inhibit metalloproteinase enzymes. Although essential for the development and remodeling of tissues, if produced in abnormally high amounts, these enzymes play a significant role in cancer development by providing a mechanism for its invasion and spread.

Resveratrol and Alzheimer's disease:

Population studies indicate a link between moderate consumption of red wine and a lower incidence of

Alzheimer's disease. A laboratory study published in the *Journal of Biological Chemistry* helps explain why.

Resveratrol, a naturally occurring polyphenol found mainly in grapes and red wine, greatly reduces the levels of amyloid – beta peptides (Abeta). Plaques containing Abeta are a hallmark finding in the brain tissue of patients with Alzheimer's disease.

In this study, cells treated with resveratrol had significantly lower levels of Abeta than untreated cells. Resveratrol lowers Abeta levels by promoting its rapid breakdown by proteasomes, protein – digesting 'machines' inside our cells that dismantle a variety of proteins into short polypeptides and amino acids that can then be used to make new protein the cell needs.

Each human cell contains about 30,000 proteasomes, which mainly digest proteins made within the cell, such as enzymes and transcription factors, so their parts can be recycled to make new proteins.

Resveratrol Anti - Aging Agent?

In recently published research, resveratrol has been identified as a potent activator of Sir2-an enzyme researchers have now discovered is responsible for the extension of life span seen in many species when placed on calorie restricted diets.

In the yeast *Saccharomyces cerevisiae*, not only does calorie restriction extend longevity through a pathway that requires the enzyme Sir2, but overproducing this enzyme can prolong the life of yeast even when grown under normal nutrient conditions. Similarly, in the evolutionarily more advanced worm *Caenorhabditis elegans*, increased expression of the worm's version of Sir2 has also been shown to extend lifespan.

The Sir2 enzyme belongs to a large family of molecules called sirtuins, found in virtually all life forms. In mammalian cells, sirtuins regulate cell maturation (differentiation) and programmed cell death (apoptosis).

Building on the knowledge that caloric restriction prolongs longevity through Sir2, researchers (Howitz *et al*.) searched for a small molecule that could activate this enzyme directly. They discovered two related compounds that stimulate Sir2 activity, both of which belong to the family of molecules called polyphenols – active compounds products by plants. Of all the polyphenols tested, resveratrol was the most potent by far. The researchers found that this compound prolonged the lifespan of yeast by approximately 70%, and that the extension of longevity was entirely dependent on resveratrol's activation of Sir2. Yeast strains deficient in this enzyme did not benefit from resveratrol treatment.

Could plant polyphenols such as resveratrol hold the secret of the elixir of youth sought by Ponce de Leon? Perhaps, but the research indicates that figuring out the way to apply their life extending effects will be

complicated. At relatively low doses, resveratrol was found to stimulate sirtuin activity, but higher doses have had the opposite effect. While not an ideal characteristic for a pharmaceutical drug, this suggests that the appropriate dosage could be supplied by enjoying a daily glass of grape juice or red wine. More importantly, however, much more research must be done before we understand how sirtuins function in mammalian aging. Extending longevity in yeast is a long way from life extension in higher organisms. Till scientists figure this out, a daily dose of resveratrol – rich grapes in all their delicious forms might add years to your life as well as delight to your years.

An Effective Anti-Microbial Agent:

Researchers at Erciyes University, Turkey, have found that an agent made from grape pomace extract (grape seeds, skin and stems) is an effective anti-microbial agent. When tested against 14 bacteria including *Escherichia coli* and *Staphylococcus aureus*, the grape extract inhibited all the bacteria tested at extract concentrations of 2.5, 5, 10 and 20%, except for *Y enterocolitica*, which was not inhibited by the 2.5% concentration.

Purple Grape Juice, Red Wines - Food-Borne Illness:

If you get a food – borne illness, drink purple grape juice or a glass of red wine. Commonly used antibiotics destroy the body's health – promoting intestinal bacteria, but red wines, particularly Cabernet, Pinot noir and Merlot, inhibit food borne pathogens without harming beneficial probiotic bacteria. Research presented at the Institute of Food Technologists' annual conference tested four food borne pathogens and four probiotics. The probiotics were not inhibited by red wines; the pathogens were.

The most promising results were those found for *H. pylori*, the bacterium that causes most stomach ulcers, but red wines also inhibited *E. coli*, *Salmonella Typhimurium*, and *Listeria monocytogenes*. While purple grape juice was also effective, white wine was not, suggesting that inhibitory effects against pathogens may be due to the catechin and resveratrol found in grape skins and red wines. (Grape skins are removed when making white wine.) Ethanol (the alcohol in wine), pH levels and resveratrol were separately found have similar protective effects.

Das A, Institute of Food Technologists' Conference, Chicago, July 31, 2007, Food Microbiology, Presentation# 142-13)

Red Wine, Colorectal Cancer Risk, and Causes of Mortality:

Drinking at least three glasses of red wine a week could cut the risk of colorectal cancer by almost 70%, researchers reported at the 71st Annual Scientific Meeting of the American College of Gastroenterology in Las Vegas. Colorectal cancer accounts for 9% of new cancer cases every year worldwide, occurring primarily in the United States and Europe. Fortunately, if diagnosed early, it remains one of the most curable cancers.

Joseph Anderson and colleagues from the Stony Brook University in New York looked at the drinking habits of 360 red and white wine drinkers with similar lifestyles and found that, while white wine consumption had no association with colorectal cancer occurrence, regularly drinking red wine was linked to a 68% reduced risk of the cancer.

The active component in wine thought to be largely responsible is resveratrol, a natural anti-fungal that grapes-especially organically grown red grapes- produce under their skin. The concentration of resveratrol is significantly higher in red than white wine because the skins are removed earlier during white – wine production.

Nearly all dark red wines – Merlot, Cabernet, Zinfandel, Shiraz and Pinot Noir – contain resveratrol, although the

amount in a bottle can range from 0.2 to 5.8 milligrams per liter, varying among types of grapes and growing seasons.

Also, grapes and wine are reported to contain more than 600 different phytonutrients, including many with antioxidant activity, so it is likely that a number of compounds in grapes, including resveratrol, work synergistically to protect against colorectal cancer.

In support of this hypothesis, a recent animal study by researchers from Tuft's University reported brain-protecting effects from Concord grape juice resulting from synergistic activity among grape polyphenols. 'It may be that the whole is greater than the sum of its parts,' wrote lead author of this study, Barbara Shukitt-Hale, in the journal *Nutrition*.

In other research a meta – analysis of 34 studies involving over a million people published in the *Archives of Internal Medicine* – investigators at the Catholic University of Campobasso in Italy concluded that moderate drinking is associated with a reduction in all cause of mortality.

Although excessive alcohol consumption was shown to increase mortality, drinking 2 to 4 drinks per day was associated with a reduction in deaths from all causes in men. For women, the protective effect ended above 2 drinks per day. It has been proposed that the protective effect of moderate drinking may be due to associated lifestyle factors, but lead author of this study, Di

Castelnuovo noted, 'We have carefully examined this aspect. Our data suggest that, even considering all main confounding factors (as dietary habits, physical activity or the health of people studied), a moderate consumption of alcoholic beverages keeps on showing a real positive effect.'

The review also determined that the protective benefit of alcohol is greater for European than American men, which could be explained by the way in which alcohol is consumed: European men are likelier than Americans to drink wine and to enjoy it with a meal.

'The core of this study is not just about alcohol,' Catholic University Research Laboratories director Giovanni de Gaetano stated. 'It is also the way we drink that makes the difference: little amounts, preferably during meals, this appears to be the right way. This is another feature of the Mediterranean diet, where alcohol, wine above all, is the ideal partner of a dinner or lunch, but that's all: the rest of the day must be absolutely alcohol-free. The message carried by scientific studies like ours is simple: alcohol can be a respectful guest on our table, but it is good just when it goes with a healthy lifestyle, where moderation leads us toward a consumption inspired by quality not by quantity.'

Recent Harvard research (the Northern Manhattan Study and the Cardiovascular Health Study) also suggest that moderation in alcohol consumption is key: lowest risk of

stroke was seen in those who had one, or maybe two, drinks a day.

If you are inspired to try a daily glass of red wine as part of your healthy way of eating, you may want to look for red wine from southwestern France or Sardinia. Research published in *Nature* suggests that the protective polyphenols in red wine are present at higher concentrations in wines from southwestern France and Sardinia, where traditional production methods ensure these compounds are efficiently extracted during wine production.

In this study, researchers evaluated red wine samples from Australia (14), France (11), Greece (16), Italy (3), Spain (1), Sardinia (15), Argentina (33), Chile (9), Bolivia (5), Uruguay (4), and the USA (14 from California), along with various other wines from Southwest France, Georgia and South Africa.

