

Review and Progress

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Fruit Quality Traits and Cultivation Practices in Chinese Bayberry (*Myrica rubra*): Current Status and Research ProgressYaya Jin^{1,2} ✉¹ Taizhou Manman Agricultural Development Co., Ltd., Linhai, 317000, Zhejiang, China² Zhejiang Agronomist College, Hangzhou, 310021, Zhejiang, China✉ Corresponding email: 1029281612@qq.comPlant Gene and Trait, 2026, Vol.17, No.3 doi: [10.5376/pgt.2026.17.0015](https://doi.org/10.5376/pgt.2026.17.0015)

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Abstract This study explored the current research status and progress of fruit quality traits and cultivation measures in Chinese bayberry (*Myrica rubra* Sieb. et Zucc), systematically analyzing advances in external quality, internal quality, and quality evaluation systems, and reviewing the major factors affecting fruit quality formation and their regulation technologies based on recent domestic and international studies. As an important subtropical fruit tree species in China, Chinese bayberry possesses high nutritional value, economic value, and potential for functional product development. Its fruits are rich in sugars, organic acids, vitamin C, anthocyanins, polyphenols, and volatile aroma compounds. Studies have shown that genetic background, ecological environment, and fruit growth and development are the major factors influencing fruit quality formation, among which light, temperature, water conditions, and maturity stage significantly affect sugar-acid metabolism, anthocyanin accumulation, and flavor formation. Appropriate water and fertilizer management, tree and flower-fruit regulation, protected cultivation, and green ecological cultivation techniques can effectively improve fruit size, coloration, sugar-acid ratio, and functional nutrient contents, thereby enhancing fruit commercial quality and stability. In recent years, the application of electronic nose, electronic tongue, Vis/NIR spectroscopy, hyperspectral imaging, and intelligent detection technologies based on machine learning and deep learning in Chinese bayberry quality evaluation has continuously expanded, providing new approaches for rapid, non-destructive, and accurate quality assessment. Although significant progress has been achieved in Chinese bayberry quality research, there are still limitations in understanding the mechanisms of quality formation, establishing standardized cultivation regulation systems, and developing unified quality evaluation standards. Overall, strengthening research on high-quality cultivar breeding, precision and intelligent cultivation, and green high-quality production systems will contribute to the high-quality and sustainable development of the Chinese bayberry industry.

Keywords Chinese bayberry; Fruit quality; Cultivation regulation; Quality evaluation; Intelligent detection**1 Introduction**

Chinese bayberry (*Myrica rubra* Sieb. et Zucc) is one of the most important subtropical evergreen fruit trees native to China, originating from southern China and parts of East Asia, with a cultivation and domestication history of more than 2 000 years (Gao et al., 2024). At present, Chinese bayberry is mainly distributed in southern regions of China, including Zhejiang, Jiangsu, Fujian, Guangdong, Guangxi, and Yunnan provinces, among which Zhejiang and Jiangsu are the major commercial cultivation areas (Ren et al., 2021). As the country with the largest cultivation area and production of Chinese bayberry in the world, China's bayberry industry plays an important role in promoting mountainous economic development, increasing farmers' income, and advancing rural revitalization (Mo et al., 2024). In recent years, with the improvement of living standards and increasing awareness of healthy diets, market demand for high-quality specialty fruits and functional foods has continued to grow, further promoting the rapid development of the Chinese bayberry industry. However, Chinese bayberry fruits ripen rapidly, are highly perishable, and are extremely sensitive to temperature and storage conditions. Their shelf life at room temperature is usually only a few days, which greatly limits long-distance transportation and industrial utilization.

Chinese bayberry fruits are characterized by their bright color, unique flavor, and high nutritional and health-promoting value. Studies have shown that the fruits are rich in sugars, organic acids, vitamin C, phenolic compounds, flavonoids, and anthocyanins, among which cyanidin-3-O-glucoside not only contributes to the