

Research Insight

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Development of Local Characteristic Resources of *Tetrastigma hemsleyanum* and Optimization of Under-Forest Industry Development Pathways

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Abstract *Tetrastigma hemsleyanum* is an important characteristic medicinal plant resource in southern China, with traditional medicinal, edible, and modern functional product development value. With the continuous decline of wild resources and increasing market demand, artificial cultivation and ecological under-forest cultivation have gradually become important approaches for resource conservation and industrial development of *T. hemsleyanum*. Focusing on the development of local characteristic resources and the under-forest industry of *T. hemsleyanum*, this study systematically analyzes the distribution of germplasm resources, characteristics of local types, and differences in quality and ecological conditions among producing areas, and further elucidates the ecological basis of under-forest production in terms of light and temperature, moisture and soil conditions, and forest stand types. On this basis, under-forest wild-simulated cultivation and forest-medicinal plant integrated management models are compared, and the comprehensive utilization of tuberous roots, stems, leaves, and other resources, deep processing of characteristic products, and local brand development are further discussed. The results indicate that the current *T. hemsleyanum* industry still faces several major constraints, including insufficient conservation of wild and elite germplasm resources, limited supply of high-quality seedlings, low levels of standardization and large-scale under-forest cultivation, and insufficient product development, quality control, and industrial chain extension. Future development should strengthen local germplasm conservation and elite germplasm utilization, establish standardized under-forest cultivation technologies adapted to regional ecological conditions, promote whole-plant resource utilization, deep processing, quality traceability, and regional brand development, and ultimately establish an integrated industrial system linking “germplasm conservation-ecological cultivation-processing and value addition-brand development.” This study provides a reference for the sustainable utilization of *T. hemsleyanum* resources and the development of local characteristic under-forest industries.

Keywords *Tetrastigma hemsleyanum*; Local characteristic resources; Under-forest cultivation; Germplasm resources; Industrial development

1 Introduction

Tetrastigma hemsleyanum Diels et Gilg, commonly known as Sanyeqing, is a rare perennial vine and an important traditional Chinese medicinal plant widely distributed in subtropical regions of southern China, especially along the Yangtze River basin and in provinces such as Zhejiang, Fujian, and Guangxi. It has a long history of medicinal use, with records tracing back to ancient materia medica, where it was used for clearing heat, detoxification, promoting blood circulation, and treating high fever, pneumonia, hepatitis, snake bite, jaundice, and infantile febrile convulsions (Xia et al., 2023). Modern phytochemical and pharmacological studies further show that *T. hemsleyanum* contains abundant flavonoids, phenolic acids, polysaccharides, organic acids, terpenoids, steroids, and other constituents, with roughly 142~150 compounds reported to date (Hu et al., 2021).

These compounds support a broad spectrum of biological activities, including anti-tumor, anti-inflammatory, antioxidant, antipyretic, antiviral, immunomodulatory, hepatoprotective, analgesic, and antibacterial effects, which explains the strong and growing scientific and market interest in this species. Experimental studies have identified anti-cancer and anti-inflammatory effects in liver cancer cell models, inflammatory cell models, tumor-bearing mice, and ulcerative colitis models, while also linking activity to compounds such as chlorogenic acid, rutin, quercetin, kaempferol derivatives, alkaloids, and polysaccharides (Wang et al., 2018; Feng et al., 2024).