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论文

系列*l*-卡拉胶寡糖制备及其电喷雾串联质谱序列分析

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摘要:

以*l*-卡拉胶为原料, 在稀酸条件下进行酸水解得到其寡糖混合物, 采用低压凝胶渗透色谱(LPGPC)进行分离纯化, 获得了10个寡糖单体. 在利用聚丙烯酰胺凝胶电泳(PAGE)和高效薄层层析(HPTLC)对其纯度进行分析的基础上, 通过红外光谱(IR)、核磁共振波谱(NMR)和电喷雾离子化质谱(ESI-MS)对其结构进行表征, 并用电喷雾碰撞诱导串联质谱(ESI-CID-MS/MS)对其序列进行分析. 结果表明, 它们分别是还原端为2-硫酸-3,6-内醚半乳糖(A2S)和非还原端为4-硫酸-半乳糖(G4S)的*l*-卡拉胶二至二十糖. 这些酸法水解制备的寡糖结构新颖, 不同于*l*-卡拉胶酶法制备的新*l*-卡拉胶寡糖. 这不仅丰富了海洋寡糖库数据, 也为进一步运用糖生物芯片技术探索其与蛋白之间的相互作用提供了物质基础.

关键词: *l*-卡拉胶寡糖; 分离纯化; 电喷雾串联质谱; 序列分析

Preparation of Series *l*-Carrageenan Oligosaccharides and Sequence Determination by Negative-ion Electrospray Tandem Mass Spectrometry

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Abstract:

Ten oligosaccharides were separated from *l*-carrageenan mild acid hydrolysate with low pressure gel permeation chromatography(LPGPC). Based on the purity analysis of polyacrylamide gel electrophoresis(PAGE) and high performance thin layer chromatography(HPTLC), the structures of those oligosaccharides were determined by infrared spectrum(IR), nuclear magnetic resonance spectroscopy(NMR) and electrospray mass spectrometry(ESI-MS). Their sequences were confirmed as *l*-carrageenan disaccharide to eicosasaccharide with 4-linked-2-*O*-sulfated- α -D-3,6-anhydrogalactose(A2S) at the reducing and 3-linked-4-*O*-sulfated- β -D-galactopyranose(G4S) at the non-reducing terminus by electrospray collision-induced dissociation mass spectrometry(ESI-CID-MS/MS). The results show that the structural feature of these *l*-carr-oligosaccharides from mild acid hydrolysis is completely different from those neo-*l*-carra-oligosaccharides prepared by *l*-carra-geenase digestion. All these *l*-carrageenan derived oligosaccharides enrich marine carbohydrate library. More importantly, they provide the foundation for the preparation of the oligosaccharide-chip and the investigation on the interaction between oligosaccharide and protein.

Keywords: *l*-Carrageenan oligosaccharide; Separation and purification; ESI-CID-MS/MS; Sequence analysis

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