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高效液相色谱-串联质谱法同时测定食品中五种黄色化工染料

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Simultaneous determination of five yellow dyes in foods by high performance liquid chromatography coupled with tandem mass spectrometry

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摘要 采用高效液相色谱-串联质谱法(HPLC-MS/MS)建立了食品中非法添加的碱性橙、碱性嫩黄、酸性橙I、酸性橙II和酸性黄36这5种黄色工业染料的定量定性分析方法。使用Agilent ODS C18分离柱(50 mm×2.0 mm, 1.8 μm),以5 mmol/L乙酸铵水溶液(0.1%甲酸)-乙腈(3:2, v/v)为流动相,流速为0.3 mL/min。采用电喷雾离子化源,以多反应监测(MRM)方式分别在正、负离子模式下进行检测。在最佳检测条件下,得到了较宽的线性范围和较低的定量检出限。碱性橙和碱性嫩黄的线性范围均为5.0～80.0 mg/L;酸性橙I、酸性橙II及酸性黄36的线性范围均为10.0～160.0 μg/L。食品中碱性橙、碱性嫩黄、酸性橙I、酸性橙II及酸性黄36的定量限分别为20、20、40、40、40 ng/g。该方法重现性较好,保留时间和峰面积的相对标准偏差分别不大于0.50%和2.14%。本研究还测定了鸡肉、豆制品和黄鱼中添加的5种化工染料,回收率在79.8%～95.2%之间,结果令人满意。

关键词： 高效液相色谱-串联质谱法 黄色工业染料 鸡肉 豆制品 黄鱼 食品

Abstract： A method based on high performance liquid chromatography coupled with tandem mass spectrometry (HPLC-MS/MS) was developed for simultaneous determination of five yellow industrial dyes. The separations were performed with an Agilent ODS C18 column at a flow rate of 0.3 mL/min. The mobile phase was 5 mmol/L ammonium acetate (containing 0.1% formic acid)-acetonitrile (3:2, v/v). Under the optimized detection conditions, the linear ranges for Chrysoidine G and Basic Yellow 2 were 5.0~80.0 mg/L, and for Acid Orange I, Acid orangeII and Acid Yellow 36 were 10.0~160.0 μg/L. The limits of quantification for Chrysoidine G, Basic Yellow 2, Acid Orange I, Acid OrangeII and Acid Yellow 36 were 20, 20, 40, 40 and 40 ng/g, respectively. The relative standard deviations of reproducibility of this method for retention time and peak area were no more than 0.50% and 2.14%, respectively. The method was applied to determine the recoveries of the above five dyes in chicken, bean products and yellow croaker were between 79.8% ~95.2% with satisfactory results.

Keywords:

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high performance liquid chromatography coupled with mass spectrometry (HPLC-MS/MS)| yellow industrial dyes| chicken| bean products| yellow croaker| foods

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