

**Research Note :****MULBERRY: THE FRUIT OF HEAVEN'S CHOICE****V. Asha Krishna\*, P. Sujathamma, G. Savithri and T. Vijaya***Department of Sericulture, S.P. Mahila Vishvavidyalayam (Women's University), Tirupati-517502, Andhra Pradesh, India**\*E-mail: ashakrishnanine@gmail.com*

**ABSTRACT :** Mulberry, belongs to the genus *Morus* of family Moraceae, consists more than 20 species and several subspecies or varieties. Mulberry is cultivated in many countries for a long time with the sole purpose of feeding the monophagous silkworm *Bombyx mori* L. In addition to the major utilization of mulberry leaves as silkworm feed, it is being used for many other purposes, for which it is called as *Kalpavriksha*. The modern interest on the cultivation and use of mulberry for animal feed and medicinal uses has been initiated due to search for alternative uses of mulberry, once the sericulture activities reduced due to competition from foreign countries in case of Japan and Italy. In addition to the major utilization of leaves as silkworm feed, they have many excellent and beneficial functions to do. This has opened a new vista to think about other uses of mulberry apart from silkworm feed. In this context multiple uses of mulberry fruits are being discussed in the paper.

**Key words :** *Mulberry fruit, juice, herbal medicine.*

Mulberry, belongs to the genus *Morus* of the family Moraceae, is believed to be a native of either India or China. It grows throughout the year in tropical climate and remains dormant during winter in temperate climate. India has rich flora and good number of plants containing substances having medicinal properties. Mulberry is one among them. There are many species of the genus *Morus*, of which around 10-15 are generally accepted. Of these the most cultivated are: the white mulberry (*Morus alba*); black mulberry (*Morus nigra*) and the American mulberry or red mulberry (*Morus rubra*). Mulberry silk comes from the silkworm *Bombyx mori* L. which solely feeds on the leaves of mulberry plant (Subhuti, 7). One of the primary uses of the plant is for raising silkworms, which utilize the leaves as their main food source. Mulberry starts producing fruits in May-June. Mulberry has an aggregate fruit that is composed of lots of berries stuck together and measures 2-5cm. The full bodied flavour of this fruit is a good balance of sweetness and tartness with nutritional elements of vital importance for human metabolism.

Botanically the fruit is not a berry but a collective fruit called as *sorosis*, because it is formed by the consolidation of many flowers and in appearance like a swollen long berry. When the flowers are pollinated, they and their fleshy bases begin to swell. Ultimately they completely altered in texture and colour-becoming succulent, fat and full of juice.

It is juicy and has a sweet taste with some sourness that is more prominent in the less mature fruits. The colour of the mulberry fruit does not identify the mulberry species. For example, white mulberries can produce white, lavender or black fruit and red mulberry fruits are usually a very deep red-almost black. Black mulberry which has a lovely balance of sweetness and tartness makes the best pressed juices.

Mulberries are the latest in a fairly long line of fruit berries to be given "Super food" status. Levels of antioxidants in mulberry fruits are 70% higher than blueberries and 24% more than those found in cranberries. Not only those but mulberries are packed



with full of vitamins and fibre and contain high levels of resveratrol- the antioxidant super hero which is the focus of so much scientific interest across a wide range of disciplines. Fruits are eaten fresh and used for pickle

preparation too. It contains (malic acid, citric acid, pectin, mucilage and a coloring matter (Shivkumar *et al.*, 5; Singhal *et al.*, 6).

### Medicinal values

Fresh mulberry fruits are rich in amino acids, vitamins and mineral, such as Zn, Mn, Fe, Ca that are indispensable for the human body. In addition mulberry fruits are also rich in pectin and fibrin. Ascorbic acid content is as high as 20mg/100g in fresh fruit (Chu *et al.*, 2).

High level of antioxidants in mulberries is an excellent weapon to fight against infection. Shivkumar *et al.* (5) concluded that that resveratrol decreased the reproduction of the influenza virus. In other studies links are also being made between high levels of antioxidants in the diet and protection from some of the most distressing diseases of our age –chronic diseases like Alzheimers, many forms of cancer and Parkinson's.

Mulberry fruits are an excellent source of the antioxidants resveratrol, zeaxanthin, lutein and to a lesser extent the alpha and beta carotene. Mulberry fruits derive their colour from anthocyanins. This fruit pigment is noted for its powerful antioxidant property. One ounce of ripe mulberry fruit contains nearly 60mg of anthocyanins. This phytonutrient protects our body from the harmful oxidation of free radicals. Specifically, mulberry contains cyaniding 3-glucoside, which epidemiological studies confirm lowers the risk of many degenerative diseases such as chronic arthritis and atherosclerosis. Cyaniding 3-glucoside protects the body against cardiovascular disease and diabetes. Mulberry along with improving blood circulation can help people who suffer from heart palpitations.

In Chinese medicine, mulberries are considered as an important food remedy as blood tonic. They cleanse the blood; improve its circulation and helps in strengthening the entire system. So, eating of these berries are traditional folk remedies that have developed in countries for hundreds of years. Consuming mulberries during the hot season benefits in blood disorders and has a cooling effect on the body. It enriches the blood in the process while soothing and calming the nerves. It also helps in promoting the metabolism of alcohol. Eating even a small bowl of mulberries before sleeping can cure sleeping disorders. It can also help someone suffering from anaemia and can aid suffering from vertigo. A few pieces of the mulberry fruit can relieve constipation, lower blood pressure and improve the digestive system. Mulberries contain compounds that support

balanced sugar and control blood sugar in diabetic patients. Flavonoids present in mulberry fruit prevents the rise and fall of sugar level in patients. So it is highly effective to prevent complication in diabetic patients due to sugar level spike. Eating mulberry on regular basis will keep the cholesterol level within limits (Ye and Ye, 12).