They also looked at human aging patterns using data from the 1999 French census. The data showed six regions in Southwest and Central France with >25% higher level of men aged 75 or more, compared to the national average. Men living in Nuoro province in Sardinia also had higher longevity. (The analyses focused on men because they have been shown to benefit more than women from regular wine consumption.) Wines produced in areas of increased longevity (e.g., the Gers area of France and Nuoro province in Sardinia) were found to have 2-4-fold more polyphenol (oligomeric procyanidins or OPCs)

content and biological activity than wines from other regions. These are areas where traditional wine making methods are still used, plus the Tannat grape used in these regions is also particularly high in OPCs.

Concord Grape Juice Ranked among the Highest in Antioxidant Activity. Not all fruit juices are the same. They differ markedly in the variety of phenolic compounds and antioxidant activity, according to Alan Crozier, Professor of Plant Biochemistry and Human Nutrition, who, with colleagues at the University of Glasgow, evaluated 13 commercially available popular juices.

Concord grapes came out on top with the highest and broadest range of polyphenols and the highest overall antioxidant capacity. (The main components in purple grape juice were flavan-3-ols, anthocyanins, and hydroxycinnamates, together accounting for 93% of the total phenolic content.)

Read more background information and details of our rating system.

Grapes
1.00cup
92.00grams
61.64 calories

Nutrient	Amount	DV (%)	Nutrient Density	World's Healthiest Foods Rating
manganese	66 g		6	Excellent
vitamin C	68 g		8	Food
vitamin B1 (thiamin)	0.08 mg	5.3	1.6	good

potassium	175.72 mg	5.0	1.5	good
vitaminB6 (pyridoxine)	0.10 mg	5.0	1.5	good

World's Healthiest Foods Rating	Rule				
excellent	DV>=75%	OR	Density >=7.6	AND	DV>=10%
very good	DV>=50%	OR	Density >=3.4	AND	DV>=5%
good	DV>=25%	OR	Density >=1.5	AND	DV>=2.5%

In-Depth Nutritional Profile for Grapes

References:

1. Nature 2001 Dec 20/7;414:863-4 2001.
2. Anderson JC. Drinking red wine cuts risk of colorectal cancer. Research presented at the 71st Annual Scientific Meeting of the American College of Gastroenterology in Las Vegas, Nevada, October 23, 2006. 2006.

3. Cho E, Seddon JM, Rosner B, Willett WC, Hankinson SE. Prospective study of intake of fruits, vegetables, vitamins, and carotenoids and risk of age-related maculopathy. Arch Ophthalmol. 2004 Jun;122(6):883-92. 2004. PMID: 15197064.

4. Copinschi G. Metabolic and endocrine effects of sleep deprivation. Essent Psychopharmacol. 2005;6(6):341-7. 2005. PMID:16459757.

5. Corder R, Douthwaite JA, Lees DM, Khan NQ, Viseu Dos Santos AC, Wood EG, Carrier MJ. Endothelin-1 synthesis reduced by red wine. Nature. 2001 Dec 20-27; 414(6866): 863-4 2001.

6. Corder R, Mullen W, Khan NQ, Marks SC, Wood EG, Carrier MJ, Crozier A. Oenology: red wine procyanidins and vascular health. Nature. 2006 Nov 30; 444(7119):566. 2006. PMID: 17136085.

7. Dai Q, Borenstein AR, Wu Y, Jackson JC, Larson EB. Fruit and vegetable juices and Alzheimer's disease: the Kame Project. Am J Med. 2006 Sep; 119(9):751-9. 2006. PMID: 16945610.

8. Das A,. Food Microbiology, Presentation# 142-13). Institute of Food Technologists' Conference, Chicago, July 31, 2007. 2007.

9. Day AP, Kemp HJ, Bolton C, et al. Effect of concentrated red grape juice consumption on serum antioxidant capacity and low-density lipoprotein oxidation. Ann Nutr Metab 1997; 41(6):353-7 1997.

10. Di Castelnuovo A, Costanzo S, Bagnardi V, Donati MB, Iacoviello L, de Gaetano G. Alcohol dosing and total mortality in men and women: An updated meta-analysis of 34 prospective studies. Arch Intern Med. 2006 Dec 11-25; 166(22):2437-45. 2006. PMID: 17159008.

11. Donnelly L, et al. Inhibition by red wine extract, resveratrol, of cytokine release by alveolar macrophages in COPD. Thorax 2003; 58: 942-6l 2003.

12. Donnelly LE, Newton R, Kennedy GE, Fenwick PS, Leung RH, Ito K, Russell RE, Barnes PJ. Anti-inflammatory effects of resveratrol in lung epithelial cells: molecular mechanisms. Am J Physiol Lung Cell Mol Physiol. 2004 Oct; 287(4):L774-83. 2004. PMID: 15180920.

13. Elkind MS, Sciacca R, Boden-Albala B, Rundek T, Paik MC, Sacco RL. Moderate alcohol consumption reduces risk of ischemic stroke: the Northern Manhattan Study. Stroke. 2006 Jan;37(1):13-9. Epub 2005 Nov 23 2006. PMID: 16306464.

14. Eng ET, Ye J, Williams D, Phung S, Moore RE, Young MK, Gruntmanis U, Braunstein G, Chen S. Suppression of estrogen biosynthesis by procyanidin dimers in red wine and grape seeds. Cancer Res. 2003 Dec 1; 63(23):8516-22. 2003. PMID: 14679019.

15. Ensminger AH, Esminger M. K. J. e. al. Food for Health: A Nutrition Encyclopedia. Clovis, California: Pegus Press; 1986 1986. PMID: 15210.
16. Finkel T. Ageing: a toast to long life. Nature 2003 September 11; 425:132-133. 2003.
17. Freedman JE, Parker C 3rd, Li L, et al. Select flavonoids and whole juice from purple grapes inhibit platelet function and enhance nitric oxide release. Circulation 2001 Jun 12; 103(23):2792-8 2001.
18. Howitz, KT, Bitterman KJ, Cohen HY, Lamming DW, et al. Small molecule activators of sirtuins extend *Saccharomyces cerevisiae* lifespan. Nature 2003 September 11; 425, 191-196. 2003.
19. Iriti M, Faoro F. Grape phytochemistry: A bouquet of old and new nutraceuticals for human health. Med Hypotheses. 2006 Jun 8; [Epub ahead of print] 2006. PMID: 16759816.
20. Iriti M, Rossoni M, Faoro F. Melatonin content in grape: myth or panacea. Jour Sci Food Agric 2006 June;86(10):1432-1438. 2006.
21. Liu JC, Chen JJ, Chan P, Cheng CF, Cheng TH. Inhibition of cyclic strain-induced endothelin-1 gene expression by resveratrol. Hypertension. 2003 Dec; 42(6):1198-205. 2003.
22. Lu KT, Chiou RY, Chen LG, Chen MH, Tseng WT, Hsieh HT, Yang YL. Neuroprotective effects of resveratrol on cerebral ischemia-induced neuron loss mediated by free radical scavenging and cerebral blood flow elevation. J Agric Food Chem. 2006 Apr 19; 54(8):3126-31. 2006. PMID: 16608241.
23. Marambaud P, Zhao H, Davies P. Resveratrol promotes clearance of Alzheimer's disease amyloid-beta peptides. J Biol Chem, 2005 Nov 11;280(45):37377-82. Epub 2005 Sep 14. 2005. PMID: 16162502.
24. Miura D, Miura Y, Yagasaki K. Hypolipidemic action of dietary resveratrol, a phytoalexin in grapes and red wine, in hepatoma-bearing rats. Life Sci. Aug 1; 73(11):1393-400. 2003.
25. Miyagi Y, Miwa K, Inoue H. Inhibition of human low-density lipoprotein oxidation by flavonoids in red wine and grape juice. Am J Cardiol 1997 Dec 15; 80(12):1627-31 1997. PMID: 11650.
26. Mukamal KJ, Chung H, Jenny NS, Kuller LH, Longstreth WT Jr, Mittleman MA, Burke GL, Cushman M, Psaty BM, Siscovick DS. Alcohol consumption and risk of coronary heart disease in older adults: the Cardiovascular Health Study. J Am Geriatr Soc. 2006 Jan; 54(1):30-7. 2006. PMID: 16420195.
27. Mullen W, Marks S, Crozier A. Evaluation of phenolic compounds in commercial fruit juices and fruit drinks. J Agric Food Chem. 2007 Mar 16; [Epub ahead of print] 2007. PMID:17362029

28. Olson ER, Naugle JE, Zhang X, Bomser JA, Meszaros JG. Inhibition of cardiac fibroblast proliferation and myofibroblast differentiation by resveratrol. Am J Physiol Heart Circ Physiol. 2004 Oct 21; [Epub ahead of print] 2004. PMID: 15498824.

