

luteolin-7-O-glucoside and 3,5-O-dicaffeoylquinic acid highest at the Taiju stage, and the overall balance of constituents, yield, and harvest timing favoring Taiju as the best picking stage. Comparative work on Taiju and Duoju further showed that products harvested at different times differ substantially in phenolic profiles, antioxidant activity, flavor-related volatiles, and flavonoid composition, and metabolomic analysis identified 11 marker metabolites that can distinguish the two harvest periods. Related evidence from Fubaiju also showed that inflorescence diameter was negatively correlated with chlorogenic acid and 3,5-O-dicaffeoylquinic acid, and that smaller-diameter samples had higher polyphenol content and better sensory and antibacterial performance, which supports using maturity-linked morphological traits as operational harvest indices. More broadly, metabolomics-based work in *Chrysanthemum indicum* found that most varied active constituents were highest or relatively high at initial or full-bloom stages, reinforcing the general principle that intermediate maturity often provides the best quality foundation for chrysanthemum materials.

Rational drying methods are the key to maintaining Hangbaiju quality because drying not only removes moisture but also reshapes the retention of active compounds, aroma, color, antioxidant capacity, and microstructure. Direct evidence showed that drying process significantly affected the bioactive chemical contents and antioxidant activities of Xiaobaiju and Taiju, with suitable oven drying suggested at 60 °C for Xiaobaiju and 70 °C for Taiju, indicating that even closely related harvest materials require different drying settings. Across chrysanthemum studies, moderate or optimized drying usually outperformed uncontrolled heating: oven drying around 55–65 °C better balanced active and nutritional ingredients, pulsed vacuum drying preserved total phenolics, flavonoids, and marker compounds while improving antioxidant activity, and lower temperature or pulsed conditions better protected color and volatile components. Microwave-assisted and infrared-assisted methods also showed clear advantages, as microwave drying retained higher flavone, vitamin C, and soluble sugar under efficient conditions, microwave-hot air drying best preserved biologically active compounds and acetylcholinesterase inhibitory activity, and infrared-assisted or tempering-incorporated drying increased chlorogenic acid, luteolin, total phenolics, total flavonoids, antioxidant capacity, and volatile compounds while reducing energy use. At the same time, shade drying tended to preserve more flavonoids, phenolic acids, and terpenoids than heat drying, and even general chrysanthemum flower studies found better color, shape, and petal integrity under shade drying, which shows that the best method depends on whether priority is given to processing efficiency, medicinal components, or external appearance.

Standardization of harvest and processing is an important direction for upgrading the Hangbaiju industry because current quality differences across batches cannot be fully controlled by origin labels or traditional experience alone. Quality evaluation studies showed substantial variation even among commercial *Chrysanthemum morifolium* samples, with fingerprint similarities ranging from 0.640 to 0.956, and demonstrated that relying mainly on habitat and processing history while neglecting bioactive ingredients can lead to deviation in quality assessment. More robust strategies already exist: chromatographic fingerprinting combined with multi-component quantification, antioxidant evaluation, and spectrum-effect analysis identified Q-markers such as chlorogenic acid, 3,5-O-dicaffeoylquinic acid, 4,5-O-dicaffeoylquinic acid, and kaempferol-3-O-rutinoside, while integrated chromatogram-effect approaches and antioxidant activity-fingerprint models provided practical frameworks for quality assessment and authentication. Rapid detection technologies also support industrial upgrading, since near-infrared hyperspectral imaging predicted luteolin and quercetin in fresh and dry Hangbaiju, and fluorescence spectroscopy with chemometrics achieved high-accuracy origin authentication and functional compound prediction in chrysanthemum materials. Future optimization should therefore establish standardized harvest criteria centered on maturity stage, build process-specific drying protocols for different product goals, and adopt weighted multi-index models such as AHP, clustering, and chemometric authentication to achieve stable grading, premium branding, and higher-value utilization of Hangbaiju.

Conflict of Interest Disclosure

The author affirms that this research was conducted without any commercial or financial relationships that could be construed as a potential conflict of interest.