Title : Antioxidant Activity, Total Phenolic and Vitamin C Contents in Mulberry (*Morus alba L.*) Fruits

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ABSTRACT

Mulberry (*Morus alba L.*) is a plant rich in phytochemicals, particularly phenolic compounds, flavonoids, and anthocyanins, which are crucial in antioxidant activity. In addition to its nutritional value, mulberry has been widely used in traditional medicine due to health benefits. Moreover, its potent antioxidant properties have attracted interest in the cosmetic industry, where mulberry extracts are utilized in skincare products for their ability to protect the skin from oxidative stress, reduce hyperpigmentation, and promote a youthful appearance. However, the variation in antioxidant activity at different ripening stages of mulberries remains unclear. This study aimed to investigate the antioxidant activity, total phenolic and vitamin C content at varying stages of ripeness (unripe fruit, semi-ripe fruit, and ripe fruit). Antioxidant activity and total phenolic content of ethanol extract were assessed using DPPH and Folin-Ciocalteu assays, while vitamin C content from squeezed mulberry juice was analyzed by redox titration. Results showed that the ripe fruit exhibited the highest phenolic content (0.2848 mg GAE/g extract), followed by semi-ripe fruit (0.1530 mg GAE/g extract) and unripe fruit (0.1291 mg GAE/g extract). The ripe mulberries demonstrated the strongest antioxidant activity (IC_{50} = 901.97 µg/mL), followed by semi-ripe fruit (IC_{50} = 1474.05 µg/mL) and unripe fruit (IC_{50} = 1779.19 µg/mL). In addition, the ripe fruit had the highest vitamin C content (1.116 mg/mL), followed by semi-ripe fruit (0.330 mg/mL). These findings highlight the variation in antioxidant, phenolic content, and vitamin C content in different stages of ripeness. Therefore, using fully ripe mulberries should be prioritized to achieve the highest effectiveness in antioxidant benefits of health or cosmetic products.