29. Quideau S, Jourdes M, Saucier C, Glories Y, Pardon P, Baudry C. DNA topoisomerase inhibitor acutissimin a and other flavano-ellagitannins in red wine. Angew Chem Int Ed Engl. 2003 Dec 15;42(48):6012-4. 2003. PMID: 14679557.

30. Renaud SC, Gueguen R, Conard P, Lanzmann-Petithory D, Orgogozo JM, Henry O. Moderate wine drinkers have lower hypertension-related mortality: a prospective cohort study in French men. Am J Clin Nutr. 2004 Sep; 80(3):621-5. 2004. PMID: 15321801.

31. Revel A, Raanani H, Younglai E, Xu J, Rogers I, Han R, Savouret JF, Casper RF. Resveratrol, a natural aryl hydrocarbon receptor antagonist, protects lung from DNA damage and apoptosis caused by benzo[a]pyrene. J Appl Toxicol Jul-Aug; 23(4):255-61 2003.

32. Rimando A. Pterostilbene as a new natural product agonist for the peroxisome proliferators-activated receptor alpha isoform. Paper presented at the 228th American Chemical Society National Meeting, Philadelphia, PA, August 23, 2004. 2004.

33. Rivero-Cruz JF, Zhu M, Su B, Kinghorn AD. Antimicrobial phytochemicals in Thompson seedless raisins (*Vitis vinifera* L.) inhibit dental plaque. Paper presented at the 105th General Meeting of the American Society for Microbiology, Atlanta, GA, June 8, 2005. 2005.

34. Roberti M, Pizzirani D, Simoni D, Rondanin R, Baruchello R, Bonora C, Buscemi F, Grimaudo S, Tolomeo M. Synthesis and biological evaluation of resveratrol and analogues as apoptosis-inducing agents. Med CHem Jul 31; 46(16):3546-54 2003.

35. Ruano-Ravina A, Figueiras A, Barros-Dios JM. Type of wine and risk of lung cancer: a case-control study in Spain. Thorax. 2004 Nov;59(11):981-5. 2004. PMID: 15516476.

36. Sagdic O. Grape pomace extract, a natural food preservative to destroy pathogens. Reading Scientific Services Limited, Food News, August 20, 2004. 2004.

37. Scarlatti F, Sala G, Somenzi G, Signorelli P, Sacchi N, Ghidoni R. Resveratrol induces growth inhibition and apoptosis in metastatic breast cancer cells via de novo ceramide signaling. FASEB J. 2003 Dec; 17(15):2339-41. 2003.

38. Shukitt-Hale B, Carey A, Simon L, Mark DA, Joseph JA. Effects of Concord grape juice on cognitive and motor deficits in aging. Nutrition. 2006 Mar;22(3):295-302. Epub 2006 Jan 18. 2006. PMID: 16412610.

39. Srinivasan V, Maestroni G, Cardinali D, Esquifino A, Perumal SP, Miller S. Melatonin, immune function and aging. Immun Ageing. 2005 Nov 29;2:17. 2005. PMID: 16316470.

40. Stewart JR, Artime MC, O'Brian CA. Resveratrol: a candidate nutritional substance for prostate cancer prevention. J Nutr Jul; 133(7 Suppl): 2440S-2443S 2003.

41. Stocker R, O'Halloran RA. Dealcoholized red wine decreases atherosclerosis in apolipoprotein E gene-deficient mice independently of inhibition of lipid peroxidation in the artery wall. Am J Clin Nutr. 2004 Jan; 79(1):123-30. 2004.

42. Szewczuk LM, Penning TM. Mechanism-based inactivation of COX-1 by red wine m-hydroquinones: a structure-activity relationship study. J Nat Prod. 2004 Nov; 67(11):1777-82. 2004. PMID: 15568761.

43. Tate P, God J, Bibb R, Lu Q, Larcom LL. Inhibition of metalloproteinase activity by fruit extracts. Cancer Lett. 2004 Aug 30;212(2):153-8. 2004. PMID: 15279895.

44. Vgontzas AN, Zoumakis M, Papanicolaou DA, Bixler EO, Prolo P, Lin HM, Vela-Bueno A, Kales A, Chrousos GP. Chronic insomnia is associated with a shift of interleukin-6 and tumor necrosis factor secretion from nighttime to daytime. Metabolism. 2002 Jul; 51(7):887-92. 2002. PMID: 12077736.

45. Waterhouse A. Saponins, a new cholesterol fighter, found in red wine. Study presented September 8, 2003, at the 226th national meeting of the American Chemical Society, September 7-11, 2003, NYC. 2003.

46. Wood, Rebecca. The Whole Foods Encyclopedia. New York, NY: Prentice-Hall Press; 1988 1988. PMID: 15220.

47. Zern TL, Wood RJ, Greene C, West KL, Liu Y, Aggarwal D, Shachter NS, Fernandez ML. Grape polyphenols exert a cardioprotective effect in pre- and postmenopausal women by lowering plasma lipids and reducing oxidative stress. J Nutr. 2005 Aug; 135(8):1911-7. 2005. PMID: 16046716.

More of the World's Healthiest Foods (& Spices)!

Peaches

August is National Peach Month.

The finest peaches of all are considered to be the *pêches de vigne*, which are small, red-fleshed fruits grown in vineyards in France and generally found only there. Covered with grayish down, they are not particularly attractive, but the flavor is said to be superb one of the world's favorite fruits.

Peaches are believed to be native to China. They are cultivated throughout warm temperate and subtropical regions of the world. In the peach fruit, the stone is covered with a fleshy substance that is juicy, melting, and of fine flavor when matured and mellowed.

The peach originated in China and has been cultivated at least since 1000 B.C.E. It has special significance in Chinese culture. The peach tree is considered to be the tree of life and peaches are symbols of immortality and unity. Peach blossoms are carried by Chinese brides.

The peach (Prunus persica) is known as a species of Prunus native to China that bears an edible juicy fruit also called a peach. It is a deciduous tree growing to 4–10 m tall, belonging to the subfamily Prunoideae of the family Rosaceae. It is classified with the almond in the subgenus Amygdalus within the genus Prunus, distinguished from the other subgenera by the corrugated seed shell.

The leaves of the tree are lanceolate, 7–16 cm long (3–6 in), 2–3 cm broad, innately veined. Strangely enough the flowers are produced in early spring before the leaves. They are solitary or paired, 2.5–3 cm diameter, pink, with five petals. The fruit has yellow or whitish flesh, a delicate aroma, and a skin that is either velvety (peaches) or smooth (nectarines) in different cultivars. The flesh is very delicate and easily bruised in some cultivars, but is fairly firm in some commercial varieties, especially when green. The single, large seed is red-brown, oval shaped, approximately 1.3–2 cm long, and is surrounded by a

wood-like husk. Peaches, along with cherries, plums and apricots, are stone fruits (drupes).

The scientific name is persica, along with the word 'peach' itself and its cognates in many European languages, derives from an early European belief that peaches were native to Persia (now Iran). The modern botanical consensus is that they originate in China, and were introduced to Persia and the Mediterranean region along the Silk Road before Christian times. Cultivated peaches are divided into clingstones and freestones, depending on whether the flesh sticks to the stone or not; both can have either white or yellow flesh. Peaches with white flesh typically are very sweet with little acidity, while yellow-fleshed peaches typically have an acidic tang coupled with sweetness, though this also varies greatly. Both colors often have some red on their skin. Low-acid white-fleshed peaches are the most popular kinds in China, Japan, and neighboring Asian countries, while Europeans and North

Americans have historically favored the acidic, yellow-fleshed kinds.

Peaches traveled west via the silk roads to Persia, earning them the botanical name *Prunus persica.* In Persia, peaches were discovered by Alexander the Great, who mentions half a dozen types, and who introduced them to the Greeks.

By 322 B.C.E. Greece enjoyed the peach, and by 50 to 20 B.C.E., Romans grew and sold them for the modern equivalent of $4.50. The Romans called the peach a Persian apple, and the name for peach in numerous languages is the name for Persia. Once the Romans cultivated the fruit, they were able to transport it north and west to other countries of their European empire.

In different languages the fruit is known by different names. Pêche in French, Pfirsich in German, pesca in Italian, melocotón in Spanish, pêssego in Portuguese, fersken in Danish/Norwegian, persika in Swedish, persikka in Finnish, persik in Russian, brzoskwinia in Polish, breskva in Serbo-Croat, piersica in Romanian, praskova in ulgarian, robakinon in Greek, seftali in Turkish, afarseq in Hebrew, khúkh in Arabic, hulu in Persian, arú in Hindi, tao in Chinese, momo in Japanese, and persik in Indonesian.

It is said that Spaniards brought peaches to South America and the French introduced them to Louisiana. The English took them to their Jamestown and

Massachusetts colonies. Columbus brought peach trees to America on his second and third voyages.

