

Identification of *Salviae Miltiorrhizae Radix* in Taiwan Markets and Botanical Origin

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Abstract

Salviae Radix (丹參) was initially embodied as a tonic herbal drug in the “Shen Nong Pen Tsao Jing” (Shen Nong Ben Cao Jing, Shen-Nong's Herbal Classic, (神農本草經)-the premier ancient medicinal book, which is known as the first pharmacopeia in China. And from then on, the herb was almost listed in every Chinese Herbal Classic of all dynasties with a selfsame as Danshen.

In Chinese traditional medicine, Danshen root is known to have the drug characteristics as bitter, slightly cold (苦，微寒), and with some therapeutic actions and indications on: promoting blood circulation and removing blood stasis (活血化癥), relieving mental strain as well as inducing sedation and tranquillization (安神寧心), anti-abscessed (消癰) Recent pharmacological research has evidenced its functions on: vasodilative, lipid lowering, anti-arteriosclerotic, anti-coagulant, anti-thrombotic, cardioprotective, coronary blood flow accelerating, anti-microbial and antiinflammatory effects.

Since Danshen is a useful and important remedy for cardiovascular diseases and results to have a heavy and frequent clinical consumption. Sequentially, it is commonly found that there are some generic substitutes of Danshen sold in the market. For this reason, it is behooved to study and find out what and how is the adulteration, substitution, quality diverseness of different Danshen commercially sold in our inland market.

In this study, we started with literature reviews on Chinese herbal classical, pharmacobotanical, pharmacognostical and pharmacological documents of Danshen, then collected five sample standards for origin identification of different Danshen roots from China. These medicinal plant samples were identified as: *Salvia miltiorrhiza*, *S. paramiltiorrhiza*, *S. yunnanensis*, *S. bowleyana* and *S. miltiorrhiza* var. *miltiorrhiza* f. *alba* originated from the same genus *Salvia*. We illustrated and demonstrated the morphological, histological characteristics of these roots with microscopic identification and principles of pharmacognostical histology. Results from identification were established to make a working standard for further discrimination on commercial samples.

In order to explore the quality of manifold trade articles, we analyzed the indicator content of tanshinone IIA and salvianolic acid B in the Danshen samples with HPLC method. Results of the content can be regarded as a supplementary reference on plant origin extrapolation.

Furthermore, a ribosomal ITS (Internally transcribed spacer) region analysis of

these five Danshens was proceeded to investigate their variation and phylogenetic relationship among species and varieties.

We subsequently found that the morphological features of some four dried roots in these five specimens are quite similar. Hence, it is difficult to discern these homo-generic species on the basis of physical appearance only. And we found that only two kinds of Danshen, originated from *S. miltiorrhiz* and *S. paramiltiorrhiza* were sold in the domestic marketplace where the study samples we collected from.