



## Improved Euclidean Distance: a New Fingerprint Similarity Calculation Method Applied to *Flos Genkwa*

Lin LI<sup>1</sup>, Fang-zhou YIN<sup>1</sup>, Yi SHAO<sup>1</sup>, Hong-yue GUAN<sup>2</sup>, Jinci LI<sup>2</sup>,  
Huizhen LIU<sup>1</sup>, Tu-lin LU<sup>1\*</sup> & Bao-chang CAI<sup>2\*</sup>

<sup>1</sup> College of Pharmacy, Nanjing University of Chinese Medicine, Nanjing, P.R.China, 210023

<sup>2</sup> The Key Lab of Chinese Herbal Medicine Processing of Jiangsu Province, Nanjing, P.R.China, 210046

**SUMMARY.** *Flos Genkwa* (the dry bud of *Daphne Genkwa* Sieb. et Zucc.) is an old Chinese medicine that can only be safely and clinically used after being fried in vinegar to reduce its strong toxicity. However, no obvious difference between crude *Flos Genkwa* and vinegared *Flos Genkwa* has been determined thus far, and even traditional fingerprinting methods have failed to distinguish them effectively. This paper aims to improve the traditional fingerprint method used to distinguish vinegared *Flos Genkwa* from crude *Flos Genkwa*. Ten batches of *Flos Genkwa* were collected in China, processed with vinegar through a standard method, and then analyzed under the optimum liquid phase. Based on the chromatographic data obtained, a common model of vinegar *Flos Genkwa* fingerprints, including 11 common peaks and the components genkwanin, hydroxygenkwanin, luteolin, apigenin, and yuanhuacin was established. The peak of baicalein, an exogenous component added quantitatively to the samples as an internal standard, served as the reference peak. The similarity between the test samples and the common model was computed using the improved euclidean distance method developed in this paper. Results indicated that similarities between vinegared *Flos Genkwa* samples and the common model were higher than 0.9, whereas those between crude *Flos Genkwa* and the common model were lower than 0.9. The proposed method thus effectively provides a clear distinction between vinegared and crude *Flos Genkwa* samples. The results of this study help ensure the safe clinical use of the plant and expand the application field of fingerprinting technology.

**KEY WORDS:** *Flos Genkwa*, *Daphne genkwa* Sieb. et Zucc., Fingerprint, Improved euclidean distance, Similarity.

\* Authors to whom correspondence should be addressed. *E-mails:* lutulin2010@163.com (Tu-lin Lu) or caibaochang2012@163.com (Bao-chang Cai)