Even to this day China remains the largest world producer of peaches, with Italy second. Italy is the main exporter of peaches in the European Union; the regions of Campania and Emilia Romagna account for more than 50% of Italy's annual production. California produces more than 50% of the peaches in the United States (and grows 175 different varieties). So many peaches are grown in Georgia that it became known as the Peach State.

Truely wild peaches are only found in China. Unlike the cultivated fruit, the wild fruit is small, sour and very fuzzy.

Peach Varieties:

Peaches are available throughout the year. The season dictates the variety. There are several varieties of Peaches. These are discussed below.

1. Clingstone

From mid - June when the market shifts from freestone (Elegant Lady), clingstone variety is available in the market. Peach varieties can be either clingstone, where the flesh of the fruit clings to the stone, or freestone, where the stone readily twists away from the fruit. The

former type is generally used for canning. While the latter, is generally found in supermarkets only. Clingstone and Freestone peaches are available in both white and yellow varieties.

2. Free stone:

This variety is available from late April to June. Asians generally prefer the sweeter and less acidic white varieties of peach. The sweetness is due to the 'honey gene,' a dominant gene that is found in all Chinese peach varieties. Europeans and Americans have typically cultivated the yellow – skin, yellow – flesh varieties, which have higher acid.

Giant yellow peaches

The downy skin of the peach is generally flushed with red coloring, in both yellow and white varieties. The most widely – available peaches are round with a pointed end, but they can also be flat and disc-shaped. The donut peach, which is flat with rounded sides that draw in toward an indented center, like a doughnut without a hole, is a descendant of the flat Chinese peach. A flat – variety "Saturn" peach, so – called because it resembles the rings of Saturn.

On the off seasons peaches are imported into the U.S. from Chile and Mexico. Fresh varieties are sold as freestone while clingstone is usually used for canning. The fruit inside these peaches is either yellow or white. The white flesh is a 'sub-acid' fruit its flavor is more sugary sweet. The more traditional color is yellow. It's more acidic, which does give it a bit more flavor. Half of the United States crop comes from the South and the

other half from California. The United States also produces 25% of the total world market.

Selecting:

When selecting fresh peaches, look for ones that are soft to the touch, blemish free, and have a fragrant smell. Peaches that are mildly fragrant ripen into sweet and delicious flavors. Choose fruit that has a background color of yellow or cream and has a fresh looking appearance. Peaches may have some red 'blush' depending on the variety, but this isn't a sign of how the fruit will taste after it's ripened. At home peaches can be ripened at room temperature in a brown paper bag in 2 to 3 days. Peaches are highly perishable, so never buy more than you plan to use. When selecting can peaches, choose those labeled 'packed in its own juice' with 'no added sugar'. These are the healthier choices.

Storing:

The best time to eat peaches is when they are ripe. If they need to be stored they should be stored out of the sun in a cool area or stored in the refrigerator for 3 to 5 days. Peaches that need to be ripened can be stored in the refrigerator for up to 2 weeks, and then ripened in a bag as stated above. Ripe peaches taste best when they are eaten at room temperature. So remember to take them out of the refrigerator one hour before eating. That way you'll really enjoy their sweet and juicy flavor!

Nutrition and Facts:

Peaches are a good source of vitamins A, B and C. A medium peach contains only 37 calories.

You can ripe peaches by placing them in a brown paper bag for two to three days. Sliced, fresh peaches should be tossed in lemon or lime juice to prevent browning.

Nectarines are a variety of peach with a smooth skin, *not* a cross between a peach and a plum.

The juice from peaches makes a wonderful moisturizer, and it can be found in many brands of cosmetics.

Honey Royale Nectarines

A peach pit contains hydrocyanic acid, which is a poisonous substance.

Like the plum and the apricot, the peach is a member of the rose family (*Rosaceae*), distinguished by its velvety skin. It is classified as a drupe, a fruit with a hard stone.

Famous Peach Dishes:

The Bellini:

This is a fresh peach purée and Spumante, an Italian sparkling wine. Champagne or other sparkling wine can also be used. The drink is said to have originated in the 1930s at Harry's Bar in Venice, a favorite haunt of Ernest Hemingway, and is named for the 15th century Venetian painter Giovanni Bellini. The peachy color of the cocktail reminded Cipriani of the color of the garments of St. Francis in a famous Bellini painting; Cipriani named the drink in Bellini's honor.

Peach Melba:

This relish is made with poached peaches, vanilla ice cream and raspberry purée. The dessert is named after Nellie Melba, the great Australian operatic soprano.

Peaches are a favorite fresh snacking fruit and cereal fruit, and make wonderful pies and jams. Peach ice cream is a summer favorite. Ripe peaches also freeze well for later use.

Nutritional Facts:

Peaches are free from both Fat, and Saturated fat. Peaches are also free from Sodium, and Cholesterol fruit that is high in vitamin A and a good source of vitamin C.

Detailed nutritional information can be found by searching the USDA Nutritional Database. Enter 'Peach' (no quotes) as the keyword and select the link and report of interest.

Use:

Wash peaches carefully in cool soapy water, then rinse well before eating or using. If used in cooking they peel really fast if blanched in boiling water for a minute then plunged into ice water to cool. In fruit salads or platters, sprinkle cut peaches with lemon juice to help them keep their great color.

Make Peaches Part of Your 5 a Day Plan whether fresh, canned or frozen, peaches are nutritious: fat free, cholesterol free, sodium free, and high in vitamins A and C. One serving in your 5 a day plan is equal to one medium size fruit, 1/2 cup of cut up, canned, frozen or fresh fruit, or 6 oz of 100% peach juice. Peaches can be enjoyed in a variety of ways.

Slice peaches and add to your favorite cereal or as a topper to pancakes or waffles.

Take a peach or a cup of canned peaches to work or school for a light snack.

Include peaches in low fat yogurt or cottage cheese and put on toast.

Combine peaches and other fresh fruits into a fruit salad and use as a dessert or appetizer before dinner. Keep it tasty and brightly colored by adding a bit of concentrated orange juice.

Make a peach smoothie with yogurt and peaches in a blender for breakfast or a snack.

Bake, grill, or broil and serve along with your favorite meat or fish dinners.

As a dessert cut it fresh and add to angel food cake or over low fat frozen yogurt.

Freeze a can of peaches in the freezer then open and blend in the blender for a great summer dessert sorbet. As with many other members of the rose family, peach seeds contain cyanogenetic glycosides, including amygdalin (note the subgenus designation: Amygdalus). These substances are capable of decomposing into a sugar molecule and hydrogen cyanide gas. While peach seeds are not the most toxic within the rose family, that dubious honor going to the bitter almond, large doses of these chemicals from any source are hazardous to human health.

PEACH

Cherries

The very look of cherries attracts people of all ages from children to adults. People long to eat fresh cherries as these are harvested from the tree. It is a joy of its own. And watching the cherries adorning the shelves of a supermarket is a joy of another dimension. These pictures have been taken in supermarkets and in the cherry plantation.

Cherries taste best consumed ‘warm’ from the tree. Often jelly is made because they cannot be stored. Cherries can be frozen but you better remove the stones first.

The cherry is the fruit of many plants of the genus Prunus. It is a fleshy fruit that contains a single stony seed. The cherry fruits of commerce are usually obtained from a limited number of species, including especially cultivars of the wild cherry, Prunus avium.

The name 'cherry', often as the compound term 'cherry tree', may also be applied to many other members of the genus Prunus, or to all members of the genus as a collective term. The fruits of many of these are not cherries, and have other common names, including plum, apricot, peach, and others. The name 'cherry' is also frequently used in reference to cherry blossom.

True cherry fruits are borne by members of the subgenus Cerasus which is distinguished by having the flowers in small corymbs of several together (not singly, nor in racemes), and by having a smooth fruit with only a weak groove or none along one side. The subgenus is native to the temperate regions of the Northern Hemisphere, with two species in America, three in Europe, and the remainder in Asia.

Botany:

Sweet Cherry has vigorous tree with strong apical control with an erect – pyramidal canopy shape, capable of reaching 50 ft. In cultivation, sweet cherries are maintained 12-15 ft in height. Leaves are relatively large (largest of cultivated Prunus), elliptic with mildly serrate margins, acute tips, petioled, and strongly veined.

Sour Cherry tree is of medium sized tree with a rounder, more spreading habit than the erect sweet cherry. The tree is less than 15 ft in cultivation. Leaves elliptic with acute tips mildly serrate margins, smaller than sweet cherry, with long petioles.

The cherry tree grows up to 9 m., in height. Cherries are native in Europe. Cherry trees range in size, from 6 to 30 feet tall depending on the cultivar. There are also some shrub cherry cultivars such as 'Red Nanking' cherry. The

cherry tree has distinct reddish brown bark with rows or patches of horizontal markings called lenticels.

The majority of eating cherries are derived from either Prunus avium, the wild cherry (sometimes called the sweet cherry), or from Prunus cerasus, the sour cherry.

