

Electrochemical co-detection of Heavy Metals in *Astragalus Membranaceus* by Anodic Stripping Voltammetry

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Astragalus membranaceus, as an important medicinal herb, is widely used all over the world. But, the presence of toxic heavy metals in herbal chains due to the rapid industrialization possesses a serious threat on human health. For rapid screening the positive samples in medicinal herbs, an environment-friendly strategy is reported for the determination of heavy metals by using the square wave anodic stripping voltammetry method. The method showed good selectivity, linearity, recovery and precision. It is demonstrated that the intensity of the anodic peak at -0.87 V, -0.61V and -0.24V is proportional ($R^2 = 0.9978, 0.9805, 0.9870$) to the concentration of Cd^{2+} in the electrolyte over the range of 0.01-0.10 $\mu\text{g}\cdot\text{mL}^{-1}$, and Pb^{2+} , Cu^{2+} in the range of 0.10-1.00 $\mu\text{g}\cdot\text{mL}^{-1}$. The proposed method has been successfully applied to the determination of the three heavy metal ions in *Astragalus membranaceus* samples with satisfactory recoveries of 88.00-110.00 %. Meanwhile, the detection limits achieved 0.0010, 0.0007 and 0.0028 $\mu\text{g}\cdot\text{mL}^{-1}$ for Cd^{2+} , Pb^{2+} and Cu^{2+} , respectively, which are much lower than the guideline values in herbs given by the Chinese pharmacopoeia. Real sample analysis of Cd^{2+} , Pb^{2+} and Cu^{2+} in *Astragalus membranaceus* by the electrochemical method of anodic stripping voltammetry has demonstrated that the proposed method can be applied in rapid screening the positive samples of *Astragalus membranaceus*.

Keywords: Rapid screening, Heavy metal, *Astragalus membranaceus*, Micromorphologies, Electroanalysis

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