



凝胶渗透色谱-多角度激光散射联用技术研究 红芪多糖中4个组分分子特征

投稿时间: 2011-11-09 责任编辑: [点此下载全文](#)

引用本文: 陈同强,ADILBEKOV J,王娟,沈孝丽,石义凯,胡芳弟,封士兰.凝胶渗透色谱-多角度激光散射联用技术研究 红芪多糖中4个组分分子特征[J].中国中药杂志,2012,37(12):1798.

DOI: 10.4268/cjmm20121222

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基金项目: 甘肃省中小企业创新基金计划项目(0911WCCA005)

中文摘要:目的: 测定红芪多糖(HPS-3)中4个组分的绝对分子量、相对分子量分布、均方根旋转半径(R_g)、多分散系数(Mw/Mn)等分子特征参数,以均方根旋转半径(R_g)对重均分子量(Mw)作图,计算4个组分在溶液状态的构象。方法: 采用凝胶渗透色谱-多角度激光散射(GPC-MALLS)联用技术,流动相为含0.02% NaNO₃的0.1 mol·L⁻¹ NaNO₃溶液,Ultrahydrogel™1000, 500色谱柱串联。结果: HPS-3的4个组分中,HPS-3-C的Mw最大(1.986×10⁵ g·mol⁻¹),其次为HPS-3-B(1.113×10⁵ g·mol⁻¹)和HPS-3-D(8.457×10⁴ g·mol⁻¹),HPS-3-A的Mw最小(1.223×10⁴ g·mol⁻¹),而R_g最大(55.5nm)。HPS-3-D相对分子质量分布范围最广,Mw/Mn 2.543。在流动相中,HPS-3-A为球型构象,HPS-3-C为无规线团构象,HPS-3-B和HPS-3-D则均为高枝化度结构。结论: 为进一步研究HPS-3中4个组分分子特征与其生物活性的关系提供必要依据。

中文关键词: 红芪多糖 凝胶渗透色谱 多角度激光散射 分子特征

Study on molecular characteristics of four components contained in Hedysari Radix polysaccharide by gel permeation chromatography -multi angle laser light scattering technology(GPC-MALLS)

Abstract: Objective: To determine such molecular characteristic parameters as absolute molecular weight, molecular weight distribution, root-mean-square turning radius(R_g) and polydispersity index(Mw/Mn) of four components contained in Hedysari Radix polysaccharide 3 (HPS-3) and map weight-average molecular weight(Mw) with root-mean-square turning radius(R_g), in order to calculate conformations of the four components at solution state. Method: The gel permeation chromatography-multi angle laser light scattering(GPC-MALLS) was adopted, with 0.1 mol·L⁻¹ NaNO₃ contained 0.02% NaNO₃ as the mobile phase, Ultrahydrogel™1000 connected in series with Ultrahydrogel™500. Result: Among the four components of HPS-3, HPS-3-C showed the highest weight average molecular weight of 1.986×10⁵ g·mol⁻¹, followed by HPS-3-B 1.113×10⁵ g·mol⁻¹ and HPS-3-D 8.457×10⁴ g·mol⁻¹, HPS-3-A showed the lowest weight average molecular weight of 1.223×10⁴ g·mol⁻¹ but the highest square radius of gyration, that is 55.5 nm. HPS-3-D had the widest range of molecular weight distribution in four components, with the polydispersity index(Mw/Mn) of 2.543. In the mobile phase, HPS-3-A was globular structure, HPS-3-C was random coil, HPS-3-B and HPS-3-D were both highly branched structure. Conclusion: The results provided necessary basis for further studies on molecular characteristics of the four components contained in HPS-3 and their relationship with bioactivity.

keywords: Hedysari Radix polysaccharide gel permeation chromatography multi angle laser light scattering molecular characteristics

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