

Beyond Leaves: Hidden Value of Mulberry By-Products

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Mulberry (*Morus* spp.) is widely recognized as the primary and indispensable feed source for the silkworm (*Bombyx mori*), forming the backbone of sericulture. However, the significance of mulberry extends far beyond its leaves. Every part of the plant—including leaves, fruits, stems, roots, bark, and shoots—possesses immense economic and functional value. These by-products contribute to diverse sectors such as animal nutrition, food processing, medicine, paper production, handicrafts, and even sports industries. Efficient utilization of mulberry by-products not only enhances sustainability in sericulture but also generates additional income opportunities for farmers and rural communities. This article explores the hidden value and multifaceted applications of mulberry by-products.

1. Mulberry as Animal Feed

Mulberry leaves are highly nutritious and serve as an excellent feed for various animals. They contain high protein (15–35%), minerals such as calcium (2.42–4.71%) and phosphorus (0.23–0.97%), and metabolizable energy ranging from 1,130 to 2,240 kcal/kg. The leaves have negligible anti-nutritional factors, making them highly digestible with superior degradation potential. The crude protein content of mulberry foliage can reach 20–24%, making it suitable for feeding cattle, poultry, sheep, deer, and pigs.

2. Mulberry in Mushroom Production

Mulberry stems, stem powder, and bed refuse generated during silkworm rearing can be effectively utilized as substrates for mushroom cultivation. These materials provide a cost-effective and nutrient-rich medium for mushroom production.

3. Mulberry Leaves as Food

Mulberry leaves are rich in nutrients and can be used as a food source. Approximately three ounces of mulberry leaves contain about nine grams of protein. They are rich in phytonutrients such as anthocyanins, flavonoids, lutein, zeaxanthin, and carotene, along with vitamins A, B, C, and D—particularly vitamin C. They also contain essential minerals like calcium, silicon, manganese, magnesium, iron, copper, and zinc. Mulberry leaf powder can be incorporated into flour for preparing pastries and cakes.

4. Mulberry Tea

Mulberry tea, prepared from dried mulberry leaves, is naturally caffeine-free. It is traditionally believed to improve liver and kidney function, enhance vision and hearing, and relieve colds, coughs, and throat infections. It may also help prevent cholesterol oxidation, thereby reducing the risk of arterial blockage. In some countries like Iran, dried mulberries are used as a natural sweetener in black tea.

5. Mulberry Fruits and Their Uses

a) **Anti-obesity Drink:** Mulberry fruits are rich in antioxidants and are used to prepare health drinks that may help suppress appetite and support weight management.

b) Mulberry Fruit Powder: Mulberry fruit powder is known to support healthy cholesterol levels and regulate carbohydrate digestion. It is believed to help prevent heart disease and certain chronic conditions due to its antioxidant and anti-mutagenic properties.

c) Mulberry Wine: Mulberry wine is prepared from overripe or sour fruits and has a pleasant sweet taste. Traditionally, it is believed to help restore strength after illness and support overall health. It is also popular in some regions as a mild health beverage.

d) Pharmaceutical Uses: Mulberry fruits are widely used in traditional medicine for improving immunity and maintaining internal balance. They are used to treat conditions such as urinary disorders, dizziness, constipation, sore throat, and fever. Fruits of *Morus alba* possess cooling and laxative properties and are useful in treating throat infections and digestive issues. They also exhibit antidiabetic and antioxidant properties.

6. Mulberry Stem

Mulberry stems have medicinal value. A tincture prepared from the bark is traditionally used to relieve toothache.

7. Mulberry Root

Mulberry roots are important in medicinal applications. Root bark of *Morus nigra* contains compounds such as calcium malate, tannins, fatty acids, phytosterols, and alkaloids like deoxynojirimycin (DNJ), which has significant biological activity. Root extracts are used in managing high blood pressure and other ailments. In traditional Chinese medicine, the root bark of *Morus alba*, known as “Sang Bai Pi,” is used to treat cough, asthma, and related disorders.

8. Mulberry Wood in Industries

Mulberry wood is soft, durable, flexible, and elastic. It is widely used in the manufacture of sports goods such as cricket bats, hockey sticks, and badminton rackets. It is also used for making agricultural implements, as well as in house and boat construction.

9. Mulberry Branches and Shoots

Mulberry branches and shoots left after pruning are commonly used as firewood in rural areas. Due to their flexibility, shoots are also used for making baskets, toys, and other handicrafts.

10. Mulberry Bark in Paper Production

Mulberry bark is an important raw material in the paper industry and is typically harvested within 16–18 months for paper manufacturing.

11. Mulberry as a Natural Dye

Mulberry roots yield a yellow dye that is used in textile dyeing. Additionally, mulberry fruits are used as natural colouring and flavouring agents in food products.

Conclusion

Mulberry is a multipurpose plant with vast untapped potential beyond its traditional role in silkworm rearing. Its by-products serve as valuable resources in livestock feeding, human nutrition, pharmaceuticals, cottage industries, and environmental sustainability. From nutrient-rich leaves and antioxidant-rich fruits to durable wood and versatile bark, each component contributes significantly to economic and ecological benefits. Promoting the integrated utilization of mulberry by-products can enhance resource efficiency, reduce waste, and support livelihood diversification. Therefore, harnessing the full potential of mulberry can play a crucial role in advancing sustainable agriculture and rural development.

References

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