

微波萃取-气相色谱法测定血液中的可卡因及其代谢物爱冈宁甲基酯

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Simultaneous determination of cocaine and its metabolite ecg human blood using microwave extraction-gas chromatograph

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摘要

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摘要 建立了血液中可卡因(cocaine, COC)及其代谢物爱冈宁甲基酯(ecgonine methyl ester, EME)的气相色谱-质谱(CG-MS)和氢火焰离子化检测(GC-FID)方法。该方法采用微波萃取提取血液中的COC和EME,优化并确定了最佳提取条件:以氯仿-异丙醇(体积比1:1)为提取溶剂,用0.05 mol/L Na₂CO₃-NaHCO₃缓冲溶液调节样品溶液的pH至10.0,在40 °C下微波萃取6 min;采用GC-MS对COC和EME进行定性,采用GC-FID进行定量检测。COC和EME的平均回收率分别为79.91%~99.85%,相对标准偏差(RSD)均小于3%。检出限(S/N=3)分别为60 mg/L和40 mg/L。该方法无需衍生化,快速、准确、灵敏,可同时检测血液中的COC和EME。

关键词: 微波萃取 气相色谱-质谱 气相色谱-火焰离子化检测 可卡因 爱冈宁甲基酯 血液

Abstract: A method was developed for the simultaneous determination of cocaine (COC) and its metabolite ecgonine methyl ester (EME) in human blood using gas chromatography-mass spectrometry (GC-MS) and gas chromatography-flame ionization detection (GC-FID). The blood sample was prepared by microwave extraction (MWE). The optimal parameters of MWE were as follows: 6 mL of chloroform-isopropanol (9:1, v/v) mixture as extraction solvent, pH value of the sample was adjusted at 10.0 with 0.05 mol/L Na₂CO₃-NaHCO₃ buffer, the extraction was performed at 40 °C for 6 min. The COC and EME in the extract were qualified using GC-MS and quantitated using GC-FID. The recoveries of COC and EME were from 79.91% to 99.85%, the relative standard deviations were less than 3%. The limits of detection (LOD) were 60 and 40 mg/L, respectively. In the method COC and EME were detected without derivatization. The method is rapid, accurate and sensitive, and can be used for the simultaneous determination of COC and EME in blood samples.

Keywords: microwave extraction gas chromatography-mass spectrometry (GC-MS) gas chromatography-flame ionization detection (GC-FID) cocaine ecgonine methyl ester human blood

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