Cherry leaves are pale to dark green in color and alternately arranged along the stem. The simple leaves are 2 to 6 inches long with a finely toothed margin.

The Cherry fruit is part of the Rosaceae family and this also includes almonds, peaches, apricots and plums. Cherries are small and fleshy red or reddish black fruits that contain a hard drupe. It is believed that the Romans discovered the sweet cherry fruit in the Asia Minor in about 70 BC. They then introduced them in the first century AD to Britain. Cherries are available in many

species but there are generally only two kinds that are commonly eaten-the wild cherry and the sour cherry.

This cherry fruit has always been very popular as a part of desserts and other culinary purposes. The ancient days saw the cherry fruit being used for their medicinal purposes as well. Let us take a look at some facts about these red cherry fruits.

Species:

This list contains many Prunus species that bear the common name cherry; however they are mostly of little or no value for their fruit. For a complete list of these, see

Prunus. Some common names listed here have historically been used for more than one species, e.g. 'Rock cherry' is used as an alternative common name for both P. prostrata and P. mahaleb.

Description and storage:

Cherry are small soft round fruit, red or black when ripe, containing a stone or seed. Cherries always have to be picked ripe. They do not ripe well after they have been picked. You can keep cherries for one to three days.

Types and family:

There are red, black and yellow cherries. The fruit has several other peculiar characteristics.

Cherry fruits are roughly round with a depression at apex (top) of the fruit. The skin is smooth and shiny and usually ranges from pale to very dark red, although yellow and white cultivars exist.

Sweet and sour cherries are the two common types of cherries.

The Cherry Fruit Facts:

The Cherry fruit is known to grow in many areas of the United States. It is noticed that sweet cherries prove to be difficult to grow. Sour cherries are grown mainly in the Eastern side.

Cherries are very easily perishable and they rarely ripen after harvest. Therefore, you need to refrigerate them soon after their purchase. These can remain fresh in the fridge for at least 2 days.

The German word Kirsch-the cherry liqueur comes from the word karshu. This is the name given to the cherries that were first cultivated in Mesopotamia in 8 BC.

Cherries are very versatile fruits and can be a part of any meal or dessert. From breakfast to soups and salads, these find their way into any food item easily! Being delicious, these can be frozen and devoured whenever you wish!

Studies have shown the cherry fruit to have plenty of health benefits. These are known to provide pain relief for people who suffer from arthritis. It is said that eating 20 tart cherries in a day can prove to fight inflammation effectively.

Red cherries are also very high in melatonin. These are known to destroy the toxins that cause diseases. The

cherry fruit is also high in antioxidants that help to fight cancer and heart disease.

The cherry fruits are low in cholesterol, fat and sodium. They are also a very good source of fiber and Vitamin C.

Since the cherry fruit bruises easily, you need to handle them with care. While buying Cherries look for a bright color and those that have a supple exterior. Cherries, which are plump and firm, are very good to taste. If you are looking for good quality cherries, try to go in for cherries with their green stems attached.

Tart cherries and tart cherry juice are known to reduce the urate (a salt of uric acid) levels in the body. These are also known to reduce muscle pain and back pain. The benefits of tart cherries are also found even if they are frozen, in the form of juice or canned. Sweet cherries as well as tart cherries have very high levels of anthocyanins. This is the red pigment in the cherries, which helps to reduce the inflammation.

Sweet as well as sour cherries can be used for jams. Sour cherries are used more often as an ingredient in pies and are suitable for making soufflés, cooked fruit compotes etc.

Cherries are also known to have a very short fruiting season. It is during the Christmas time, one sees these plants at their peak, especially in Australia. Areas of Northern America see these cherries as the first ones to

ripen amongst other trees; therefore the term ‘in cherry condition’ has been derived which means something new.

Michigan has around 35,000 acres of tart cherry trees. This place grows almost 75% of the tart cherries, which are produced in the United States. The Traverse City is therefore called the Cherry Capital of the World. The sweet cherries are grown in large numbers in Washington.

The cherry fruit extract contains antioxidant flavanoids and are used in many tablets and capsules. These capsules are used to support the pH levels of the body.

Cherries are members of the Rosaceae family, subfamily Prunoideae. They occupy the Cerasus subgenus within Prunus, being fairly distinct from their stone fruit relatives plums, apricots, peaches, and almonds. Prunus avium L. is the Sweet Cherry, and Prunus cerasus L. the Sour, Pie, or Tart Cherry.

Sweet Cherry Cultivars:

There are less than 100 sweet cherry cultivars (a variety of a cultivated plant that is developed by breeding and has a designated name) grown in the major production regions around the world today. ‘Bing’, 'Napoleon’ (syn. 'Royal Ann'), ‘Ranier’, and ‘Lambert’ are the most important cultivars in North America. Pollinizers for 'Bing' are often ‘Early Burlat’, ‘Black Tartarian’, and ‘Van’.

There are a few self compatible cultivars such as ‘Stella’ and ‘Lapins’, but they are of poorer quality than ‘Bing' and others that form the basis of the industry.

Sour Cherry Cultivars:

'Montmorency' is by far the main sour cherry in the USA and Canada, accounting for 99% of all production. In Europe, ‘Schattenmorelle' is a major cultivar.

ORIGIN, HISTORY OF CULTIVATION:

Sweet Cherry:

P. avium originated in the area between the Black and Caspian seas of Asia Minor. Birds may have carried it to Europe prior to human civilization. Cultivation probably began with Greeks, and was perpetuated by Romans, where it was believed to be an essential part of the Legionnaire’s diet (this lead to the spread throughout Europe). Trees were planted along roadsides and were valued for their timber as well as their fruit. Sweet cherries came to the USA with English Colonists in 1629, and later were introduced to California by Spanish Missionaries. In the 1800's sweet cherries were moved west by pioneers and fur traders to their major sites of production in Washington, Oregon, and California. Cultivars selected at that time still form the base of the industry today.

Sour Cherry:

There is good evidence suggesting that P. cerasus, a tetraploid, arose from a natural cross between P. avium and P. fruticosa (Ground cherry). The geographic ranges of the two species overlap in northern Iran and Turkmenistan, which is the center of origin of sour cherry. From there, sour cherry followed a similar course to Europe as sweet cherry, and ultimately came to North America with English settlers. It is more tolerant of the humid, rainy eastern conditions, and therefore proliferated there more than sweets, where it is still cultivated today in greatest numbers. Low monetary returns make sour cherry a less attractive investment than sweet cherry. Thus, it has been planted in western states only to a limited extent. Michigan, the leading producer, grows sour cherries along the eastern shore of Lake Michigan, where the moderating influence of the lake on winter and spring temperatures is beneficial to production.

Production:

Sweet Cherry - 1,896,522 MT or 4.2 billion pounds. Sweet cherries are produced commercially in 65 countries on over 900,000 acres. Worldwide yield averages just over 4500 lbs/acre.

Top 10 countries:

(% of world production)
1. Iran (12)
2. Turkey (12)
3. USA (9)
4. Italy (7)
5. Spain (6)
6. Germany (6)
7. Russia (6)
8. France (4)
9. Romania (4)
10. Ukraine (4)

Sour cherry:

1,035,650 MT or 2.3 billion pounds is the annual production of sour cherries worldwide.. Sour cherries are grown in 27 countries worldwide on 613,000 acres. Yields are 3700 lbs/acre worldwide.

Top 10 countries:

(% of world production)
1. Russia (24)
2. Poland (20)
3. Turkey (12)
4. Germany (8)
5. Iran (6)
6. Serbia & Montenengro (6)
7. Hungary (4)
8. Belarus (4)
9. USA (3)
10. Czech Republic (2)

Flowers:

Sweet Cherry brings white flower, with long pedicels, born in racemose clusters of 2-5 flowers on short spurs

with multiple buds at tips; the distal bud is vegetative and continues spur growth. Spurs are long-lived, producing for 10-12 years. Ovary position is perigynous with a distinct hypanthium, characteristic of stone fruits.

Sour Cherry individual flowers are the same as for sweet cherry. Sour cherry inflorescence buds usually produce 2-4 flowers, with long pedicels, as in sweet cherry. However, many are borne laterally on 1-yr wood, not exclusively on spurs as in sweets. Spurs are shorter-lived on sour than sweet, gradually declining in productivity over 3-5 years. Sour cherries are the latest blooming of the stone fruits.

Pollination:

Sweet Cherry:

Pollination is absolutely essential for production, since sweet cherries are self – incompatible and need a high degree of fruit set (25-50%) for a commercial crop. In addition to self-incompatibility, there is a high degree of cross-incompatibility. Pollinizers are set every third tree in every third row, or a ratio of 8-9:1. Honey bees are the main pollinator.

Sour Cherry. Sour cherries are self-fertile, and require no pollinizers.

