A simple real-time polymerase chain reaction (PCR)-based assay for authentication of the Chinese *Panax ginseng* cultivar Damaya from a local ginseng population

H. Wang[1], J. Wang[2] and G. Li[2]

[1]School of Life Science, Yantai University, Yantai, China
[2]School of Pharmacy, Yantai University, Yantai, China

Corresponding author: G. Li
E-mail: lsyq_003@163.com

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ABSTRACT. *Panax ginseng* is one of the most important medicinal plants in the Orient. Owing to its increasing demand in the world market, cultivated ginseng has become the main source of medicinal material. Among the Chinese ginseng cultivars, Damaya commands higher prices and is grown in significant proportions among the local ginseng population. Due to the lack of rapid and accurate authentication methods, Damaya is distributed among different cultivars in the local ginseng population in China. Here, we identified a unique, Damaya-specific single nucleotide polymorphism (SNP) site present in the second intron of mitochondrial cytochrome c oxidase subunit 2 (*cox*2). Based on this SNP, a Damaya cultivar-specific primer was designed and an allele-specific polymerase chain reaction (PCR) was optimized for the effective molecular authentication of Damaya. We designed a method by combining a simple DNA isolation method with real-time allele-specific PCR using SYBR Green I fluorescent dye, and proved its efficacy in clearly discriminated Damaya cultivar from other Chinese

ginseng cultivars according to the allelic discrimination analysis. Hence, this study provides a simple and rapid assay for the differentiation and conservation of Damaya from the local Chinese ginseng population.

Key words: *Panax ginseng*; Damaya cultivar; *cox*2; SNP; Allele-specific PCR; Real-time PCR

