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## **Evaluation of Ascorbic Acid and Moisture Contents in Two *Morus* Species of University of Peshawar Botanical Garden, Pakistan**

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### **Abstract:**

Fruits of *Morus* (*Morus alba* L. and *Morus nigra* L.) were evaluated for ascorbic acid (vitamin C) and moisture contents. It was observed that ascorbic acid was 31.15 mg/100g in *Morus nigra* and 29.32 mg/100g in *Morus alba*. Moisture contents remained 6.6 % in *Morus nigra* and 6.8 % in *Morus alba*. The results indicated that *Morus nigra* contained highest amount of ascorbic acid and thus must be preferred. Wild berries including black berries, blue berries and mulberries are collected in large quantities and are used as standard part of the diet and for also sale in the market. The study was undertaken to extend the knowledge of vitamin C contents of commonly consumed fruit plants.

**Keywords:** Ascorbic acid, Moisture contents, *Morus* species, Botanical Garden

### **1. Introduction**

University of Peshawar Botanical Garden (UPBG) is situated at Azakhel, District Nowshera. It is located between 34°-15' and 34°-31' North latitude and 71.33 to 44 East longitude at an elevation of 290 m. It is spread over an area of 100 acres. Wild fruit plants growing in the Botanical Garden include *Zizyphus* species and *Morus* species. Fruits of two *Morus* species including *Morus alba* and *Morus nigra* were selected for their ascorbic acid and moisture contents. Zennie and Ogzewalla (1977) assayed 16 wild edible plants for ascorbic acid and 10 plant species for vitamin A contents. Plant species were found to be rich source of these vitamins as compared to common garden fruits and vegetables. Scartezzinia *et al.* (2006) described the vitamin C contents and antioxidant activity of *Emblica officinalis*. The fruits of this plant contained 0.40 % ascorbic acid and Ayurvedic method of processing increased the ascorbic acid contents to 1.28 %. Imran *et al.* (2010) analyzed fruits of four *Morus* species for proximate composition, essential minerals and antioxidant values. Ascorbic acid was in the range from 15.20 ± 1.25 to 17.03 ± 1.71 mg/100g. Rai *et al.* (2012) observed that in tomato fruits ascorbic acid contents decreased gradually during storage. Hashempour *et al.* (2013) investigated juices from six *Citrus* species for phenolic, ascorbic acid and antioxidant activity.

### **2. Materials and Methods**

Fruits of *Morus alba* L. and *Morus nigra* L. were collected, shade dried and made powder for ascorbic acid and moisture contents determination. The plant species were chosen because of their availability and their vitamin contents were expected to be high. Ascorbic acid was determined by the standard method as reported in AOAC (2000) by using the formula:

$$\frac{F \times T \times 100}{S \times D} = \frac{\text{ml of Ascorbic acid}}{\text{ml of dye used}}$$

Standard method of AOAC (1990) was used to determine the percent moisture contents using the formula:

$$\frac{\text{wi-wf}}{\text{wt.of sample}}$$

### 3. Results and Discussion

*Morus alba* L. and *Morus nigra* L. showed 29.32 mg/100g and 31.15 mg/100g ascorbic acid contents respectively. The moisture contents ranged from 6.8 % in *Morus alba* and 6.6 % in *Morus nigra*. *Morus nigra* indicated highest amount of ascorbic acid while moisture content was high in *Morus alba*.

Ascorbic acid is a naturally occurring organic compound with antioxidant properties. Human beings and other animals require it as a part of their nutrition. Ascorbic acid has antiscorbutic properties also prevent cold and cancer. As a mild reducing agent ascorbic acid degrades upon exposure to air converting the oxygen to water. Ascorbic acid and its Na, Ca and K salts are commonly used as antioxidant food additives. Ascorbic acid is found in plant and animals where it is produced from glucose. All animals either make it, eat it or die from scurvy due to lack of it. There are many different biosynthesis pathways for ascorbic acid in plants including glycolysis and other pathways (Zennie and Ogzewalla, 1977). The main content of fresh ripe mulberry fruits is water 85-88 %. Traditionally mulberry fruit has been used as a medicinal agent to nourish the yin and blood, benefit the kidneys and treat weakness, fatigue and anemia. Mulberry can nourish and promote production of body fluid. It can cure chronic diseases of the digestive tract, promote gastric juice secretion, improve the appetite and eliminate abdominal distention. Mulberry is suitable for gastritis and chronic hepatitis. Mulberry contain plentiful nutritious elements such as minerals and vitamins (Imran *et al.*, 2010). Ascorbic acid (AA) is water soluble vitamin which also known to be one of the more liable vitamins. Fruits and vegetables are the primary dietary source of ascorbic acid. Ascorbic acid is one of the organic compounds found in a number of commercially important native fruit plants (Sommano *et al.*, 2011). Antioxidants are nutrients which can convert or sluggish the oxidative damage to our body. When our body cells use oxygen they produce free radicals which are harmful. Antioxidants act as free radical scavengers and hence check and fix damage due to these free radicals. Antioxidants may also augment immune system and therefore, poorer the risk of cancer and infections (Neelam and Khan, 2012).

Sl. No.	Plant species	Ascorbic acid mg/100g	Moisture content %
1.	<i>Morus alba</i> L.	29.32	6.8
2.	<i>Morus nigra</i> L.	31.15	6.6

Table 1: Ascorbic acid and Moisture contents in two *Morus* species of UPBG.

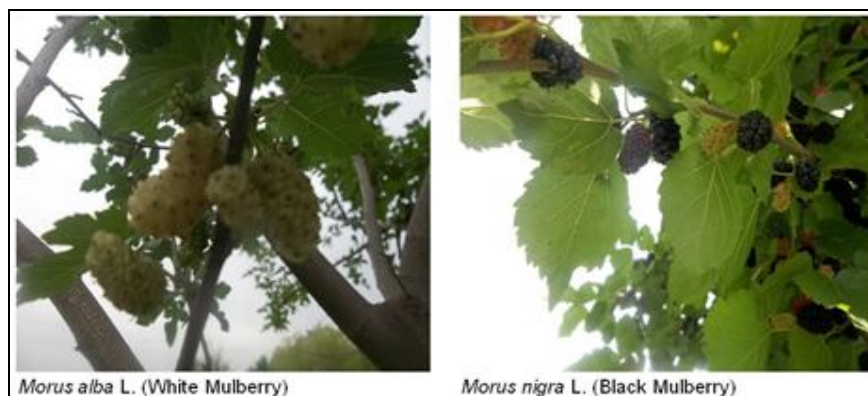


Figure 1

### 4. References

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