Fruit:

Sweet Cherry - A drupe: ½" to 1 1/4", round or heart-shaped, glabrous, with long pedicel attached. The pit is generally smooth, and encloses a single seed. The skin color is generally deep red or purple (often referred to as "black"), yellow, or rarely white. Yellow fruit often have a red cheek. The flesh color varies from white to dark red. Fruit is borne on short spurs that arise from older wood. Sweet cherries require only about 2-3 months for fruit development. Thinning is unnecessary.

Sour cherries generally have lower sugars and higher organic acid contents than sweet cherries, giving them their distinct flavor. They are generally bright red in color, and exhibit less color variation than sweets. 'Montmorency' produces about 2/3 of fruit laterally on longer wood, and 1/3 on spurs. Sour cherries require only about 2-3 months for fruit development. No thinning is required.

Maturity:

Traditionally, color change and soluble solids content are used to signal maturity. However, 'fruit removal force' has been used more recently, and is more reliable. This is based on the progressive abscission of the fruit from the pedicel starting about 2 weeks before maturity. It is measured by a pull gauge, which pulls the fruit from the

pedicel and registers the force required to remove the fruit.

Harvest Method:

Sweet cherries for fresh consumption are harvested by hand, usually leaving the pedicels intact. They are harvested at firm-mature stage to reduce bruising. Sweets intended for processing are hand harvested also, but without pedicels. Sour cherries intended for processing are shaken from trees when ripe. Ethephon, an ethylene releasing compound, is applied about 2 weeks prior to harvest to reduce fruit removal force, and increase % fruit harvested.

Post Harvest Handling:

Both sweet and sour cherries have extremely short shelf lives, and must be handled gently to reduce bruising and oxidation. Sour cherries for processing are dumped into cold water immediately following harvest. They are then transported to processing plants, where they are washed, de-stemmed, pitted, and packed for freezing, all within hours from harvest. Sweet cherries are hydro-cooled or dumped into cold water by pickers, and packed in shallow flats after being sorted based on color and size.

Storage:

Shelf life of fresh cherries is only a few days at room temperature, and about 2 weeks at 32°F. Sour cherries canned or frozen can be stored several months. They are subject to the same post-harvest diseases (brown rot, grey mold, blue mold, Rhizopus, Alternaria, etc.) as other stone fruits.

Maraschino cherries are made mostly from sweet cherries, but a small proportion of sour cherries are brined for this purpose. Cherries with clear flesh are picked slightly early, perhaps are de-colorized with SO2, then steeped in Marasca, a liqueur distilled from the fermented juice of wild cherries. Sour cherries are primarily processed into pie fillings. Per capita consumption of cherries is 1.9 lbs/year, divided approximately equally between fresh (sweet) and canned and frozen (sour) cherries.

One little known fact is that only two species of cherry fruit can be found in America, three can be found in Europe, and the remainder of the cherry species can be found in Asia.

Cherries have a very short fruiting season. In Australia they are usually at their peak around Christmas time. In Southern Europe and America, they are most ripe and at their peak in June. In the United Kingdom, they are ripe

and ready to eat around mid July and during the summer season.

In many parts of North America, cherry fruit trees are among the first fruit trees that ripen. As of 2003 the annual world production of domesticated cherries was about 3 million tons, with one third of this number consisting of sour cherries.

In addition to being an enjoyable fruit, they have attractive flowers and are commonly planted for their flower display in spring. Several of the Asian cherries are particularly noted for their flower display. The Japanese Sakura, for example, is a national symbol that is displayed yearly at the Hanami festival. Most of the flowering cultivars are sterile and do not bear fruit.

The cherry fruit selected for eating are derived primarily from two species, the Wild cherry and the Sour cherry. The Wild variety has given rise to the Sweet variety and many other varieties. The Sour variety has been used mainly for cooking.

The high costs of production, more specifically costs related to irrigation, spraying, labor, as well as their proneness to damage from rain and hail makes the cherry fruit relatively expensive. Nonetheless, there is a high demand for this nutritious and delicious fruit.

Vitamins, Minerals and Photo-chemical Components

The cherry fruit contains dietary fiber and minerals like calcium, iron, magnesium, phosphorous, potassium, sodium, zinc, copper, manganese, and selenium. In addition, small amounts of vitamins A, C, B6, B12, E, thiamin, riboflavin, niacin, and pantothenic acid can be found in cherries.

They also contain Beta carotene, with sour cherries being shown to have more Beta carotene than sweet cherries. Cherry fruit have antioxidants like pectin and anthocyanins that have been linked to the prevention of cancer and heart disease.

Surprisingly, the actual juice from cherries is a potent antibacterial agent that fights tooth decay. Studies performed at Forsyth Dental Center have shown that black cherry juice can block up to 89% of enzyme activity that normally leads to plaque formation.

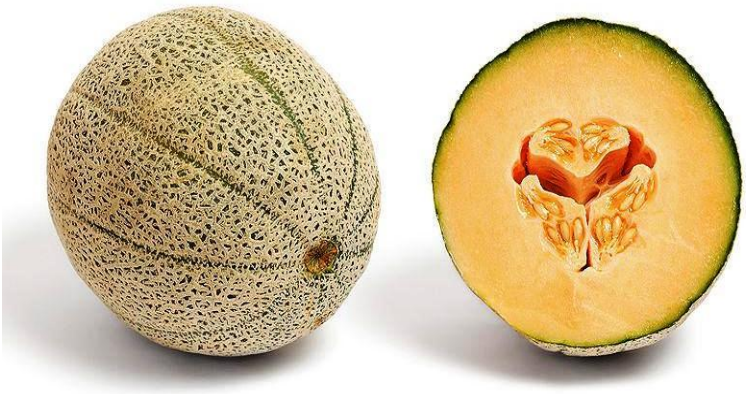
Dietary value, per 100 gram edible portion:

	Sweet cherry	**Sour cherry**
Water (%)	80	84
Calories	70	58
Protein (%)	1.3	1.2
Fat (%)	0.3	0.3
Carbohydrates	17	14

(%)		
Crude Fiber (%)	< 1	< 1
	% of US RDA*	
Vitamin A	2.2	20
Thiamin, B1	3.6	3.6
Riboflavin, B2	3.8	3.8
Niacin	2.2	2.2
Vitamin C	22.2	22.2
Calcium	2.8	2.8
Phosphorus	2.4	2.4
Iron	4.0	4.0
Sodium	---	---
Potassium	4.1	4.1

* Percent of recommended daily allowance set by FDA, assuming a 154 lb male adult, 2700 calories per day.

Cantaloupe



It is no wonder that the cantaloupe with its refreshingly rich flavor and aroma and minimal number of calories is the most popular variety of melon in the United States and other parts of the world. With its refreshing effect Cantaloupe is very popular fruit throughout. Although they have become increasingly available throughout the year, their season runs from June through August when they are at their best.

The cantaloupe derives its name from the ltalian papal village of Cantalup, where it was first cultivated around 1700 A.D. It belongs to the same family as the cucumber, squash, pumpkin and gourd, and like many of its relatives, grows on the ground on a trailing vine. Cantaloupe are also referred to as a netted melon because it has a ribless rind with a distinctive netted skin. Inside of the melon there is a hollow cavity that contains seeds encased in a web of netting. Cantaloupe is also known as rockmelon in several parts of the world.

Cantaloupe (also cantaloup, muskmelon or rockmelon) refers to two varieties of Cucumis melon, which is a species in the family Cucurbitaceae, which includes nearly all melons and squashes. Cantaloupes range in size from 0.5 kg to 5.0 kg. Originally cantaloupe referred only to the non-netted orange-fleshed melons of Europe; however, in

more recent usage it has come to mean any orange – fleshed melon (C. melon).

Because they are descended from tropical plants, and tend to require warm temperatures throughout a relatively long growing period, cantaloupes grown in temperate climates are frequently started indoors, and grown indoors for 14 days or longer, before being transplanted outdoors.

Cantaloupe are often picked, and shipped, before fully ripening. Post – harvest practices include treatment with a sodium hypochlorite wash to prevent mold growth, and salmonella growth. However this treatment, because it can mask the melon's musky aroma, can make it difficult for the purchaser to judge the relative quality of different cantaloupes.

Choosing a ripe melon depends on the preferences of the individual. For a heavy musk flavor and softer flesh look for an Eastern Shipper with a strong yellow color, no stem (peduncle) attached, and a strong musk odor. For a sweeter crisper melon look for a Western shipper and a melon without stem (peduncle) attached and a mild musk odor. For a very sweet melon with little or no musk choose a fruit that has the stem still on the fruit and no aroma.

Cantaloupe is normally eaten as a fresh fruit, as a salad, or as a dessert with ice cream or custard. Melon pieces wrapped in prosciutto are a familiar modern antipasto.

