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Development of molecular markers and comparative analysis of major chemical components for major medicinal crops: Kangwhal and Cheongung

Hoyoung Choi¹, Jae-Wook Bang², Youngbae Suh*

College of Oriental Medicine, Kyung Hee University, Hoegi-dong 1, Dongdaemoon-gu, Seoul 131-701; School of Bioscience and Biotechnology, Chungnam National University, Gung-dong, Yusong-gu, Daejeon 305-74; Natural Products Research Institute, Seoul National University, Yeongun-dong 28, Jongro-gu, Seoul 110-460
(*ysuh@plaza.snu.ac.kr)

Botanical origins of some medicinal plants such as Kangwhal and Cheongung have been in dispute because different plant species are used in Korea, China and Japan. In addition, taxonomic difficulties are due to the wide range of variation of morphological characters in these plants. In Korea, Korean Herbal Pharmacopoeia defines that roots and rhizomes of *Ostericum koreanum* Maxim. is used as Kangwhal. The roots of *Cnidium officinale* and *Ligusticum chuanxiong* (Umbelliferae) have been used as herbal medicine known as Cheongung in Korea. In the Oriental Medicine, Cheongung is considered to activate blood and circulate qi, alleviate pain, and to be effective on gynecological diseases. To establish standard identification analyses on these crude drugs, we have developed molecular markers by PCR-mediated DNA fingerprinting. RFLP and RAPD as well as sequencing nr ITS and rbcL gene were selected to compare and discriminate Kangwhal and Cheongung in markets. We also performed molecular phylogenetic analyses to elucidate botanical origins of these crude drugs. Cytological analyses using FISH method revealed that two cultivars of Kangwhal were cultivated in Korea. They were different in the numbers of chromosomes. Chemical analyses on essential oils also showed significant difference in these two cultivars. In RFLP analyses of ITS region for Cheongung, Alu I and Sac I provided useful molecular markers to distinguish the species of original plants. The molecular markers developed from PCR-mediated RFLP can be adopted as an identification tool to control the quality of these crude drugs in markets.

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(서울대학교 서영배)

‡ 총연구기간 (년차): 2002년 - 2006년 (4년차)