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Methodological Research on ECR+AMS for Tracing the Authenticity of Medicinal Herbs

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The authenticity of traditional Chinese medicinal herbs refers to the superior quality and significant efficacy of herbs from specific regions due to unique geographical and climatic factors. This concept holds an important place in traditional Chinese medicine. Scientific analysis and testing are crucial for ensuring the quality of medicinal herbs and enhancing clinical efficacy.

Conventional mass spectrometers cannot simultaneously measure ratios such as $^{13}\text{C}/^{12}\text{C}$ and $^{14}\text{C}/^{12}\text{C}$, nor can they measure $2\text{H}/\text{H}$, $3\text{H}/\text{H}$, and $^{17}\text{O}/^{16}\text{O}$, $^{18}\text{O}/^{16}\text{O}$ at the same time. Therefore, it is challenging to distinguish the true production areas of medicinal herbs that belong to the C3 plant category.

ECR+AMS (Accelerator Mass Spectrometry with a Electron cyclotron resonance ion source) is an advanced analytical technique with ultra-high sensitivity and detection limits ranging from femtograms to attograms (10^{-15} to 10^{-18} grams). It can be a primary method for detecting the authenticity of medicinal herbs. By using AMS to detect isotopic fingerprints and establish a corresponding spectral database, it can serve as a technical support for the identification, evaluation standards, and quality control system of authentic medicinal herbs, allowing nuclear-derived technology to benefit all of humanity.

Student Submission

No

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