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研究论文

白藜芦醇的电化学行为及其与DNA的相互作用

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摘要

采用电化学方法研究了白藜芦醇在pH=2~13的缓冲溶液中的电化学行为、抗氧化能力及其与DNA的相互作用. 研究结果表明， 在2.0<pH<7.1的介质中, 白藜芦醇产生的P_1波是其中性分子的2e, $2H^+$不可逆还原波; 在7.3<pH<10.9的溶液中, 白藜芦醇产生的P_3波与P_1波具有相同的还原机理, 在较正的电位下白藜芦醇产生的P_2波是其一价阴离子的可逆2e, $2H^+$还原波; 在pH>11的溶液中, 白藜芦醇产生的P_4和P_5波分别是其二价和三价阴离子的还原波. 在最佳实验条件下, 微分脉冲极谱图上I_{P3}在8.0×10^{-8}~2.0×10^{-6} mol/L范围内与白藜芦醇的浓度呈线性关系, 检出限为4×10^{-8} mol/L. 将该法用于中药虎杖中白藜芦醇含量的测定, 结果与高效液相色谱法一致.

关键词 电化学行为 白藜芦醇 还原波 虎杖 DNA

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Electrochemical Behavior of Resveratrol and Its Interaction with DNA

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Abstract

Electrochemical techniques were employed to study the electrochemical behavior in a wider pH range, the antioxidative ability and the interaction with DNA of resveratrol. The experimental results show that wave P_1 detected in 2.0<pH<7.1 solutions was an irreversible reduction wave of resveratrol involving 2e and $2H^+$; and wave P_3 detected in 7.3<pH<10.9 solutions was caused by the same reason with P_1, wave P_2 located at less negative potential was produced by the reversible reduction of ionized resveratrol involving 2e and $2H^+$; as expected, the reduction waves P_4 and P_5 of bivalent and trivalent anion of further ionized resveratrol also present in the solution with pH>11. Under the optimum conditions, a linear relationship could be established between the peak current of wave P_3 and the concentration of resveratrol in the range from 8.0×10^{-8} to 2.0×10^{-6} mol/L, and the detection limit was 4×10^{-8} mol/L. The determination result of content of resveratrol in Chinese traditional herbal medicine *Polygonum cuspidatum* by the proposed differential pulse polarography method was consistent with the result by the comparison HPLC method. The antioxidative a
bility of resveratrol and the interaction mode of resveratrol with DNA were prov
ed by electrochemical method.

Key words Electrochemical behavior; Resveratrol; Reduction wave; Polygonum cuspidatum; DNA

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