Diabetics have a tendency to feel thirsty all the time, so they are more prone to liver-kidney yin deficiency. People who sweat easily in the day or night, youngsters who spot grey hair and women with irregular periods are likely to be suffering from this area of deficiency.

### Nutritional values

#### *Fruit juice/drink*

Mulberry fruits are edible and well known for its delicious taste. The fruits of the mulberry are sweet and soft. Because of their sweetness, they are of little value for culinary uses. The ripe fruits are harvested by gently shaking the trees (Singhal *et al.*, 6). They can be consumed directly or can be used in the preparation of Wine, Jam or Soft drinks. "Da 10" is the most popular fruit mulberry variety, which is planted in Zhejiang, Guangdong and Jiangsu provinces of China (Ye, 11). Mulberry fruit research has become more active in the Sericulture Research Institute of Yunna province, China utilizing many species in cross breeding for fruit production, the result of which is DL-number 1 (Chu *et al.*, 2). Mulberry fruits have many excellent characters like nice taste, large size, attractive colour and high nutritive and medicinal values.

Mulberry fruit juice has been commercially produced as a health beverage, and it has become very popular in China, Japan and Korea (Machii, 4). As a result of working with the fresh fruits to yield a juice product, the constituents have been analyzed by (Subhuti, 7). The main content of fresh, ripe mulberry fruit is: Water 85 -88%, Carbohydrate-7.8-9.2%, Protein-0.4-1.5%, Fat-0.4-0.5%, Free acids- 1.1-1.9%, Fiber-0.9-1.4%, Minerals-0.7-0.9%, (Source : [www.itmonline.org](http://www.itmonline.org), 10)

Mulberries are literal powerhouse of nutrition. They are very rich in Vitamins B, C, K and the element iron. Good levels of fibre, riboflavin, phosphorus, copper, magnesium, potassium and calcium are also found in mulberries. A new UK fruit Juice Company has launched a super fruit drink prepared from pure fresh pressed mulberry fruits which is full of antioxidants (Fairjuice, 3) without adding preservatives, the original mulberry fruit juice remains fresh under

cold storage for 3 months, while the bottled beverage remains fresh at room temperature for 12 months.

Mulberry juice is extremely beneficial for post-operative patients. It accelerates healing, improves blood circulation, decrease swelling, aid recovery after child birth and prevents the onset of infection. It can balance internal secretion, enhance the immunity and promotes body fluid production. It also helps people who suffer from dehydration. It also promotes the melanin production in hair and helps to maintain the natural colour of the hair. People with grey hair can also benefit with regular intake of mulberry. Mulberry juice applied directly on the hair can revive the hair roots and stimulate healthy hair growth again.

Drinking a glass of mulberry juice also improves vision. It has a high content of vitamin A which strengthens our eye sight and relieves eye strain, which is ideal for people who spend hours on computer. It also protects eyes from free radicals which is the cause of eye sight loss and retina degeneration. If someone had consumed too much alcohol, a small bottle of mulberry juice can help you overcome the effects of it and prevent from getting a hang over the next day. Regular consumption of mulberry juice will also help for healthy skin, anti obesity and acts as brain tonic. Tanakij and Pilairuk (9) suggested through their experiment that mulberry fruit extract mixed with honey is not only nutritious but also it acts against both pathogenic and food poisoning bacteria.

#### *Fruit tea*

It is natural, pleasantly savor all year-round, hot or cold. It does not contain caffeine and/or theine and therefore can be safely drunk at any time of the day. In Chinese markets, mulberry is often provided in the form of a paste called "Sangshengao"-mixed in hot water to make tea. In Iran, dried mulberries are used as a sweetener in black tea. After a sip of tea, dried mulberry fruits are eaten to sweeten the mouth (Singhal *et al.*, 6; Tanakij and Pilairuk, 9).

#### *Fruit wine*

Over ripened and sour fruits have high source of vitamin-C which is commonly used for the preparation of special wine and beer in most of the cold countries.

A glass of mulberry wine a day helps to get rid of impurities in the body which can help and make the body slim. It is believed that small dose of the drink protects against stomach and heart diseases (Alakbarov and Aliyev, 1) and very popular as a ladies drink in Europe.

#### *Fruit syrup*

It is a kind of molasses obtained from mulberries. It is very beneficial to be consumed as food by anemic patients. It is good especially for stomach illness and ulcer. It is used to increase body resistance against cold, for asthma and bronchitis patients and also a source of energy for sports persons. It helps intelligence development and physical development of babies and children. During gargling, it is efficient for mouth and throat illness. It is suggested for the diet of pregnant and breast feeding women, tuberculosis patients and those in healing period (Sujathamma *et al.*, 8).

#### *Fruit powder*

Raw mulberry fruit powder is a true nutritional treasure, being used in both alternative and traditional medicines for years. It contains a vast amount of nutrients essential to one's health with an overwhelming amount of anti-inflammatory, antiseptic cleansing qualities and healing properties to refresh and restore the body. It promotes healthy liver and kidney function, and improves digestion and assimilation.

#### **Commercial values**

##### *Food colour*

Fruits can be used as colouring and flavouring agent (ShivKumar *et al.*, 5). As there is increasing demand for natural food colorants, mulberry fruit extract being water-soluble and easily extractable, acts as a good colouring and flavouring agent. Fruit as feed supplements to ruminant live stock can be exploited as an income-generating micro enterprise (Ye and Ye, 12).

##### *Cosmetic*

Fruit extract can be used in cosmetics globally. It is a common ingredient in many skin care creams, shower gels etc., due to its antioxidant powers.

In view of the excellent characters of mulberry fruit, much more research studies may be initiated for thorough exploitation.

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