高等学校化学学报 2007 28 (1): 183-187 ISSN: 0251-0790 CN: 22-1131/O6

研究论文

N-(2-磺酸基苯甲基)壳聚糖的合成、表征及其水凝胶的pH敏感性

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收稿日期 2006-5-10 修回日期 网络版发布日期 2007-1-9 接受日期

摘要 通过两步反应合成了水溶性的*N*-(2-磺酸基苯甲基)壳聚糖(SBCS), 用IR, ^{1}H NMR和UV-Vis谱对产物的结构进行了表征. 用胶体滴定法测定了N上2-磺酸基苯甲基的取代度. 以戊二醛为交联剂制备了*N*-(2-磺酸基苯甲基)壳聚糖水凝胶(SBCSG), 考察了凝胶在不同pH值缓冲溶液中的溶胀行为. 实验结果表明, SBCSG溶胀度随着凝胶交联度的增大而减小. 在碱性介质中SBCSG的溶胀度显著增大, 而在酸性介质中溶胀度显著减小, 在pH= 5.0缓冲液中的溶胀度达到最小值. SBCSG在碱性介质中的溶胀度随着侧链N上2-磺酸基苯甲基取代度增大而增大. 在pH=7.4的人工肠液和pH=1.0的人工胃液中SBCSG的溶胀-收缩具有可逆性, 显示出良好的pH敏感性. 有望作为pH敏感口服结肠定位给药系统药物载体.

关键词 壳聚糖 改性 pH敏感性 水凝胶 溶胀度

分类号 O631

DOI:

Synthesis and Characterization of *N*-(2-Sulfobenzyl)chitosan and pH Sensitivity of Its Hydrogel

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Received 2006-5-10 Revised Online 2007-1-9 Accepted

Abstract By two steps of reaction, a novel water-soluble chitosan derivative[*N*-(2-sulfobenzyl) chitosan, SBCS] was synthesized. The chemical structure of SBCS was characterized by FTIR, ^{1}H NMR, UV-Vis spectra. Degree of substitution(DS) of *N*-2-sulfobenzyl was determined by colloid titration. In the buffer solutions with different pH values the swelling characteristics of hydrogels based on SBCS(SBCSG) prepared by cross-linking with glutaraldehyde were studied. The results show that the swelling ratio(SR) of SBCSG was decreased with increasing the dosage of glutaraldehyde. The SBCSG swelled more significantly in alkaline solution than in acidic medium and showed the lowest SR at pH=5.0. In alkaline solution, the SR of SBCSG was increased with raising the DS of *N*-2-sulfobenzyl of SBCS, but no significant change in acidic environment. The SBCSG showed swelling reversibility when soaked in pH=1.0 and pH=7.4 buffer solutions alternately. The results imply that SBCS could be potential pH sensitive carrier for colon-specific drug delivery system.

Key words Chitosan; Modification; pH-sensitivity; Hydrogel; Swelling ratio

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