Mussel-inspired fabrication of konjac glucomannan/microcrystalline cellulose intelligent hydrogel with pH-responsive sustained release behavior

Lin Wang, Yu Du, Yi Yuan, Ruo-Jun Mu, Jingni Gong, Yongsheng Ni, Jie Pang, Chunhua Wu

PII: S0141-8130(17)34414-8
DOI: doi:10.1016/j.ijbiomac.2018.02.083
Reference: BIOMAC 9138

To appear in:

Received date: 9 November 2017
Revised date: 3 February 2018
Accepted date: 12 February 2018

Please cite this article as: Lin Wang, Yu Du, Yi Yuan, Ruo-Jun Mu, Jingni Gong, Yongsheng Ni, Jie Pang, Chunhua Wu , Mussel-inspired fabrication of konjac glucomannan/microcrystalline cellulose intelligent hydrogel with pH-responsive sustained release behavior. The address for the corresponding author was captured as affiliation for all authors. Please check if appropriate. Biomac(2017), doi:10.1016/j.ijbiomac.2018.02.083

Mussel-inspired fabrication of konjac glucomannan/microcrystalline cellulose intelligent hydrogel with pH-responsive sustained release behavior[1]

Lin Wang[a], Yu Du[a], Yi Yuan[a], Ruo-Jun Mu[a], Jingni Gong[a], Yongsheng Ni[a], Jie Pang[a]*, Chunhua Wu[a]*

[a] *College of food science, Fujian Agriculture and Forestry University, Fuzhou, China, 350002*

Abstract

Intelligent hydrogels are attractive biomaterials for various applications, however, fabricating a hydrogel with both adequate self-healing ability and mechanical properties remains a challenge. Herein, a series of novel intelligent konjac glucomannan (KGM)/microcrystalline cellulose (MCC) hydrogels were prepared vis the mussel-inspired chemistry. MCC was firstly functionalized by the oxidative polymerization of dopamine, and the intelligent hydrogels were obtained by mixing aqueous solutions of KGM and functionalized MCC (PDMCC). By introducing PDMCC, a more compact interconnected porous structure formed for the resulting hydrogels. The self-healing ability and mechanical properties of intelligent hydrogels were dependence on the PDMCC content. Compared with KGM hydrogels, KGM/PDMCC hydrogels exhibited a more distinct pH sensitivity and a lower initial burst release, which was attributed to the compact structure and strong intermolecular hydrogen bond interaction between PDMCC and KGM. These results suggest that the KGM/PDMCC intelligent hydrogels may be promising carriers for controlled drug delivery.

Keywords: Konjac glucomannan; Microcrystalline cellulose; Poly(dopamine); Intelligent hydrogels; pH-responsive sustained release behavior

*Corresponding author.

E-mail address : pang3721941@163.com (J. Pang); chwu0283@163.com (C. H. Wu).