Sanjeev Kapoor, the Indian Master Chef describes the charentais variety: 'the orange, sugary and fragrant flesh makes this fruit popular both as a dessert or main course. These have smooth gray-green rinds and very fragrant orange flesh. It keeps well when stored in a cool, dry place and ripens after several days in a warm room.'

Because the surface of a cantaloupe can contain harmful bacteria—in particular, salmonella it is always a good idea to wash a melon thoroughly before cutting for consumption. Optimum preparation procedures are required to store the fruit after cutting for less than three days to prevent risk of Salmonella or other bacterial pathogens.

A moldy cantaloupe in a Peoria, Illinois market in 1941 was found to contain the best and highest quality penicillin after a worldwide search.

Health Benefits:

Cantaloupe Gets an A+ in our food ranking system. Cantaloupe is qualified as an excellent source of vitamin A on account of its concentrated beta – carotene content. Once inside the body, beta – carotene can be converted into vitamin A, so when you eat cantaloupe it's like getting both these beneficial nutrients at once. One cup of cantaloupe is just 56 calories, but provides 103.2% of the daily value for vitamin A. Both vitamin A and beta – carotene are important vision nutrients. In a study of over

50,000 women nurses aged 45 to 67, women who consumed the highest dietary amount of vitamin A had a 39% reduced risk of developing cataracts. In another study that looked at the incidence of cataract surgery and diet, researchers found that those people who ate diets that included cantaloupe had half the risk of cataract surgery, while those who ate the highest amounts of butter, salt and total fat had higher risks for cataract surgery. Beta-carotene has also been the subject of extensive research in relationship to cancer prevention and prevention of oxygen-based damage to cells.

Cantaloupe also emerged from our food ranking system as an excellent source of vitamin C. While beta – carotene and vitamin A are fat soluble antioxidants, vitamin C functions as an antioxidant in the water-soluble areas of the body. So, between its beta-carotene and vitamin C content, cantaloupe has all areas covered against damage from oxygen free radicals. In addition to its antioxidant activity, vitamin C is critical for good immune function. Vitamin C stimulates white cells to fight infection, directly kills many bacteria and viruses, and regenerates Vitamin E after it has been inactivated by disarming free radicals. Owing to the multitude of vitamin C's health benefits, it is not surprising that research has shown that consumption of vegetables and fruits high in this nutrient is associated with a reduced risk of death from all causes including heart disease, stroke and cancer. One cup of cantaloupe contains 112.5% of the daily value for this well-known antioxidant.

In our food ranking system, cantaloupe also qualified as a very good source of potassium and a good source of vitamin B6, dietary fiber, folate, and niacin (vitamin B3). The combination of all these B complex vitamins along with the fiber found in cantaloupe make it an exceptionally good fruit for supporting energy production through good carbohydrate metabolism and blood sugar stability. These B complex vitamins are required in our cells for processing carbohydrates (including sugars), and cantaloupe's fiber helps ensure cantaloupe's sugars are delivered into the bloodstream gradually, keeping blood sugar on an even keel.

Cantaloupe's Pro – vitamin A Promotes Lung Health

If you or someone you love is a smoker, or if you are frequently exposed to secondhand smoke, then making vitamin A-rich foods, such as cantaloupe, part of your healthy way of eating may save your life, suggests research conducted at Kansas State University.

While studying the relationship between vitamin A, lung inflammation, and emphysema, Richard Baybutt, associate professor of nutrition at Kansas State, made a surprising discovery: a common carcinogen in cigarette smoke, benzo(a)pyrene, induces vitamin A deficiency.

Baybutt's earlier research had shown that animals fed a vitamin A-deficient diet developed emphysema. His latest animal studies indicate that not only does the benzo(a)pyrene in cigarette smoke cause vitamin A

deficiency, but that a diet rich in vitamin A can help counter this effect, thus greatly reducing emphysema.

Baybutt believes vitamin A's protective effects may help explain why some smokers do not develop emphysema. 'There are a lot of people who live to be 90 years old and are smokers,' he said. 'Why? Probably because of their diet…The implications are that those who start smoking at an early age are more likely to become vitamin A deficient and develop complications associated with cancer and emphysema. And if they have a poor diet, forget it.'

If you or someone you love smokes, or if your work necessitates exposure to second hand smoke, protect yourself by making sure that at least one of the World's Healthiest Foods that are rich in vitamin A, such as cantaloupe, is a daily part of your healthy way of eating.

Protect your vision with cantaloupe:

Your mother may have told you carrots would keep your eyes bright as a child, but as an adult, it looks like fruit is even more important for keeping your sight. Data reported in a study published in the Archives of Ophthalmology indicates that eating 3 or more servings of fruit per day may lower your risk of age – related macular degeneration (ARMD), the primary cause of vision loss in older adults, by 36%, compared to persons who consume less than 1.5 servings of fruit daily.

In this study, which involved over 100,000 women and men, researchers evaluated the effect of study participants' consumption of fruits; vegetables; the antioxidant vitamins A, C, and E; and carotenoids on the development of early ARMD or neovascular ARMD, a more severe form of the illness associated with vision loss. Food intake information was collected periodically for up to 18 years for women and 12 years for men.

While, surprisingly, intakes of vegetables, antioxidant vitamins and carotenoids were not strongly related to incidence of either form of ARMD, fruit intake was definitely protective against the severe form of this vision – destroying disease.

Three servings of fruit may sound like a lot to eat each day, but by simply slicing some cantaloupe over your morning cereal, topping off a cup of yogurt or green salad with a half cup of berries, and snacking on an apple, plum, nectarine or pear, you've reached this goal.

In summer, what could be a more cooling or delicious lunch than half a cantaloupe filled with cottage cheese and topped with your favorite nuts and a sprig of mint? It's easy to see how fruit, especially cantaloupe, can become a regular part of your healthy way of eating.

Description:

The fruit that we call the cantaloupe is, in actuality, really a muskmelon. The true cantaloupe is a different species of melon that is mostly grown in France and rarely found in the United States. It derives its name from the Italian papal village of Cantalup where it was first cultivated around 1700 A.D. From here on, we will still use the term 'cantaloupe' when referring to the muskmelon.

The cantaloupe is a melon that belongs to the same family as the cucumber, squash, pumpkin and gourd, and like many of its relatives, it grows on the ground on a trailing vine. It is round or oval in shape and usually has a ribless rind. Having a distinctive netted skin; it is also referred to as netted melon. Many of the cantaloupes available today are hybrids of muskmelons and true cantaloupes and have qualities that reflect both.

Cantaloupes range in color from orange – yellow to salmon and have a soft and juicy texture with a sweet, musky aroma that emanates through the melon when it is ripe. Cantaloupes feature a hollow cavity that contains their seeds encased in a web of netting.

Cantaloupe is also known as rockmelon in several parts of the world. The scientific name for cantaloupe is Cucumis melo.

History:

The exact origin of melons is unclear, although they are thought to have originated in India, Africa or ancient Persia and have been cultivated in these lands since ancient times. Historical texts from Greek and Roman times note that these ancient civilizations enjoyed cantaloupes. They were introduced to the United States during colonial times but were not grown commercially until the very late 19th century. Today, major growers of cantaloupe include the United States, Turkey, Iran and many Central American countries.

How to Select and Store:

The key to purchasing a good quality melon is to find one that is ripe, which is sometimes a challenge because oftentimes they are picked while still unripe in order to ensure that they make it through the shipping process undamaged. There are many clues that you can look for to find a melon that is ripe. If you tap the melon with the palm of your hand and hear a hollow sound, the melon has passed the first test. Choose a melon that seems heavy for its size, and one that does not have bruises or overly soft spots. The rind, underneath the netting, should have turned to yellow or cream from the green undertones that the unripe fruit has. The 'full slip,' the area where the stem was attached, should be smooth and slightly indented, free from remnants of the stem. The end

opposite the full slip should be slightly soft, and you should be able to smell the fruit's sweetness subtly shining through, although be careful since an overly strong odor may be an indication of an overripe, fermented fruit. Cantaloupe is so fragrant that you will be able to test for its aroma of ripeness even if you purchase already cut cantaloupe, packaged in a plastic container.

For the most antioxidants, choose fully ripened melon.

Research conducted at the University of Innsbruck in Austria suggests that as fruits fully ripen, almost to the point of spoilage, their antioxidant levels actually increase.

Key to the process is the change in color that occurs as fruits ripen, a similar process to that seen in the fall when leaves turn from green to red to yellow to brown- a color change caused by the breakdown and disappearance of chlorophyll, which gives leaves and fruits their green color.

Until now, no one really knew what happened to chlorophyll during this process, but lead researcher, Bernard Kräutler, and his team, working together with botanists over the past several years, has identified the first decomposition products in leaves: colorless, polar NCCs (**Nonfluorescing Chlorophyll Catabolytes**) that contain four pyrrole rings - like chlorophyll and heme.

