

研究论文

RP-HPLC-ICP-MS技术用于西洋参中多元素溶出特性及形态分析

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**摘要** 采用电感耦合等离子体质谱(ICP-MS)和反相高效液相色谱-电感耦合等离子体质谱联用技术(RP-HPLC-ICP-MS)对西洋参(*Panax quinquefolium*. L)及西洋参提取物中多种元素的含量及元素的形态进行了研究. 对西洋参中的多种元素用水、乙醇和氯仿等不同极性的溶剂进行提取, 考察了这些元素在不同溶剂中的溶出特性, 采用ICP-MS法对其进行定量测定; 并采用RP-HPLC-ICP-MS联用技术对西洋参水提取液中多种元素(P, Mg, Al, Ca, Mn, Fe, Zn, Ni, Cu和Sr)的形态进行了分析. 结果表明, 元素提取率随提取溶剂极性的增加而增大, 特别表现在Mg, Ca, P, Mn, Sr, Mo和Pb等元素上; 采用HPLC-ICP-MS技术在以0.1 mol/L的稀硝酸和超纯水为流动相, 流速为0.4

mL/min, 进样量为20  $\mu$ L的条件下, 各元素的无机态和有机态均得到良好分离.

**关键词** [西洋参](#) [元素溶出特性](#) [元素形态分析](#) [反相高效液相色谱-电感耦合等离子体质谱联用技术](#)

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Element Transference Characteristics and Element Speciation Analysis in *Panax quinquefolium*. L by RP-HPLC-ICP-MS

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**Abstract** Inductively coupled plasma mass spectrometry (ICP-MS) and high performance liquid chromatography coupled with ICP-MS (HPLC-ICP-MS) were applied to the study of the chemical speciation of inorganic elements in *Panax quinquefolium*. L. Chloroform, water and ethyl alcohol were employed to extract *Panax quinquefolium*. L, and the extracts were then determined by ICP-MS in order to analyze the transference characteristics of the elements. The RP-HPLC-ICP-MS technique was applied for the analysis of element speciation. The results showed that the polarity of the extraction solvent affects significantly the elemental transference ratio. The transference characteristics of kinds of elements including Mg, Ca, P, Mn, Sr, Mo and Pb were in linearity proportion with the polarity of extraction solvent. The inorganic and organic species of the elements were well separated by HPLC-ICP-MS under the following conditions: C<sub>18</sub> bonded silica gel column, 0.10 mol/L nitric acid and super pure water as the mobile phase, flow rate of 0.4 mL/min and injection volume of 20  $\mu$ L.

**Key words** [Panax quinquefolium. L.](#); [Transference characteristics of element](#); [Element speciation analysis](#); [RP-HPLC-ICP-MS](#)

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