After examining apples and pears, the scientists discovered that NCCs replace the chlorophyll not only in the leaves of fruit trees, but in their very ripe fruits, especially in the peel and flesh immediately below it.

'When chlorophyll is released from its protein complexes in the decomposition process, it has a phototoxic effect: when irradiated with light, it absorbs energy and can transfer it to other substances. For example, it can transform oxygen into a highly reactive, destructive form,' report the researchers. However, NCCs have just the opposite effect. Extremely powerful antioxidants, they play an important protective role for the plant, and when consumed as part of the human diet, NCCs deliver the same potent antioxidant protection within our bodies. Angew Chem Int Ed Engl. 2007 Nov 19; 46(45):8699-8702.

Leaving a firm cantaloupe at room temperature for several days will allow the texture of its flesh to become softer and juicier. Note that cantaloupe can be left at room temperature only if it is whole, intact, and not yet to the stage of full ripeness. Once the cantaloupe has reached its peak ripeness, place it in the refrigerator to store.

Melon that has been cut should be stored in the refrigerator as well and should be wrapped so as to ensure that the ethylene gas that it emits does not affect the taste or texture of other fruits and vegetables.

Public health organizations like the Canadian Food Inspection Agency (CFIA) and the U.S. Food and Drug Administration (FDA) do make allowances for cut cantaloupe to be kept at room temperature for a short period of time (between 2-4 hours). However, if left at room temperature for 2-4 hours and not eaten, this sliced cantaloupe is considered no longer safe for consumption and must be discarded. A primary risk here involves Salmonella contamination. To widen the safety margin for cantaloupe even further, we recommend that all cut cantaloupes be refrigerated at all times.

How to Enjoy:

Tips for Preparing Cantaloupe:

Since bacteria can grow on the surface of most melons, it is important to wash the outside of the cantaloupe before cutting into it. After washing, simply slice the melon into pieces of desired thickness and scoop out the seeds and netting. Remember to refrigerate your sliced cantaloupe if you are not going to consume it immediately.

No time to prepare your fruit salad right before serving? You can prepare it several hours ahead or even the day before and still have fresh, flavorful cantaloupe. Simply cut up the fruit while holding it under water. Once again, be sure to refrigerate your cantaloupe immediately after cutting. Looking for a way to keep pre-sliced ready-to-eat cantaloupe fresh longer, USDA Agricultural Research

Service scientists found that slicing the fruit when it's held under water short-circuits the signals plant cells send to each other when they detect an injury, such as being sliced.

Cut fruit, if chilled, retains its almost all its nutrients for at least 6 days.

Everyone loves colorful, delicious fresh fruit salad, plus it is a perfect addition to any meal and makes a great snack or dessert. So why don't we enjoy fresh fruit salad more? Simply because it's been thought that cut fruit rapidly degrades, so fruit salad, which can take 15 minutes to prepare, would have to be freshly prepared to be good.

Now, a study published in the Journal of Agricultural and Food Chemistry has found that minimal processing of fruit-cutting, packaging and chilling-does not significantly affect its nutritional content even after 6, and up to 9, days.

In practical terms, this means that you can prepare a large bowl of fruit salad on the weekend, store it in the refrigerator, and enjoy it all week, receiving almost all the nutritional benefits of just prepared fruit salad.

Researchers cut up cantaloupes, pineapples, mangoes, watermelons, strawberries and kiwi fruit. The freshly cut fruits were then rinsed in water, dried, packaged in clamshells (not gastight) and stored at 41 degrees Fahrenheit.

After 6 days, losses in vitamin C were less than 5% in mango, strawberry, and watermelon pieces, 10% in pineapple pieces, 12% in kiwifruit slices, and 25% in cantaloupe cubes.

No losses in carotenoids were found in kiwifruit slices and watermelon cubes. Pineapples lost 25%, followed by 10-15% in cantaloupe, mango, and strawberry pieces.

No significant losses in phenolic phytonutrients were found in any of the fresh-cut fruit products. 'Contrary to expectations, it was clear that minimal processing had almost no effect on the main antioxidant constituents. The changes in nutrient antioxidants observed during nine days at five degrees Celsius would not significantly affect the nutrient quality of fresh cut fruit. In general, fresh-cut fruits visually spoil before any significant nutrient loss occurs,' wrote lead researcher Maria Gil.

A Few Quick Serving Ideas:

Add some sparkling water to fresh squeezed cantaloupe juice for a delightfully refreshing drink in the warm months of the year. In a blender or food processor, purée cantaloupe and peeled soft peaches and make delicious cold soup. Add lemon juice and honey to taste.

Top cantaloupe slices with yogurt and chopped mint.

Slice melons in half horizontally, scoop out seeds and use each half as a basket in which to serve fruit salad.

Individual Concerns:

Cantaloupe is not a commonly allergenic food, is not known to contain measurable amounts of oxalates or purines, and is also not included in the Environmental Working Group's 2009 report "Shopper's Guide to Pesticides" as one of the 12 foods most frequently containing pesticide residues.

Nutritional Profile:

Cantaloupe is an excellent source of vitamin A and vitamin C. It is also a very good source of potassium and a good source of dietary fiber, vitamin B3 (niacin), vitamin B6 and folate.

In-Depth Nutritional Profile:

In addition to the nutrients highlighted in our ratings chart, an in-depth nutritional profile for Cantaloupe is also available. This profile includes information on a full array of nutrients, including carbohydrates, sugar, soluble and insoluble fiber, sodium, vitamins, minerals, fatty acids, amino acids and more.

Eat your fruits and vegetables

Healthy diets rich in fruits and vegetables may reduce the risk of cancer and other chronic diseases.

1. Fruits and vegetables also provide essential vitamins and minerals, fiber, and other substances that are important for good health.
2. Most fruits and vegetables are naturally low in fat and calories and are filling.

Need some new ideas for adding more fruits and vegetables to your daily diet?

1. Check out Fruits & Veggies Matter for tips, recipes, and more! You can find easy ways to add more fruits and vegetables into your daily eating patterns. Visit the fruit and vegetable of the month pages to find seasonal fruits and vegetables, preparation tips, and great recipes.

2. In addition, you can find many new ideas in our recipe database. The database enables you to find exciting fruit and vegetable recipes that fit your needs. Searching by meal, by ingredient, or by cooking needs is easy.

Not sure how many fruits and vegetables you should be eating each day?

Visit Fruits & Veggies Matter's fruit and vegetable calculator. Here you can calculate your fruit and vegetable recommendations based on your calorie needs for your age, sex, and activity level. This site also has helpful tips and photographs of 1/2 cup and 1 cup fruit and vegetable examples.

Curious as to whether fruits and vegetables can help you manage your weight?

Take a look at this How to Use Fruits and Vegetables to Help Manage your Weight brochure and learn about fruits and vegetables and their role in your weight management plan. Tips to cut calories by substituting fruits and vegetables are included with meal-by-meal examples. You will also find snack ideas that are 100 calories or less. With these helpful tips, you will soon be on your way to adding more fruits and vegetables into your healthy eating plan.

Related Resources:

The State Indicator Report on Fruits & Vegetables, 2009 provides national and state-specific information on fruit and vegetable (F&V) consumption and policy and environmental supports. The behavioral indicators are derived from objectives for F&V outlined in *Healthy People 2010*. The policy and environmental indicators measure a state's ability to support the consumption of F&V through increased access, availability, and reduced

price in schools and communities. The report can be used to inform decision makers and track progress.

The National Action Guide (PDF-160k) summarizes the national data on F&V consumption, policy, and environmental supports and provides potential actions that government and business leaders, coalitions, community-based organizations, and professionals can take to improve Americans' nutrition along with resources for taking action.

Fruits the Essence of Life Vigor

Fruits are indeed the essence of life vigor.' This is mystical. To understand this you will have to go deeper into the layers of consciousness. Fruits are energy. Fruits are the manifestation of cosmic harmony, oneness. All along the process of their growth fruits are in total harmony with the cosmos. Fruits are in a subconscious state of awareness. Fruits have feeling, sensitivity, and the way to flow with totality. This is how a man comes into life as a child pulsating with this harmony and vigor. Like the fruits the child is also in subconscious state of awareness. And then his inward journey begins. In this process he goes through various layers of consciousness until he is just conscious.

Fruits are the essence of life vigor. As a result I had decided to call this work as 'Fruits the Essence of Life Vigor'. The title is meaningful in many ways.

Begin your journey at the gross level.

It has been prepared with loving tender care and is being served to you as a fresh platter for your nourishment both outer and inner.

It is for the overall development of Human Consciousness Taoshobuddha Meditations TM embarked on Health and Healing Transformation Series. In this series 'Meditation the Ultimate in Healing' is published as E Book. More titles will be released on such topics.

A PRODUCTION OF TAOSHOBUDDHA MEDITATIONS

Fruits the Essence of Life Vigor